



Republic of the Philippines

Department of Education

DepEd Complex, Meralco Avenue, Pasig City

STRENGTHENED SENIOR HIGH SCHOOL CURRICULUM

CONSTRUCTION OPERATION

Grade 11/12

Course Description:

This course equips learners with essential skills for Construction Operations, focusing on residential and industrial setups. It covers site preparations, structural works, architectural works, plumbing works and basic of construction management in compliance with the National Building Code of the Philippines. Upon completion, learners are eligible to take assessments to earn National Certificate level I in Plumbing, level II in Masonry and/or Tile Setting, higher education, and careers related in the construction industry sector.

Elective: Technical Professional

Prerequisite: None

Time Allotment: In Grade 11, 320 hours for two semesters, 8 hours per week. In Grade 12, 320 hours for one semester, 16 hours per week

Schedule: First/Second Semester

QUARTER 1

CONTENT STANDARD	The learners demonstrate an understanding of concepts and principles in masonry.
PERFORMANCE STANDARD	The learners perform masonry works based on industry and safety standards.
LEARNING COMPETENCIES	CONTENT
1. Discuss overview in masonry	Introduction <ul style="list-style-type: none"> • Concepts in masonry <ul style="list-style-type: none"> ○ Definition ○ Scope of masonry • Career opportunities in masonry (not limited to following) <ul style="list-style-type: none"> ○ Cement mason finisher ○ Block/brick mason ○ Masonry contractor • Current trends in masonry <ul style="list-style-type: none"> ○ Sustainability and greenhouse gases ○ Construction automation and robotics ○ Digital tools and Building Information Modeling (BIM) ○ Adaptive re-use and historic preservation
2. Discuss masonry materials, tools and equipment	

	<p>Masonry Materials</p> <ul style="list-style-type: none"> • Concrete blocks, cements and aggregates <ul style="list-style-type: none"> ○ Types ○ Specifications • Mixture of concrete/mortar <ul style="list-style-type: none"> ○ Ratio and proportion ○ Application • Reinforcement bars <ul style="list-style-type: none"> ○ Types ○ Specifications • Anchors, ties, and reinforcements <ul style="list-style-type: none"> ○ Types ○ Specifications • Scaffoldings and platforms <ul style="list-style-type: none"> ○ Types • Formworks <ul style="list-style-type: none"> ○ Types <p>Masonry Tools and Equipment</p> <ul style="list-style-type: none"> • Hauling • Excavation • Formwork • Re-bars • Mixing cement/mortar • Block laying • Plastering
3. Perform procedure in site preparations	<p>Site preparation</p> <ul style="list-style-type: none"> • Site clearing • Methods <p>Site surveying</p> <ul style="list-style-type: none"> • Soil testing • Site plan design • Site investigation
4. Perform procedure in excavation for foundation works	Foundation layout

	<ul style="list-style-type: none"> • Foundation plan • Types of foundation • Methods of excavation
5. Perform procedures in formworks preparation	<p>Formworks</p> <ul style="list-style-type: none"> • Types • Components <p>Formworks fabrication procedures</p>
6. Perform procedures in re-bars preparation	<p>Re-bars</p> <ul style="list-style-type: none"> • Forms • Application <p>Re-bars preparation procedures</p> <ul style="list-style-type: none"> • Fabrication • Installation
7. Perform procedures in scaffoldings preparation	<p>Scaffolding</p> <ul style="list-style-type: none"> • Types • Components <p>Basic scaffolding procedures</p> <ul style="list-style-type: none"> • Fabrication • Assembly

QUARTER 2

CONTENT STANDARD	The learners demonstrate an understanding of concepts and principles in performing masonry works.
PERFORMANCE STANDARD	The learners perform masonry works based on industry and safety standards.
LEARNING COMPETENCIES	CONTENT
1. Perform procedures in preparing concrete for pouring	<p>Concrete pouring</p> <ul style="list-style-type: none"> • Slump test requirement • Types of common concrete structure <ul style="list-style-type: none"> ○ Wall footing ○ Stiffener column ○ Lintel beams

	<ul style="list-style-type: none"> ○ Floor and slab ○ Cantilever ○ Sill, concrete canopy, and header ● Consolidation methods <ul style="list-style-type: none"> ○ Curing
<p>2. Perform procedures in backfilling and compaction</p>	<p>Backfilling, and compaction</p> <ul style="list-style-type: none"> ● Types of common backfilling materials <ul style="list-style-type: none"> ○ Sand ○ Gravel ○ Boulders ○ Soil ○ Debris ● Excavation methods ● Backfilling methods ● Compaction methods <p style="text-align: center;">Compaction equipment</p>
<p>3. Perform procedures in laying block/ bricks</p>	<p>Concrete blocks and bricks</p> <ul style="list-style-type: none"> ● Types of blocks and bricks ● Composition of blocks and bricks ● Specifications of blocks and bricks <p>Blueprint reading and interpretation</p> <ul style="list-style-type: none"> ● Reference building line <ul style="list-style-type: none"> ○ Horizontal and vertical guide ● Safety practices in brick/block laying ● Laying blocks/bricks <p>Tile Setting Materials</p> <ul style="list-style-type: none"> ● Common types of tiles ● Specifications ● Common tile adhesive ● Common tile grout
<p>4. Perform procedures in plastering concrete surfaces</p>	<p>NOTE: Layout and installation for plumbing works should be considered before plastering activities.</p> <p>Cement plaster</p> <ul style="list-style-type: none"> ● Surface preparation

	<ul style="list-style-type: none"> ○ Walls, ceiling, column and beam ○ Interpret plans for plastering • Mixing ratio and proportion of plaster • Plastering procedure and techniques
5. Perform pre-cast balusters and handrails installation	<p>Pre-cast balusters and handrails</p> <ul style="list-style-type: none"> • Types of balusters and handrails • Plans and drawings <ul style="list-style-type: none"> ○ Lay-out • Safety practices in balusters and handrails installation <p>Baluster and handrails installation Steel works installation</p>

QUARTER 3

CONTENT STANDARD	The learners demonstrate an understanding of concepts and principles in performing plumbing works.
PERFORMANCE STANDARD	The learners perform plumbing works based on industry and safety standards.
LEARNING COMPETENCIES	CONTENT
1. Prepare common plumbing materials, tools and equipment for installation	<p>Plumbing Materials</p> <ul style="list-style-type: none"> • Pipes • Fittings • Adhesives and Sealant <p>Tools and Equipment</p> <ul style="list-style-type: none"> • Measuring and testing tools • Cutting tools • Threading and reaming • Roughing-in
2. Perform plumbing installation based on lay-out plan.	<p>Plumbing lay-out</p> <ul style="list-style-type: none"> • Blueprint reading and interpretation <ul style="list-style-type: none"> ○ Plumbing signs and symbols ○ Plumbing system <ul style="list-style-type: none"> ➤ Drainage ➤ Sanitary Line ➤ Water line

	<ul style="list-style-type: none"> ➤ Vent <ul style="list-style-type: none"> ○ Isometric, Schematic and riser diagram ○ Schedule of pipes and fittings • Roughing in <ul style="list-style-type: none"> ○ Methods • Stub out <ul style="list-style-type: none"> ○ Methods
<p>3. Perform piping joints and connections based on job specifications</p>	<p>Plumbing joints and fittings</p> <ul style="list-style-type: none"> • Common types of pipe joints • Common types of fittings • Cutting, reaming and threading operations <p>Installation process</p> <ul style="list-style-type: none"> • Fit-up of pipe joints • Solvent and sealant <p>Caulking</p> <ul style="list-style-type: none"> • Types of caulking materials • Application of caulking <p>Common single plumbing unit</p> <ul style="list-style-type: none"> • Service entrance • Toilet and bath fixtures • Kitchen fixtures • Laundry fixtures

QUARTER 4

CONTENT STANDARD	The learners demonstrate an understanding of concepts and principles in basic construction management.
PERFORMANCE STANDARD	The learners perform project cost and estimates for basic construction services.
LEARNING COMPETENCIES	CONTENT
1. Discuss the basic concept of construction management	Construction scope management <ul style="list-style-type: none"> • Scope of work • Schedule of work Cost and estimates <ul style="list-style-type: none"> • Materials • Labor • Equipment • Logistics *
2. Perform basic project cost and estimates for construction services	Forms/ papers <ul style="list-style-type: none"> • Budget of works • Bill of materials • Bill of labor cost
3. Simulate basic cost and estimates for basic construction projects	Basic construction projects <ul style="list-style-type: none"> • Basic structural works • Basic block laying and plastering • Plumbing works for bathroom and kitchen

GLOSSARY

3R - The principle of reducing waste, reusing and recycling resources and products

5S - The five in a 5S workplace organizational and housekeeping methodology refers to five steps – sort, set in order, shine, standardize and sustain.

CERAMIC TILES - Glazed or unglazed tiles made from clay; commonly used for walls and floors.

CURING - Is defined as providing adequate moisture, temperature, and time to allow the concrete to achieve the desired properties for its intended use.

DOWEL - A headless, cylindrical pin which, is sunk into corresponding holes

EPOXY ADHESIVE - Durable, waterproof adhesive ideal for wet or high-traffic areas.

EPOXY GROUT - Stain- and water-resistant grout for long-lasting applications.

FORMWORKS - A set of wood or steel forms in place to hold wet concrete until it hardens

GROUT - A cement-like material used to fill gaps between tiles after installation. Types include: installation i.e., the plumbing system.

JOINT FILLER - Material to fill larger gaps or expansion joints between tiles

LINTEL - Refers to the horizontal member over an opening such as door or window, usually carrying the load

LOGISTICS- This pertains to systematic way of preparation of materials and equipment that is to be transported and hauled.

MORTAR - Refers to a mixture of cement, sand and water used for laying bricks or masonry units

MOSAIC TILES - Small tiles (glass, stone, or ceramic) mounted on sheets for decorative designs.

PIPE - Refers to a cylindrical conduit or conductor conforming to the particular dimensions commonly known as “pipe size” and is denoted by its interior diameter or I.D.

PLUMBING - It is the art and technique of installing pipes, fixtures and other apparatuses in buildings for bringing in the supply, liquids, substances and/or ingredients and removing them; and such water, liquid and other carried-wastes hazardous to health, sanitation, life, property; also the pipes and fixtures after

PLUMBING APPLIANCE - Refers to any one of a special class of device or equipment intended to perform a special plumbing function. Its operation and/or control may be dependent upon one or more energized components, such as motors, controls, heating elements and pressure-temperature-sensing elements. Such device or equipment may operate automatically through one or more of the following actions; a time cycle, a temperature range, a pressure range, a measured volume or weight; or the device or equipment may be manually adjusted or controlled by the user or operator.

PLUMBING FIXTURES - Are approved-type installed receptacles, devices or appliances supplied with water or receive liquid or liquid-borne wastes and discharge such wastes into the drainage system to which they may be directly or indirectly connected. Industrial or commercial tanks, vats and similar processing equipment are not plumbing system fixtures, but may be connected to or discharged into approved traps or plumbing fixtures as provided for in this Code.

Plumbing system - Refers to all potable water supply and distribution pipes, all plumbing fixtures and traps, all sanitary and storm drainage systems; vent pipes, roof drains, leaders and downspouts; and all building drains and sewers, including their respective joints and connections; devices, receptacles, and appurtenances

PLUMBING UNIT - Refers to a minimum standard quantity of plumbing fixtures that discharge wastes into a plumbing installation including; one (1) water meter, one (1) water closet, one (1) lavatory, one (1) shower head and drain for a bathtub or shower stall, one (1) kitchen sink, one (1) laundry tray and three (3) floor drains and four (4) faucets/hose bibb.

PORCELAIN TILES - Dense, durable tiles with low water absorption; suitable for high-traffic and outdoor areas.

POTABLE WATER - Is a water satisfactory for drinking, culinary and domestic purposes and meets the requirements of the Philippine National Standards for Drinking Water.

PRESSURE - Is a normal force exerted by a homogenous liquid or gas, per unit of area on the wall of the container.

PRIMER - A bonding agent applied to surfaces to ensure adhesive sticks effectively.

REBAR - Refers to the reinforcing bars that are embedded in building components such as concrete, masonry walls, columns, beams and other structural parts

RECYCLING - The waste management concept of transforming again into a raw material that can be shaped into a new item

REDUCE - The waste management concept of reducing what is produced and what is consumed

REUSE - The waste management concept of reusing items, or re-purposing them for a use different than what they are intended for

SANDED GROUT - For joints wider than 3 mm; contains fine sand for strength.

SCAFFOLD - Refers to a temporary or movable platform supported on the ground or suspended, used for working at considerable heights above the ground.

SEALANT - A silicone- or acrylic-based material used to seal edges and corners, especially in wet areas.

SELF-LEVELING COMPOUND - A liquid mixture that creates a smooth, level surface for tile installation.

THINSET MORTAR - Cement-based adhesive mixed with water or a polymer additive for better bonding.

TILE ADHESIVE - A ready-mix or powdered compound used to fix tiles to a surface.

TILE MORTAR - A general term for a mix of cement, sand, and water used as a base to lay tiles.

TILE SPACERS - Small plastic pieces used to ensure even spacing between tiles.

TILE TRIM/EDGING - Metal or PVC strips used to finish exposed tile edges or corners.

TROWEL - A flat tool with notched edges for spreading adhesive evenly on surfaces.

UNSANDED GROUT - For narrow joints under 3 mm; smooth and ideal for delicate tiles.

WATERPROOFING MEMBRANE - A layer applied to prevent water seepage in wet areas (e.g., bathrooms and pools). within the property; water lines in the premises; potable, tap, hot and chilled water pipings; potable water treating or using equipment; fuel gas piping; water heaters and vents for same.

TOOLS, EQUIPMENT, AND MATERIALS

TOOLS		EQUIPMENT		MATERIALS	
Quantity	Description	Quantity	Description	Quantity	Description
10 pcs	Bucket	1 unit	One bagger mixer	600 pcs	Concrete hollow blocks
1 pc	Mixing board	PPE	PPE	4000 pcs	Bricks
12 pcs	Shovel	1 set	Automatic level (optional)	20 bags	Cement
25 pcs	Steel trowel	1 unit	Welding machine	6 cu. meter	Sand
25 pcs	Wooden float	2pcs	Portable grinder	50 pcs	Reinforcement bar (10 mm dia)
25 pcs	Steel tape	2pcs	Electric drill	40 kls	G.I.wire
6 pcs	Mason hammer			10 kls	Common nails (#2,#3,#4)
6pcs	Plumb bob			100 pcs	Lumber (2" x2"x 10")
1 set	scaffolding			5kls	Concrete nails

					(#2)
6 pcs	Marking gauge			10 bags	lime
6pcs	Hand saw			25pcs	pencil
2pcs	Bar bender			5kls	Nylon string
2pcs	Bar cutter			6 cu meter	gravel
6pcs	Steel square			9 pcs	Plywood ½' x 4' x8'
10 pcs	Cold chisel			12 pcs	Hand rails 3" x 4" x8"
12 pcs	hacksaw			50 pcs	Precast baluster5" x5"
6 pcs	Level hose				
6 pcs	Spirit level				
25 pcs	Claw hammer				
20 pcs	Chalk line				
4pcs	Measuring box				
25pcs	Steel float				

REFERENCE

Technical Education and Skills Development Authority (TESDA). Masonry NC I & II. Compiled by the Skills Standards and Certification Office. Series 2011. Taguig City: Philippines. TESDA, 2011.

Technical Education and Skills Development Authority (TESDA). Plumbing NCI & II. Compiled by the Skills Standards and Certification Office. Series 2011. Taguig City: Philippines. TESDA, 2011.

Technical Education and Skills Development Authority (TESDA). Tile Setting NCII. Compiled by the Skills Standards and Certification Office. Series 2011. Taguig City, Philippines: TESDA, 2011.