

ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship
Curriculum Standard

Terrazzo, Tile and Marble Setter

Level 2

241A

2009

Please Note:

Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the *Trades Qualification and Apprenticeship Act* (TQAA) or the *Apprenticeship and Certification Act, 1998* (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the *Ontario College of Trades and Apprenticeship Act, 2009* (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College's website (www.collegeoftrades.ca) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: www.collegeoftrades.ca/about/legislation-and-regulations.

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INTRODUCTION

This new curriculum standard for the Terrazzo, Tile and Marble Setter trade or modular program is based upon the on-the-job performance objectives, located in the industry-approved training standard.

The curriculum is organized into 2 levels of training or 6 reportable subjects per Level. The Program Summary of Reportable Subjects chart summarizes the training hours for each reportable subject.

The curriculum identifies only the learning that takes place off-the-job. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship or Modular Training Standards. Employers/Sponsors are expected to extend the apprentices or trainee's knowledge and skills through practical training on the work site. Regular evaluations of the apprentice's or trainee's knowledge and skills are conducted throughout training to ensure that all apprentices or trainees have achieved the learning outcomes identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Terrazzo, Tile and Marble Setter

Level II

PROGRAM SUMMARY OF REPORTABLE SUBJECTS

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practice
S1139	Trade Practices and Procedures II	60	30	30
S1140	Blueprint Reading and Construction Geometry II	45	25	20
S1141	Construction Techniques & Procedures II	60	10	50
S1142	Terrazzo Installation II	60	15	45
S1143	Tile Installation II	60	17	43
S1144	Natural Stone Installation II	75	15	60
	Total	360	112	248

S1139. TRADE PRACTICES AND PROCEDURES II

Duration: Total Hours: 60
Theory: 30
Practical: 30

Prerequisites: None

Content:

S1139.1 Material Specifications
S1139.2 Restoring Existing Surfaces
S1139.3 Finalize Projects
S1139.4 Job Site Conditions

Evaluation & Testing: - Assignments related to theory and appropriate application skills
- Minimum of one mid-term test during the term
- Final exam at end of term
- Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects	Notebook & Organizational Skills	Final Assessment
10%	60%	10%	5%	15%

Instructional and Delivery Strategies:

- Lecture and assignment work.

Reference Materials:

Product information as supplied by the manufacturer:

- General installation procedures
- Tool adjustments
- Warranty requirements
- Required installation material
- Conditions for installation

S1139.1 MATERIAL SPECIFICATIONS

Duration:	Total Hours	12
	Theory:	12
	Practical:	0

Cross-Reference to Training Standard Performance Objectives:

U0854.02, U0855.01 to U0855.03, U0856.01

General Learning Outcome:

On successful completion, the apprentice is able to:

Describe material specifications including characteristics and bonding material applications in accordance with manufacturers and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1139.1.1 Describe the following material characteristics:

- Mortars
 - Dry-set mortar - Portland cement, Sand & water retentive additives
 - Latex-Portland cement mortars - a two component liquid latex mixed with factory blended dry-set mortar
 - Light weight mortar - polymer-modified non-sag mortar
 - Full contact mortars – High performance, polymer modified mortars
 - Fast setting mortars – Epoxy mortars/ epoxy resin and hardener used for high bond strength and chemical resistance
 - Furan resin mortar consisting of carbon and/or silica filled furan resin and hardener
- Bond strength
 - Mortar bed
 - Setting material
 - Terrazzo topping
 - Tile
- Hardness

- Extra heavy commercial
- Heavy commercial
- Moderate normal commercial
- Light commercial
- Residential

- Absorption
 - Percent of moisture penetration by weight for marble, granite, limestone, slate, tile and engineered stone

- Compressive shear strength for force applied to:
 - Glazed wall tile
 - Mosaic tile
 - Quarry tile
 - Porcelain tile
 - Marble
 - Granite
 - Limestone
 - Slate
 - Engineered stone

- Abrasiveness
 - Light traffic abrasive hardness (HA) 6 minimum
 - Moderate traffic abrasive hardness (HA) 7 to 10
 - Heavy traffic abrasive hardness (HA) 12 minimum

- Porosity
 - Percent of water by weight absorbed
 - Setting material
 - Exterior and interior installations

- Contraction and expansion factors
 - Thermal expansion
 - Temperature changes
 - Interior
 - Interior/sunlight
 - Exterior – normal
 - Exterior – excessive
 - Cold – joint
 - Isolation – joint

- Structural - joint

S1139.1.2 Describe the properties and applications of bonding materials used on terrazzo, tile and natural stone.

- Dry-Set mortars
 - Epoxy based
 - Latex based
 - Portland cement
- Glues
 - Water based
 - Solvent based
- Mortars
 - Sand
 - Cement
 - Latex

S1139.1.3 Explain the construction features of mechanical systems and their applications.

- Fasteners (angles, bolts, wedges, hooks and pins)
- Anchoring systems
- Strut systems
- Spring nuts
- Shims and spacers
- Clips
- Accessories

S1139.1.4 Explain the reason for the specific applications of admixtures.

- Colouring agents for:
 - portland cement terrazzo
 - epoxy terrazzo
 - grout
- Curing agents and sealers
 - water – based
 - solvent – based
- Retardants for setting-up process or aggregate

- Accelerators for fast - setting

S1139.1.5 Describe the handling and disposal process for chemicals as prescribed by the Workplace Hazardous Materials Information System (WHMIS) under the Occupational Health and Safety Act.

- Location
- Containers
- Ventilation

S1139.2 RESTORING EXISTING SURFACES

Duration:	Total Hours	25
	Theory:	5
	Practical:	20

Cross-Reference to Training Standard Performance Objectives:

U0856.13, U0859.02, U0861.11, U0862.09

General Learning Outcome:

On successful completion, the apprentice is able to:

Restore existing surfaces in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

- S1139.2.1 Describe the steps required to restore existing surfaces.
- Remove existing materials
 - Clean and sweep preparation area
 - Remove any foreign substance
 - Install new underlayment to conform to surrounding area.
 - Mortar bed
 - Crack isolation membranes
 - Waterproof membranes
 - Levelling coat
- S1139.2.2 Review the potential hazards associated with the restoration of existing surfaces.
- S1139.2.3 Review the requirements for Workers' Compensation Coverage, WHMIS training and Material Safety Data Sheets, Emergency First-Aid, Fire Procedures and Safety committees.
- S1139.2.4 Perform specified procedures to prepare surfaces to be restored.
- Effective cleaning methods
 - Remove contaminants such as oil, sealers & curing compounds
 - Sweep clean

- Vacuum
- Wash
- Shot blasting
- Sand blasting
- Grinding
- Scarifying

S1139.2.5 Perform restoration work with new materials.

- Matching types
- Matching colours
- Matching finish
- Textured to finished floor

S1139.2.6 Perform steps required to perform a successful job cleanup and repair of existing surfaces.

S1139.2.7 Finish restored surfaces to specified condition appropriate for the surrounding area.

S1139.3 FINALIZE PROJECTS

Duration:	Total Hours	15
	Theory:	5
	Practical:	10

Cross-Reference to Training Standard Performance Objectives:

U0851.01, U0857.06, U0858.14, U0860.06

General Learning Outcome:

On successful completion, the apprentice is able to:

Finalize work projects in accordance with manufacturer's recommendations and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

- S1139.3.1 Describe the importance and details of check-off procedures for finishing projects.

- S1139.3.2 Explain the purpose and contents of deficiency lists.

- S1139.3.3 Apply the steps required for final cleaning of various types of terrazzo, tile and natural stone surfaces.

- S1139.3.4 Remove and store tools and equipment from the work site to the assigned storage area.

S1139.8 JOB SITE CONDITIONS

Duration:	Total Hours:	8
	Theory:	8
	Practical:	0

Cross-Reference to Training Standard Performance Objectives:
U0854.01 to U0854.07

General Learning Outcome:

On successful completion, the apprentice is able to:

Describe the job site conditions required to produce quality work in accordance with government safety regulations, manufacturer's recommendations and specifications and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1139.8.1 Identify the job site conditions required for effective installations.

- Conformance to job specifications
- Check off list
- Parameters of measuring equipment
- Obstructions
- Available power and utilities
- Accessibility for people and equipment

S1139.8.2 Outline the factors required to verify the accuracy of drawings.

- Accuracy of materials list
- Material type
- Material quantity
- Material quality

S1139.8.3 Identify the common causes of work stoppage.

- Excess moisture
- Unstable substrate
- Lack of security
- Insufficient lighting
- Inadequate ventilation
- Lack of electrical power

- Inaccurate temperature for curing requirements

S1139.8.4 Describe the job site material handling practices.

- Motorized and non-motorized vehicles
- Dollies
- Rigging equipment (chain block)
- Securing materials
- Lifting techniques
- Safe lifting weights

S1139.8.5 Outline the recommended material storing techniques.

- Protection of materials from elements.
 - Covering
 - Sheltering
 - Insulating
 - Heating

S1139.8.6 Describe the application of personal lifting devices and equipment.

- Scissor lifts (cherry picker)
- Hydraulic lifts/platform lifts
- Ladders
- Basic scaffolds
- Swing stages
- Zoom boom

S1139.8.7 Outline the recommended disposal practices for job site materials.

- Recycling practices
- Removing practices
- Disposing of hazardous and non-hazardous materials
- Extra materials for future repairs

S1140. BLUEPRINT READING AND CONSTRUCTION GEOMETRY II

Duration: Total Hours 45
Theory: 25
Practical: 20

Prerequisites: None

Content:

- S1140.1 Blueprint Views and Sections
- S1140.2 Blueprint Notices, Addenda and Revisions
- S1140.3 Construction Geometry
- S1140.4 Material Layout Plan
- S1140.5 Interpret Construction Drawings

Evaluation & Testing:

- Assignments related to theory and appropriate application skills
- Minimum of one mid-term test during the term
- Final exam at end of term
- Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects	Notebook & Organizational Skills	Final Assessment
10%	60%	10%	5%	15%

Instructional and Delivery Strategies:

- Lecture and assignment work.

Product information as supplied by the manufacturer:

- General installation procedures
- Tool adjustments
- Warranty requirements
- Required installation material
- Conditions for installation

S1140.1 BLUEPRINT VIEWS AND SECTIONS

Duration:	Total Hours	14
	Theory:	8
	Practical:	6

Cross-Reference to Training Standard Performance Objectives:

U0854.02, U0855.01

General Learning Outcome:

On successful completion, the apprentice is able to:

Identify the views and sections used on project installation blueprints in accordance with manufacturers' specifications and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1140.1.1 Describe the details of the views and sections used on blueprints.

- Front view
- Side view
- Plan (top) view
- Sections
- Details and schedules
- Abbreviations and title blocks on orthographic drawings

S1140.1.2 Explain how notices, addenda and revisions are indicated and issued.

S1140.1.3 Apply generally accepted principles in layout.

- Reference to the site conditions
- Starting point
- Bench marks
- Use of tools
 - water levels/squares/measuring tapes/ chalk lines/ plumb bobs/laser levels and transits, hand levels, straight edges and mason lines.

S1140.2 BLUEPRINT NOTICES, ADDENDA AND REVISIONS

Duration:	Total Hours	6
	Theory:	6
	Practical:	0

Cross-Reference to Training Standard Performance Objectives:

U0854.02, U0855.01

General Learning Outcome:

On successful completion, the apprentice is able to:

Explain how notices, addenda and revisions are presented on project installation blueprints in accordance with manufacturers' specifications and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1140.2.1 Define examples of notices, addenda and revisions for installation blueprints.

- Notices
 - warning of changes
- Addenda
 - additional extra work or deletion
- Revisions
 - changes from original drawing

S1140.2.2 Explain how notices, addenda and revisions are indicated and issued for installation blueprints.

S1140.3 CONSTRUCTION GEOMETRY

Duration:	Total Hours	8
	Theory:	3
	Practical:	5

Cross-Reference to Training Standard Performance Objectives:

U0854.02, U0855.01

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform operations in construction geometry in accordance with manufacturers' specifications.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

- S1140.3.1 Draw parallel lines.
- S1140.3.2 Bisect lines and angles.
- S1140.3.3 Determine the radius of:
 - An arc
 - Centre of a circle
 - Laying out a regular polygon

- S1140.3.4 Perform operations in construction geometry for a typical site drawing.
 - Terrazzo installation
 - Tile installation
 - Natural Stone installation

S1140.5 MATERIAL LAYOUT PLAN

Duration:	Total Hours	14
	Theory:	5
	Practical:	9

Cross-Reference to Training Standard Performance Objectives:

U0854.01 to U0854.03

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform layout procedures for assigned terrazzo, tile and natural stone installations in accordance with manufacturers' specifications.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

- S1140.5.1 Explain how to overcome site conditions and obstacles that affect the layout of materials and accessories.
- Furniture
 - Appliances
 - Temperature
 - Access
 - Radiators and heating vents
- S1140.5.2 Develop layout schemes for specified materials and establish material and labour components for a job.
- Job Site Access
 - Material Delivery
 - Material Storage
 - Material Layout Schemes
- S1140.5.3 Perform measuring, scaling, and sketching procedures for an assigned layout plan.
- Determine starting point.
 - Use bench marks
 - Use layout tools.

S1140.6 INTERPRET CONSTRUCTION DRAWINGS

Duration:	Total Hours	3
	Theory:	3
	Practical:	0

Cross-Reference to Training Standard Performance Objectives:

U0854.02, U0855.01

General Learning Outcome:

On successful completion, the apprentice is able to:

Interpret construction drawings in accordance with blueprint specifications for related installation tasks.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1140.6.1 Access and read construction drawings.

- Floor plans
- Elevations
- Details
- Room schedules

S1140.6.2 Interpret construction drawings for specific installations of Terrazzo, Tile and Natural Stone.

- Dimension lines
- Arrowheads
- Hidden lines
- Area identification
- Abbreviations
- Symbols

S1141. CONSTRUCTION TECHNIQUES AND PROCEDURES II

Duration: Total Hours: 60

Theory: 10
Practical: 50

Prerequisites: None

Content:

- S1141.1 Construction Techniques Planning and Preparation
- S1141.2 Substrate Preparation

Evaluation & Testing:

- Assignments related to theory and appropriate application skills
- Minimum of one mid-term test during the term
- Final exam at end of term
- Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects	Notebook & Organizational Skills	Final Assessment
10%	60%	10%	5%	15%

Instructional and Delivery Strategies:

- Lecture and assignment work.

Reference Materials:

Product information as supplied by the manufacturer:

- General installation procedures
- Tool adjustments
- Warranty requirements
- Required installation material
- Conditions for installation

S1141.1 CONSTRUCTION TECHNIQUES PLANNING AND PREPARATION

Duration:	Total Hours:	8
	Theory:	8
	Practical:	0

Cross-Reference to Training Standard Performance Objectives:

U0851.01, U854.02, U0855.01 to U0855.04

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform planning and preparation for construction techniques of terrazzo, tile and natural stone installations in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1141.1.1 Outline worksite organization practices.

- Safe storage of materials, tools and equipment.
- Weight distribution.
- Theft prevention.
- Protection from other adverse conditions.

S1141.1.2 Describe various forms of oral and written reports for:

- Safe storage of materials, tools and equipment.
 - Location
 - Strength of shelves
 - Climate
- Weight distribution.
 - Capacity of storage units
 - Balance of load
- Material check lists
 - Quantity
 - Quality

- Job progress
 - Timelines
 - Completion deadlines
- Discrepancies from plan to site conditions
 - Variations from plan
 - Deterioration of substrate
- Shortage and losses
 - Material theft
 - Breakage
 - Poor quality control
- Equipment and tool break-downs
 - Defective equipment and tools
 - Equipment maintenance issues
 - Abuse of equipment and tools
 - Improper storage

S1141.1.3 Access and identify regulations pertaining to construction techniques and procedures

- Industry regulations
- Government regulations

S1141.2 SUBSTRATE PREPARATION

Duration:	Total Hours:	52
	Theory:	2
	Practical:	50

Cross-Reference to Training Standard Performance Objectives:

U0856.01 to U0856.13

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform substrate preparation for terrazzo, tile, and natural stone installations in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

- S1141.2.1 Perform visual inspection of to determine substrate condition.
- lumps
 - Depressions
 - Fractures
 - Soiling
 - Contamination
 - Obstructions
 - Structural deficiencies
 - Level
 - Square
 - Uniformity
 - Physically inspect for concave and convex substrate irregularities
- S1141.2.2 Explain the cleaning process for substrates.
- Use of chemicals
 - Sweeping and vacuuming
 - Washing
 - Scrubbing
 - Rough – grinding and scraping

- S1141.2.3 Perform the cleaning process for substrates.
- Using chemicals
 - Using brooms, wire brushes, scrapers, vacuums (wet & dry)
 - Washing using squeegee/mops, wiping cloths, pails & sponges
 - Scrubbing using brushes
 - Grinding using hand or floor grinders
 - Shot blasting
 - Sand blasting
 - Scarifying
- S1141.2.4 Apply WHMIS requirements.
- Using rubber gloves
 - Masks
 - Glasses
 - Provide adequate ventilation
 - Provide adequate lighting
- S1141.2.5 Install anti-fracture materials to structural cracks.
- Using trowels, brushes, rollers
 - Prepare crack
 - Apply primer and bonding material
 - Overlap the crack with a rubber or fiberglass membrane or nylon mesh
 - Perform sealing and allow appropriate curing time and conditions
- S1141.2.6 Prepare and patch fractures, holes, surface cracks and unevenness.
- Using cement/mortar (plus latex)
 - Epoxy-based compound
 - Using trowels, straightedges, squeegees and mixing tools and equipment
- S1141.2.7 Install expansion and control joints on concrete or under bed surfaces.
- Using skill saws with masonry blades
 - Snips
 - Hacksaw
 - Caulking guns
 - Wrenches
 - Flat trowels
 - Pointed trowels
- S1141.2.8 Install tape on cementitious board
- Using specified tape
 - Bonding material
 - Provide recommended set and cure time
 - Rub and clean

- S1141.2.9 Prepare a solid and sound surface using snips, hammers, trowels, shovels, straight edges, transits and water levels for the following methods.
- Scratch coat method.
 - Wire lath is fastened to the surface and a coat of latex- Portland cement mortar is applied over the lath.
 - Thin-set/direct-bond method
 - Bonding agent such as epoxy, latex, acrylic, various adhesives are applied directly to the surface
 - Floating-floor method
 - Surface is covered if specified with 6mm of sand and or polyethylene film
 - Installation of 2" x 2" (51 mm x 51 mm) wire mesh
 - Installation of under bed of specified thickness
 - Rough surface – 6 mm sand bed applied under the cleavage membrane
 - Steel trowel or fine broom finish omit sand
 - Apply cleavage membranes over concrete substrates
 - Screed and float
 - Bonded mortar bed method
 - Slurry-bond coat and mortar under bed of specified thickness is applied
- S1141.2.10 Explain the installation procedure for water proofing membranes in “wet areas” such as:
- Shower stalls, Whirlpools, Swimming pools
 - Using scissors, trowels, drills and mixing paddles and knives

S1142. TERRAZZO INSTALLATION II

Duration: Total Hours: 60

Theory: 15

Practical: 45

Prerequisites: None

Content:

S1142.1 Install terrazzo base

S1142.2 Install specialty terrazzo floors

S1142.3 Install terrazzo to stairs, bases and walls

Evaluation & Testing: - Assignments related to theory and appropriate application skills
- Minimum of one mid-term test during the term
- Final exam at end of term
- Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects	Notebook & Organizational Skills	Final Assessment
10%	60%	10%	5%	15%

Instructional and Delivery Strategies:

- Lecture and assignment work.

Reference Materials:

Product information as supplied by the manufacturer:

- General installation procedures
- Tool adjustments
- Warranty requirements
- Required installation material
- Conditions for installation

S1142.1 INSTALL TERRAZZO BASE

Duration:	Total Hours:	20
	Theory:	4
	Practical:	16

Cross-Reference to Training Standard Performance Objectives:

U0855.01 to U0855.03, U0857.01 to U0857.02

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform terrazzo base installations in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1142.1.1 Describe types and composition of terrazzo base materials.

- Portland Cement Terrazzo
 - Bonded Terrazzo
 - Epoxy Bonded Terrazzo
 - Floating Terrazzo
 - Venetian Terrazzo
 - Palladiana Terrazzo
 - Rustic Terrazzo
 - Terrazzo on Vertical Surfaces
 - Polyacrylate modified cement terrazzo
 - Conductive terrazzo
- Precast Terrazzo
 - Portland cement
 - Epoxy resin
 - Stairs
 - Bases
 - Window sills
- Epoxy Resin Thin Set Terrazzo
- Polyacrylate Modified Cement Terrazzo
- Aggregate Chips

- Grading sizes
- Recommended standard sizes
- Chip size for granite, plastic and glass variations from manufacturers and suppliers.
- Metal chips of non-corrosive and non-rusting material.
- European chips

- Identify standard chip sizes/ passing screen/ retained on bottom screen.

- Standard terrazzo aggregate defined as domestic marble chips 0, 1, 2.

- Specification writer schedule of various sizes, proportions, types and colours of aggregate and gauges, thickness and types of divider stripes for various locations.

S1142.1.2 Perform the preparation procedures for substrate.

- Sweep and clean until dust free
- Fill cracks and holes
- Apply levelling material as required
- Check for structural integrity

S1142.1.3 Perform base installation.

- Sweep and clean until dust free
- Fill cracks and holes

- Install Portland Cement Terrazzo
 - Apply bonded terrazzo
 - Apply epoxy bonded terrazzo
 - Apply floating terrazzo
 - Apply venetian terrazzo
 - Apply palladiana terrazzo
 - Apply rustic terrazzo
 - Apply terrazzo on vertical surfaces

- Install Precast Terrazzo
 - Apply portland cement
 - Apply epoxy resin
 - Apply to stairs
 - Apply to bases
 - Apply to window sills

- Install epoxy resin thin set terrazzo
- Install polyacrylate modified cement terrazzo
- Install aggregate chips
 - Grading sizes
 - Recommended standard sizes
 - Chip size for granite, plastic and glass variations from manufacturers and suppliers.
 - Metal chips of non-corrosive and non-rusting material.
 - European chips

S1142.2 INSTALL SPECIALTY TERRAZZO

Duration:	Total Hours:	17
	Theory:	5
	Practical:	12

Cross-Reference to Training Standard Performance Objectives:

U0857.05

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the installation procedures of specialty terrazzo in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1142.2.1 Describe the installation steps for specialty terrazzo products on floors.

- Types
 - Venetian terrazzo (aggregate chips sizes 1-8)
 - Palladiana (fractured slabs of marble or granite)
 - Epoxy terrazzo (seeding into epoxy)
 - Conductive terrazzo (reduce static discharge)
 - Polyacrylate terrazzo (latex mix)
 - Rustic terrazzo (exposed aggregate)
 - Other types of terrazzo
- Installation steps
 - Install Base strips
 - Install Screed mortar bed
 - Install Floor strips
 - Install Cove divider
 - Install Cove base
 - Prepare terrazzo by combining marble or granite chips
 - Install terrazzo material
 - Perform first grind and apply grout
- Perform second grind

- Apply sealer
- S1142.2.2 Determine the steps necessary to take in order to adequately test and prepare the sub-floor or wall.
- S1142.2.3 Describe the installation of divider strips for terrazzo pattern.
- Fresh mortar under bed for floor installations
 - Mortar for walls
 - Epoxy-based methods for base or finished slabs.
 - Curing process and time requirements
- S1142.2.4 Describe the process to prepare the terrazzo for installation.
- Combine marble or granite chips of specified size and colour with epoxy or cement.
 - Add pigment to cement as required
 - Use electric or manual tools and water as specified.
- S1142.2.5 Perform terrazzo floor installation.
- Broom clean base slab
 - Apply slurry bond coat
 - Place and screed under bed
 - Install divider strips
 - Spread terrazzo mixture level to top of strips
 - Sprinkle topping with dry aggregate
 - Roll topping with heavy roller and remove excess cement and water
 - Hand trowel topping until surface is smooth with no voids or pin holes
 - Allow recommended curing time.
- S1142.2.6 Perform cleanup of a terrazzo installation.
- Remove any installation debris
 - Remove residue
 - Soak floor and apply slurry bond coat as required
 - Prime the floor for as specified for epoxy terrazzo installations

S1142.3 INSTALL TERRAZZO ON STAIRS, BASES AND WALLS

Duration:	Total Hours:	23
	Theory:	6
	Practical:	17

Cross-Reference to Training Standard Performance Objectives:

U0855.01 to U0855.03, U0857.06, U0857.07

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the installation procedures of terrazzo on stairs, base and walls in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1142.3.1 Describe the types and construction features of stairs.

- Boxed or closed stringer
- Open stringer, one side.
- Open stringer, two sides.
- Winders or pie-shaped.
- Circular or elliptical.

S1142.3.2 Describe tools required for installation on stairs, base and walls.

- Flat trowels
- Cove trowels
- Small hand rollers
- Brushes or whisks
- Base grinders
- Sanding discs
- Files
- chisels

- S1142.3.3 Perform installation of terrazzo on stairs, base and walls.
- Install base bead top strip
 - Apply under bed to backing 8mm from finish surface
 - Place and screed under bed mix
 - Install divider strips, cove dividers, slip resistant channels
 - Apply a slurry bond coat (except for resinous and epoxy bonded)
 - Apply a stiff terrazzo mix to risers, treads, curbs, stringers and other vertical substrates
 - Use flat and cove trowel to uniformly compact aggregate to detailed shape
 - Hand trowel until surface is smooth with no voids
 - Wash off excess cement with brush
- S1142.3.4 Install pre-cast terrazzo on steps and risers.
- Confirm step materials with blueprints and specifications
 - Lay out the stairs
 - Even out treads and risers with screed mix on steel stairs
 - Even out treads and risers with Portland cement mortar on cured under bed and concrete stairs
 - Back butter bonding material to back of treads and risers
 - Anchor the risers
 - Set and align stone treads and risers
 - Grout joints and clean
 - Protect area during curing process
 - Allow specified time to cure
- S1142.3.5 Finish terrazzo installation using base grinding machines.
- First grind
 - Grouting with matching coloured cement
 - Grout and perform second grind
 - Apply sealer

TERRAZZO, TILE AND MARBLE SETTER – LEVEL 2

S1143. TILE INSTALLATION II

Duration:	Total Hours	60
	Theory:	17
	Practical:	43

Prerequisites: None

Content:

S1143.1	Mosaic tile pattern design
S1143.2	Tile lay out
S1143.3	Tile installation

Evaluation & Testing:

- Assignments related to theory and appropriate application skills
- Minimum of one mid-term test during the term
- Final exam at end of term
- Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects	Notebook & Organizational Skills	Final Assessment
10%	60%	10%	5%	15%

Instructional and Delivery Strategies:

- Lecture and assignment work.

Reference Materials:

Product information as supplied by the manufacturer:

- General installation procedures
- Tool adjustments
- Warranty requirements
- Required installation material
- Conditions for installation

S1143.1 TILE PATTERN DESIGN

Duration:	Total Hours	4
	Theory:	4
	Practical:	0

Cross-Reference to Training Standard Performance Objectives:

U0858.09

General Learning Outcome:

On successful completion, the apprentice is able:

Describe the tile pattern design process in accordance with manufacturer's recommendations and specifications and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1143.1.2 Describe the types and applications of standard ceramic tiles.

- Types
 - Porcelain
 - Clay
 - Glass
 - Terrazzo
 - Kinker tile
 - Marble
 - Granite
 - Limestone
 - Sandstone
 - Slate
 - Agglomerate
 - Quarry
 - Paver
 - Glazed

- Applications
 - Shower stalls
 - Whirl pools
 - Swimming pools
 - Back splashes
 - Saunas
 - Gutters
 - Columns
 - Ceilings
 - Arches
 - Bathtub/walls

S1143.1.2 Describe pattern design process.

- Verify Pattern match
- Determine die lot match
- Use pattern scribe process
 - Free hand scribe
 - Direct scribe
- Strip measure

S1143.3 TILE LAYOUT

Duration:	Total Hours:	19
	Theory:	4
	Practical:	15

Cross-Reference to Training Standard Performance Objectives:

U0858.04, U0858.05

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the layout procedures for ceramic tile in accordance with manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

- S1143.3.1 Determine layout schemes for ceramic tile installation.
 - Job Site Access
 - Material Delivery
 - Material Storage
 - Material Layout Schemes

- S1143.3.2 Perform measuring, scaling, and sketching procedures for a layout plan.
 - Determine starting point.
 - Using bench marks
 - Using layout tools.

- S1143.3.3 Perform free-hand sketch to assist communication and clarify details of layout plan.

- S1143.3.4 Perform the dry layout installation for ceramic tile pattern.
 - Place tile against base and floor to determine required cuts and angles
 - Place tile according to layout plan

- S1143.3.5 Test and prepare the substrate.

S1143.4 TILE INSTALLATION

Duration:	Total Hours:	37
	Theory:	9
	Practical:	28

Cross-Reference to Training Standard Performance Objectives:

U0851.01, U0854.02, U0855.01 to U0855.04, U0858.01 to U0858.16,
U0860.06

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the installation procedures for ceramic tile in accordance with manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1143.4.1 Describe installation methods for ceramic tile.

- Straight running bond
- Brick joint
- Herring bone
- Diamond pattern
- Basket weave
- Stack bond

S1143.4.2 Describe installation materials required for tile.

- Dry- set mortar
- Latex modified mortar
- Epoxy mortar
- Epoxy grout
- Fast setting mortar
- Furan resin mortar
- Organic adhesives
- Grout
 - Sanded
 - Un-sanded

S1143.4.3 Describe materials preparation process for tile installation of:

- Floors
- Walls
- Ceilings
- Arches
- Bath tub/walls
- Shower stalls
- Whirl pools
- Swimming pools
- Back splash
- Saunas
- gutters

S1143.4.4 Perform cutting and fitting procedures for ceramic tile installation:

S1143.4.5 Describe the application procedure for thin set and adhesives.

S1143.4.6 Perform standard ceramic tile installation according to the specified layout plan.

- Apply scratch coat
- Apply mortar
- Apply and screed under bed
- Spread bond coat or adhesive with trowel
- Install tile
- Apply grout
- Allowing recommended curing time.
- Apply sealer (if specified)
- Protect new installation throughout curing time frame

S1143.4.7 Install surface-mounted and recessed accessories.

- Handicapped safety rails
- Towel bars
- Soap and shampoo dishes
- Prefabricated stair nosing
- Carborundum inserts
- Tactile surfaces

- S1143.4.8 List the steps required to perform a successful cleanup of a tile installation.
- Remove all cutting debris
 - Remove grout residue
 - Seal the floor for as specified for tile installations
- S1143.4.9 Remove, repair and maintain damaged tile perform recommended waste disposal.

S1144. NATURAL STONE INSTALLATION II

Duration: Total Hours 75
Theory: 15
Practical: 60

Prerequisites: None

Content:

S1144.1 Mechanical Installations
S1144.2 Interior Conventional and Stacking Installations
S1144.3 Slabs on Floor Installations
S1144.4 Counter Top Installations

Evaluation & Testing: - Assignments related to theory and appropriate application skills
- Minimum of one mid-term test during the term
- Final exam at end of term
- Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects	Notebook & Organizational Skills	Final Assessment
10%	60%	10%	5%	15%

Instructional and Delivery Strategies:

- Lecture and assignment work.

Reference Materials:

Product information as supplied by the manufacturer:

- General installation procedures
- Tool adjustments
- Warranty requirements
- Required installation material
- Conditions for installation

S1144.1 MECHANICAL INSTALLATION

Duration:	Total Hours:	20
	Theory:	3
	Practical:	16

Cross-Reference to Training Standard Performance Objectives:

U0859.01 to U0859.11

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform mechanical installations of natural stone materials in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards.

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1144.1.1 Describe the hardware used for mechanical installation of natural stone.

- Types
 - Anchoring devices for concrete
 - Inserts
 - Shims
 - Copper wire
 - Stainless steel angles
 - Stainless bolts
 - Expansion anchor
 - Struts
 - Plate
 - Dowel
 - Electrical separator
 - Liner

S1144.1.2 Describe installation procedure for mechanical hardware.

- Drilling holes for inserts and cutting slots using:
 - Carboloy masonry bits
 - Circular saws
 - Hammers and chisels
 - Adjustable clamps
 - Crowbars, rubber mallets, pliers
- Installing inserts in concrete.
 - Angle iron for first course
 - Galvanized or stainless steel struts
 - Expansion shields
 - Screwing into existing structures
 - Resetting insulation as required

S1144.1.3 Describe how to confirm slab support and joint size meets specifications.

- Compare slab size and weight with engineering specifications, anchor details and shop drawings.
- Select appropriate support hardware
- Measure joint size

S1144.1.4 Perform mechanical installation of natural stone.

- Set up working platforms
 - Scaffolds
 - Swing stages
 - Scissor lifts
- Inspect slabs
 - Structural integrity
 - Absence of defects
 - Gaps, voids, small cracks
- Confirm layout
 - Refer to blueprints and specifications
 - Perform trial layout
 - Book-match if specified
 - Locate starting point and datum line
- Drill holes and cut slots in specified locations
- Install inserts
- Confirm independent support for each slab
- Confirm joint size
- Install overhangs

- Using dowelled liners or “J” plates and epoxy
- Drilling and dowelling the holes
- Tighten the wall fasteners
- Cut openings for accessories
 - Electrical outlets
 - Light switches
 - Floor drains
 - Vents
- Set slabs in place using:
 - Fork lifts
 - Chain hoists
 - Manually
 - Suction cups
 - Lifting clamps
- Caulk joints
- Grout and point joints
- Clean surface

S1144.1.5 Perform repair of natural stone.

- Gaps
- Voids
- Small cracks
- Chips

S1144.2 INTERIOR CONVENTIONAL AND STACKING INSTALLATION

Duration:	Total Hours:	20
	Theory:	3
	Practical:	16

Cross-Reference to Training Standard Performance Objectives:

U0860.01 to U0860.07

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the conventional and stacking installation methods of natural stone in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1144.2.1 Describe the hardware used for conventional and stacking method of installing natural stone.

- Types
 - Anchoring devices for substrate
 - Inserts
 - Hooks
 - Copper or non ferrous wire
 - Plaster
 - Latex Portland cement
 - Mortar
 - Epoxy
 - Liner

S1144.2.2 Describe installation procedure for hardware.

- Drilling holes for inserts and cutting slots using:
 - carboloy masonry bits
 - circular saws

- hammers and chisels
- adjustable clamps
- crowbars, rubber mallets, pliers

- Installing inserts in concrete.
 - Angle iron for first course
 - Expansion shields
 - Screwing into existing structures
 - Applying cement, mortar and or epoxy

S1144.2.3 Describe how to confirm slab support and joint size meets specifications.

- Compare slab size and weight with engineering specifications
 - Select appropriate support hardware
 - Measure joint size

S1144.2.4 Perform conventional and stacking installation method of natural stone.

- Set up working platforms
 - Scaffolds
 - Swing stages
 - Scissor lifts
- Inspect slabs
 - Structural integrity
 - Absence of defects
 - Gaps, voids, small cracks
- Confirm layout
 - Refer to blueprints and specifications
 - Perform trial layout
 - Book-match if specified
 - Locate starting point
- Drill holes and cut slots in specified locations
- Install inserts
- Apply cement, mortar and or epoxy
- Confirm independent support for each slab
- Confirm joint size
- Install overhangs
 - Using dowelled liners or “J” plates and epoxy
 - Drilling and dowelling the holes
 - Tighten the wall fasteners
- Cut openings for accessories

- Electrical outlets
- Light switches
- Floor drains
- Vents

- Set slabs in place using:

- Fork lifts
- Chain hoists
- Manually
- Suction cups

- Caulk joints
- Grout and point joints
- Clean surface

S1144.2.5 Perform specialty installations for:

- Thresholds
- Shower seats and jams
- Window sills
- Mantels
- Door and window jams

S1144.2.6 Perform repair of natural stone.

- Gaps
- Voids
- Small cracks

S1144.3 SLAB ON FLOOR INSTALLATION

Duration:	Total Hours:	20
	Theory:	4
	Practical:	16

Cross-Reference to Training Standard Performance Objectives:

U0861.01 to U0861.011

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the installation of slabs on floors in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1144.3.1 Perform installation of slabs on floors.

- Inspect slabs
 - Structural integrity
 - Absence of defects
 - Size and colour uniformity
 - Chips
 - Voids
- Confirm layout
 - Refer to blueprints and specifications
 - Perform trial layout
 - Book-match if specified
 - Locate starting point

S1144.3.2 Perform the preparation requirements for installing natural stone on floors.

- Inspect slabs
- Confirm layouts by referencing blueprints and drawings
- Re-check materials
- Clean and sweep until all contaminants are removed
- Level base as required

S1144.3.3 Test and prepare the sub-floor.

- Verify sub-floor material requirements
- Test sub-floor for dimensional stability
- Insure sub-floor material is stable and well bonded

S1144.3.4 Describe the dry layout installation for natural stone floor pattern.

- Identify starting point
- Place slabs to determine cutting and spacing requirements
- Set square lines and main lines

S1144.3.5 Describe the process to prepare the natural stone for installation.

- Use of electric or manual tools and water as specified.

S1144.3.6 Perform standard natural stone floor installations.

- Mix and screed under bed
- Mix and apply bond coat
- Mix and apply medium bed

- Perform dry layout of natural stone
- Perform cutting and fitting
 - Diamond drilling
 - Diamond blade grinding and cutting
 - Pattern matching
 - Colour matching

- Spread bond coat to underlayment and backside of slab
- Install stone
- Apply grout
- Allow recommended curing time.

S1144.3.7 Perform cleanup and maintenance of a natural stone floor installation.

- Remove all cutting debris
- Remove grout residue
- Seal the floor as specified
- Remove bond coat residue
- Waste disposal and removal of any installation debris
- Application of protective coatings (if required)

S1144.3.8 Repair natural stone floors.

S1144.3.9 Perform the removal and maintenance requirements for natural stone and perform recommended waste disposal.

S1142.4 COUNTER TOP INSTALLATION

Duration:	Total Hours:	20
	Theory:	5
	Practical:	12

Cross-Reference to Training Standard Performance Objectives:

U0862.01 to U0862.09

General Learning Outcome:

On successful completion, the apprentice is able to:

Perform the installation procedures for natural stone on counter tops in accordance with government regulations, manufacturer's recommendations and specifications and approved industry standards

Learning Outcomes and Content:

On successful completion, the apprentice is able to:

S1144.4.1 Interpret blueprints and specifications for natural stone counter top installations.

- Required materials
- Bonding materials
- Digitizer diagrams and notes
- Shop drawings
- Templates

S1144.4.2 Perform visual inspection of counter tops, backsplash, vanity, aprons, and island tops.

- Confirm strength and integrity
- Absence of defects
- Review sink and faucet template is accurate
- Verify overlap of counter top is as specified
- Verify that grain direction and veining run in same direction

- S1144.4.3 Perform the recommended and safe lifting, carrying and transporting techniques for natural stone counter top installations.
- Identify various slab thickness and relate to lifting and handling
 - Determine the number of persons required to safely lift and install counter top slabs
 - Use of hand straps
 - Use of lifting clamps
 - Use of suction support bars to help prevent breakage
 - Use of motorized lifting devices
 - Securing slabs during delivery transportation
- S1144.4.4 Describe the installation steps for natural stone on counter tops.
- Preparation of substrate
 - Check measurements
 - Verify if mounting surface is square
 - Check if millwork is level
 - Review tolerances of joint widths
 - Assess millwork and wall for irregularities
 - Verify the integrity of slab support
 - Install aprons
 - Cut out accessory openings
 - Install slabs
 - Grout joints
 - Clean and seal the slab as specified
- S1144.4.5 Perform steps to test and prepare the cabinet base.
- S1144.4.6 Describe the dry layout installation for counter tops.
- Required clearances
 - Level and shimming tests
 - Check gables for span requirements
- S1144.4.7 Prepare the natural stone counter top for installation.
- Cut outs for sink and fixtures
 - Diamond bit grinding requirements
- S1144.4.8 Perform standard natural stone counter top installation.
- Install necessary supports and position under mount sinks
 - Perform dry layout of counter top to verify fit and leveling requirements
 - Verify shim requirements
 - Apply adhesive to substrate
 - Install counter top

- Install shims as required
- Mix matching colour to seam adhesive and secure seams if required
- Apply sealant caulking
- Allowing recommended curing time.
- Clean and seal counter top as specified

S1144.4.9 Perform installation of natural stone backsplash.

- Dry-set backsplash to ensure fit
- Apply adhesive to wall
- Install backsplash
- Caulk or epoxy joints

S1144.4.10 Perform cleanup of a natural stone counter top installation.

- Remove all grinding debris
- Remove caulking residue
- Clean back splash and walls as required

APPENDIX I

Summary of Equipment Required for Level II

Unit I: Recommended Minimum Tools and Equipment:

- General Tools
 - Crescent shaped knife
 - Concave cutting gouge
 - Cove base adhesive applicator gun & nozzle
 - Divider scribe
 - Universal scribe
 - Hand roller
 - Trowels
 - pointing
 - flat
 - cove
 - Pliers
 - Metal snips
 - Hammer
 - Chisels
 - Sponges
 - Broom
 - Rake
 - Measuring divider
 - Tape
 - Water level
 - Laser level
 - Square
 - Straight edges
 - Box and open end wrench set
 - 3/8" Socket set

Safety equipment per student

1 - Knee pad set

1 - Hard hat

4 - Respirators per class

1 - Safety glasses

1 - Hearing protection

Job site equipment

- 4 ft. level
- box of white rags
- dollies or hand trucks
- moisture test kit
- hammer drill
- vacuum cleaner
- anchorite tools
- pH test kit
- circular saw
- plumb bobs

Unit 2: Recommended Minimum Tools and Equipment:

- Scaling Tools
- Calculators

Unit 3, 4, & 5: Recommended Minimum Tools and Equipment:

- Hand Tools
 - Tile cutter
 - Crescent shaped knife
 - Concave cutting gouge
 - Cove base adhesive applicator gun & nozzle
 - Divider scribe
 - Universal scribe
 - Hand roller
 - Trowels
 - pointing
 - flat
 - cove
 - Pliers
 - Metal snips
 - Hammer
 - Chisels
 - Sponges
 - Broom
 - Rake
 - Measuring divider
 - Tape
 - Water level
 - Laser level

- Square
- Straight edges
- Power Tools and Equipment
 - Hammer drill
 - Skill saw
 - Cement mixer
 - Base floor machine
 - Wet saw

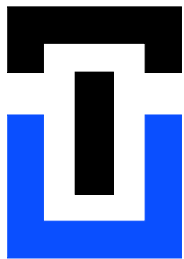
Unit 6: Recommended Minimum Tools and Equipment:

- Power Tools
 - Circular saws
 - Grinders
 - Mixing drums
 - Tub saws
 - Hammer drills
 - Variable speed drill, ceramic and masonry drill bits
 - Wet saw
- Hand Tools
 - Trowels (notched)
 - Claw hammer
 - Rubber mallet
 - Socket set
 - Box and open end wrenches
 - Pliers
 - Snipes
 - Pinch bar
 - Pry bar

APPENDIX II

SUGGESTED PROJECTS LEVEL II:

1. Terrazzo – Floor Installation
2. Terrazzo – Base and Wall Installation
3. Tile - Floor and Wall Layout Installation
4. Natural Stone - Floor Layout Installation
5. Natural Stone - Counter Top Layout Installation



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