



**ONTARIO COLLEGE OF TRADES**  

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**ORDRE DES MÉTIERS DE L'ONTARIO**

Apprenticeship  
Curriculum Standard

Drywall, Acoustic &  
Lathing Applicator

Level 1 and 2

Trade Code: 451A

Date: 2003

**Please Note:** Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8<sup>th</sup>, 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 (<http://www.collegeoftrades.ca>) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: <http://www.collegeoftrades.ca/about/legislation-and-regulations>

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## Introduction

The Drywall, Acoustic and Lathing Applicator curriculum has been developed in keeping with the prescribed Ministry of Training, Colleges and Universities Training Standards. The curriculum is designed to adhere to the current grade-reporting structures for the respective program specialties.

For easy reference, a time allocation has been included for each respective subject and unit, along with the Theory/Practical breakdown for the delivery of the Learning Content.

The curriculum has been designed to give the instructor every reasonable opportunity for flexibility and innovation without deviating to any significant degree from the subject requirements, as determined by the Provincial Advisory Committee, and as prescribed in the Regulations for the Trades. Since the scope of the prescribed curriculum is quite extensive, the apprentices must be expected to reinforce the acquired knowledge through regular independent out-of-classroom assignments. The curriculum has been presented in a chronological sequence in keeping with sound teaching methodologies. However, the actual application of the sequence may differ somewhat between Training Delivery Agencies because of scheduling, staffing, and facilities utilization.

The curriculum includes specific references to the Ministry of Training, Colleges and Universities Apprenticeship Training Standards. While these references to various performance objectives in the Training Standards have been linked to the respective in-school outcomes, employers should not assume complete coverage to a journeyperson level. The in-school delivery focuses primarily on the knowledge required to master the respective objectives outlined in the Training Standards. Employers, therefore, are expected to complete the training of these respective objectives by applying the prescribed in-school knowledge to the required practical learning experienced in the work setting.

To ensure that apprentices will be able to successfully demonstrate the learning outcomes according to performance criteria, specific times have been allocated in the respective areas to allow for some applications enhancement. It is of utmost importance that all application assignments relate to prescribed experiences only. Time constraints will not permit engaging apprentices in tasks of limited learning benefits that are unrelated to the curriculum outcomes. If the statement in the assigned operations begins with “perform,” “outline,” “describe,” or “explain,” the student is expected to complete the activity.

Regular evaluations of the apprentices' learning achievements must be performed in both theory and practical applications throughout the program to ensure consistency with learning outcome expectations. Testing of apprentice knowledge and skills will take place during the allotted delivery hours for each unit. In addition to providing an evaluation of apprentice competency, the review of test question answers is considered to be a valuable learning opportunity.

In all practical activities, the apprentices will observe the Occupational Health and Safety Act and the applicable regulations including use of personal protective equipment. Institutional regulations and policies may also apply.

## Participation By Stakeholders

A Steering Committee comprised of five members from four Training Delivery Agencies worked in collaboration with the Ministry of Training, Colleges and Universities and industry stakeholders, participated in the development of this document. The format that is used in this document has been approved by the Ministry of Training, Colleges and Universities.

Implementation  
September 2004

## Summary of Total Program In-School Training Hours

### Level 1

	Reportable Subject	Total	Theory	Practical
1.1	Trade Knowledge and Safety Orientation	42	32	10
1.2	Trade Calculations	36	36	0
1.3	Plan Reading	36	36	0
1.4	Computers	24	24	0
1.5	Suspended Ceiling Systems	24	8	16
1.6	Partitions and Curtain Walls	96	20	76
1.7	Residential Steel-Stud Construction	42	12	30
	Total	300	168	132

### Level 2

	Reportable Subject	Total	Theory	Practical
2.1	Geometry Theory and Application	48	16	32
2.2	Suspended Ceilings	48	12	36
2.3	Drywall Partitions and Ceilings	54	20	34
2.4	Demountable Partitions	36	8	28
2.5	Raised-Access Flooring	12	4	8
2.6	Trade Calculations	24	24	0
2.7	Plan Reading	36	36	0
2.8	Metal Cutting and Welding	36	8	28
2.9	Thermal and Sound Theory and Application	6	6	0
	Total	300	134	166

Number:	1.1
Title:	Trade Knowledge and Safety Orientation
Duration:	42 Total Hours
	Theory: 32 hours      Practical: 10 hours
Prerequisites:	None
Co-Requisites:	None
Cross-reference to Learning Outcomes:	U4315.01 – U4316.03

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice is able to apply the requirements of safety practices, regulations and legislation while able to demonstrate knowledge of trade terminology and the tools of the trade.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 1.1.1 Describe the history and orientation of the trade.
- 1.1.2 Identify the tools of the trade and describe their safe use and maintenance.
- 1.1.3 Describe the relationship between attitude and safety on and off the job.
- 1.1.4 Describe various equipment, materials, and construction operations of the trade.

Learning Content:

- 1.1.1 Describe the history and orientation of the trade.
- Describe the place of lathers in history and culture.
  - Describe current trends in the trade and list the advantages for continuous training towards a well rounded Drywall, Acoustic and Lathing Applicator.
- 1.1.2 Identify the tools of the trade and describe their safe use and maintenance.
- Identify and describe the use and maintenance of hand tools, portable power tools, and laser levels used in the Drywall, Acoustic and Lathing Applicator trade.
- 1.1.3 Describe the relationship between attitude and safety on-and off-the-job.
- Select, wear, and maintain personal protective equipment.
  - Describe Workplace Hazardous Materials Information System (WHMIS) principles.
  - Describe safe operation of generic powder-actuated tools.
  - Identify and describe correct procedures for ladders and scaffolds and scissors lift.
  - Identify and describe the main aspects of electrical safety on the jobsite.
  - Apply proper lifting and handling techniques of construction materials as per safety legislation.
  - Describe the relevant government legislation and regulations.
- 1.1.4 Describe various equipment, materials, and construction operations of the trade.
- Identify the equipment, materials, and the construction elements of the trade by the correct name and the colloquial expression.
  - Describe and select metal lath material by size, gauge, and type for installation operations.
  - Identify and diagram framing of substructures for flat ceilings.
  - Layout and install hangers and ties as per plans and specifications.
  - Erect furring and carrying channels as per plans and specifications.
  - Install metal wire lath and accessories as per plans and specifications.
  - Plan and prepare a daily/periodical log of shop activities.

Evaluation Structure:

Theory Testing: 57%

Application Exercises: 10%



Number:	1.2
Title:	Trade Calculations
Duration:	36 Total Hours
	Theory: 36 hours      Practical: 0 hours
Prerequisites:	Unit 1
Co-requisites:	Unit 1
Cross-reference to Learning Outcomes:	U4316.03, U4316.04, U4322.05, U4324.04

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to construct percentage calculations and perform operations using both the Imperial and Metric systems of measure.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 1.2.1      Construct geometric lines, arcs, angles, and figures as used in the trade.
- 1.2.2      Perform operations in the Imperial and Metric systems of measure.
- 1.2.3      Apply formulae for perimeter, area, and volume in both the Imperial and Metric systems of measure.
- 1.2.4      Perform percentage calculations as applied to money management.

Learning Content:

- 1.2.1 Construct geometric lines, arcs, angles, and figures as used in the trade.
- Perform geometric development of common angles (90, 60, 45, 30, and 22.5), parallel lines, perpendicular lines, bisection of lines and angles, regular polygons (pentagon, hexagon, octagon, etc.).
  - Draw archways of various styles including circular, segmented arcs, elliptical, Tudor, and gothic.
- 1.2.2 Perform operations in the Imperial and Metric systems of measure.
- Perform measurements and computations in both metric (millimeters and meters to two decimal places) and imperial systems (feet, inches, sixteenths of an inch).
  - Perform soft conversions (approximations) between metric and imperial measurements.
- 1.2.3 Apply formulae for perimeter, area, and volume in both the Imperial and Metric systems of measure.
- Perform perimeter, area, and volume calculations (rectangles, triangles, circles) in both the metric and imperial systems.
  - Perform hard conversions in linear, area, and volume calculations within each system of measurement e.g., inches to feet, square inches to square feet, millimeters squared to meters squared, etc.
- 1.2.4 Perform percentage calculations as applied to money management.
- Perform percentage calculations as applied to discounts, increases, payroll deductions, benefits, salary increases, RRSP's, etc.
  - Prepare a personal money management budget that includes rent, mortgage, food and clothing expenses, transportation expenses, entertainment expenses, etc.

Evaluation Structure:

Theory Testing: 30%

Application Exercises: -

Number:	1.3
Title:	Plan Reading
Duration:	36 Total Hours
	Theory: 36 hours      Practical: 0 hours
Prerequisites:	Unit 1, 2
Co-requisites:	Unit 1, 2
Cross-reference to Learning Outcomes:	U4316.01

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to interpret the language of construction drawings with both material take-off of floor plans and reflected ceilings.

Learning Outcomes:

Upon successful completion the apprentice will be able to:

- 1.3.1      Construct drawings using lines, symbols, abbreviations, and scales.
- 1.3.2      Apply the techniques of producing an orthographic projection of a small building.
- 1.3.3      Interpret the language of construction drawings.
- 1.3.4      Perform the proper sketching, interpretation, and material take-off of floor plans and reflected ceiling plans.

Learning Content:

- 1.3.1 Construct drawings using lines, symbols, abbreviations, and scales.
- Identify commonly-used drafting equipment and materials.
  - Distinguish between the different lines, symbols, scales, and dimensioning conventions.
  - Produce floor plans and reflected ceiling plans.
- 1.3.2 Apply the techniques of producing an orthographic projection of a small building.
- Identify plan, elevation, and section drawings and state their application.
  - Sketch an orthographic projection of a simple building including all plan, elevation, and section drawings.
- 1.3.3 Interpret the language of construction drawings.
- Identify and interpret the different lines, symbols, and scales of the various plan, elevation, and section drawings of a given set of construction drawings.
  - Identify and interpret floor plans and reflected ceiling plans.
- 1.3.4 Perform the proper sketching, interpretation, and material take-off of floor plans and reflected ceiling plans.
- Perform a material take-off from a set of floor plans and reflected ceiling plans.

Evaluation Structure:

Theory Testing: 25%

Application Exercises: -

Number: 1.4  
Unit Title: Computers  
Duration: 24 Total Hours  
Theory: 24 hours Practical: 0 hours  
Prerequisites: None  
Co-requisites: None  
Cross-reference to Learning Outcomes: U4315.13, U4315.14

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice is able to identify all components of a personal computer (PC) and produce various reports / assignments with the use of Microsoft Applications.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 1.4.1 Develop the basic computer skills for use in word-processing and spreadsheet applications.

Learning Content:

1.4.1 Develop the basic computer skills for use in word-processing and spreadsheet applications.

- Identify the main components of the personal computer and state their function.
- Perform the basic actions of turning on the computer and accessing software packages using DOS and/or WINDOWS.
- Perform basic applications in a word processing environment.
- Perform basic applications in a spreadsheet format.

Evaluation Structure:

Theory Testing: 75%

Application Exercises: -

Number: 1.5  
Title: Suspended Ceiling Systems  
Duration: 24 Total hours  
Theory: 8 hours Practical: 16 hours  
Prerequisites: Unit 1, 2, 3  
Co-requisites: Unit 1, 2, 3  
Cross-reference to Learning Outcome: U4324.01

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to identify all components and apply the proper tools to installing suspended ceiling systems.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 1.5.1 Identify the tools, components, accessories, layout, and installation procedures of suspended ceiling systems.
- 1.5.2 Select the proper installation of suspended ceiling systems as per plans and specifications.

Learning Content:

- 1.5.1 Identify the tools, components, accessories, layout, and installation procedures of suspended ceiling systems.
- Identify the components, accessories, and types of tile of T-BAR and suspended drywall systems.
  - Sketch a grid system and layout pattern for a suspended ceiling system including spacing, hangers, and wire gauge.
  - Describe leveling techniques associated with water levels, lasers, lines, etc.
- 1.5.2 Select the proper installation of suspended ceiling systems as per plans and specifications.
- List the steps for the installation of suspended ceiling systems.
  - Identify ceiling types and components as per plans and specifications.
  - Install fasteners and hangers for ceilings as per specifications.
  - Install and level ceiling suspensions as per plans and specifications.
  - Install bulkheads and soffits as per plans and specifications.
  - Install ceiling tile finishes as per plans and specifications.
  - Fabricate and install access panels as per plans and specifications.

Evaluation Structure:

Theory Testing: 8%

Application Exercises: 11%



Number:	1.6
Title:	Partitions and Curtain Walls
Duration:	96 Total Hours
	Theory: 20 hours      Practical: 76 hours
Prerequisites	Unit 1, 2, 3, 5
Co-requisites:	Unit 1, 2, 3, 5
Cross-reference to Learning Outcomes:	U4317.03, U4320.01-U4320.09, U4322.01 – U4322.08

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to erect steel-stud walls, apply drywall and describe the application of acoustic and thermal insulation at a basic level.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 1.6.1 Describe the components and installation procedures for steel-stud walls and curtain walls.
- 1.6.2 Identify the types, components, accessories, and installation procedures of drywall products.
- 1.6.3 Select and install steel-stud walls and curtain walls and their accessories as per plans and specifications.
- 1.6.4 Select and apply drywall and its accessories to walls and ceilings as per plans and specifications.

Learning Content:

1.6.1 Describe the components and installation procedures for steel-stud walls and curtain walls.

- Identify the components, sizes, spacing, gauges (structural vs. non-structural), fasteners, openings, and framing of steel-stud walls and curtain walls.
- Describe the squaring, layout, plumbing, and alignment procedures for steel stud walls.
- Identify jigs and templates and bracing techniques used in the installation of curtain walls.

1.6.2 Identify the types, components, accessories, and installation procedures of drywall products.

- Identify types of drywall and components, fasteners, spacing, thicknesses, fire ratings, MR, WR, exterior board, foil-backed, coreboard, vinyl board, gyplap sheeting, gypsum lath, blueboard, cement board, etc.
- Describe cutting techniques and installation procedures for drywall application.
- Describe the application of drywall to ceilings, soffits and bulkheads.
- Identify drywall accessories and trim (corner bead, L-trim, J-trim, paper corners, etc., expansion joints, control joints, acoustical sealants, caulking) and state their application.

1.6.2 Select and install steel-stud walls and curtain walls and their accessories as per plans and specifications.

- Describe the steps for the installation, fastening, leveling, plumbing, and squaring of metal door frames.
- Layout and install track, studs, stiffeners, and insulation as per plans and specifications.
- Layout partition walls plumb and aligned as per plans and specifications.
- Fasten the floor and ceiling tracks.
- Select the required hollow metal door and window frames for openings.
- Install studs and accessories as per plans and specifications.
- Install hollow metal frames with reinforcing studs at doors and window openings.

1.6.4 Select and apply drywall and its accessories to walls and ceilings as per plans and specifications.

- Select wallboard as per plans and specifications.
- Determine starting point for wallboard application.
- Install wallboard to studs fastening and spacing screws as per plans and specifications.
- Apply wallboard to curved surfaces as per plans and specifications.
- Apply a double layer of wallboard as per plans and specifications.
- Apply accessories to wallboard as per specifications.

Evaluation Structure:

Theory Testing: 25%

Application Exercises: 50%

Number:	1.7
Title:	Residential Steel-Stud Construction
Duration:	42 Total Hours
	Theory: 12 hours      Practical: 30 hours
Prerequisites:	Unit 1, 2, 3, 5, 6
Co-requisites:	Unit 1, 2, 3, 5, 6
Cross-reference to Learning Outcomes:	U4317.01 – U4317.06

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to describe and apply the proper material and techniques used in residential construction.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 1.7.1 Describe the material and framing techniques of steel studs used in residential construction.
- 1.7.2 Layout and install residential steel-framed floors, walls, ceilings, and roofs as per plans and specifications.

Learning Content:

- 1.7.1 Describe the material and framing techniques of steel studs used in residential construction.
- Identify types of structural steel studs and components, fasteners, spacing, thicknesses, fire ratings, etc., as used in residential construction.
  - Describe cutting techniques and installation procedures of track and stud.
  - Describe and sketch floor framing systems – beams, joists, and stairwell openings.
  - Identify load-bearing walls, and calculate lengths of headers (lintels), jacks, cripples, etc.
  - Describe the design of trusses and calculate and sketch the layout of the connection points of trusses.
  - Identify the accessories and trim related to residential steel construction.
- 1.7.2 Layout and install residential steel-framed floors, walls, ceilings, and roofs as per plans and specifications.
- Apply layout procedures as per plans and specifications and develop a materials' cutting list.
  - Measure, cut, and install headers, jacks, lintels, cripples, load-bearing walls.
  - Measure, cut, and install floor framing complete with stairwell opening.
  - Measure, cut, and install roof framing with rafters and trusses.
  - Measure, cut, and apply decking, sheathing and rigid insulation.

Evaluation structure:

- Theory Testing: 11%
- Application Exercises: 18%

Number: 2.1

Title: Geometry Theory and Application

Duration: 48 Total Hours

Theory: 16 hours      Practical: 32 hours

Prerequisites: Level 1, Unit 2

Co-Requisites: None

Cross-reference to Learning Outcomes: U4316.04, U4322.05, U4322.06, U4324.04

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to apply the techniques of advanced geometric construction as applied to the trade.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.1.1      Layout and construct archways, dome ceilings, vaulted groin ceilings, and curved walls and bulkheads as per plans and specifications.

Learning Content:

- 2.1.1            Layout and construct archways, dome ceilings, vaulted groin ceilings, and curved walls and bulkheads as per plans and specifications.
- Describe and draw:
    - Segmental, gothic, elliptical, parabolic, hyperbolic arches.
    - Regular polygons: pentagon, hexagon, and octagon.
    - Vaulted groin layout.
    - Dome ceilings and light coves.
    - Curved walls and bulkheads.
  
  - Layout and construct:
    - Segmental, gothic, elliptical, parabolic, hyperbolic arches.
    - Regular polygons: pentagon, hexagon, and octagon.
    - Vaulted groin ceilings.
    - Dome ceilings and light coves.
    - Curved walls and bulkheads.

Evaluation Structure:

Theory Testing:            25%

Application Exercises:    23%

Number:	2.2
Title:	Suspended Ceilings
Duration:	48 Total Hours
	Theory: 12 hours      Practical: 36 hours
Prerequisites:	Level I, Unit 5
Co-requisites:	Level I, Unit 1 - 3
Cross-reference to Learning Outcomes:	U4324.01 – U4324.06

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to identify, and apply all the components and installation techniques of the more advanced suspended ceiling systems.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.2.1 Identify and list all components and installation techniques of advanced suspended ceiling systems.
- 2.2.2 Select and install suspended ceiling systems as per plans and specifications.



Learning Content:

2.2.1 Identify and list all components and installation techniques of advanced suspended ceiling systems.

- List the components of, sketch the layout of, and describe the installation techniques of rectangular layout, 45° layout, bulkheads, soffits, etc., of the following:
  - Accessible Tile Systems (ATS);
  - Coffered Ceilings (Metal Pan);
  - Linear Systems.

2.2.2 Select and install suspended ceiling systems as per plans and specifications.

- Select the components of, layout, and install rectangular layout, 45° layout, bulkheads, soffits, riveting, etc., of the following:
  - Accessible Tile Systems (ATS);
  - Coffered Ceilings (Metal Pan);
  - Linear Systems.

Evaluation Structure:

Theory Testing: 19%

Application Exercises: 25%

Number:	2.3
Title:	Drywall Partitions and Ceilings
Duration:	54 Total Hours
	Theory: 20 hours      Practical: 34 hours
Prerequisites:	Level I, Unit 6
Co-requisites:	Level I, Unit 1-3, 5
Cross-reference to Learning Outcomes:	U4318, U4320, U4323

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to identify the procedures to select and install drywall partitions and shaft wall systems.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.3.1      Select the materials, components, and installation procedures of drywall partitions and shaft wall systems as per plans and specifications.
- 2.3.2      Select and install moulded and cast forms as per plans and specifications.

Learning Content:

- 2.3.1 Select the materials, components, and installation procedures of drywall partitions and shaft wall systems as per plans and specifications.
- Identify and select metal components for specific installations as per plans and specifications.
  - List components of a shaft wall system.
  - Identify coreboard and accessories as per plans and specifications.
  - Describe the installation of exterior finish board and Exterior Insulation Finish Systems (EIFS).
  - Describe the installation of X-ray shielding to wall studs.
  - Describe the importance of air leakage control and sound dampening and the application of acoustical sealants and caulking as per plans and specifications.
- 2.3.2 Select and install moulded and cast forms as per plans and specifications.
- Select metal components for specific installations as per plans and specifications.
  - Install components of a shaft wall system.
  - Install coreboard and accessories as per plans and specifications.
  - Apply exterior finish board.
  - Layout and install the substructure for moulded and cast forms as per plans and specifications.
  - Apply the finish forms to the substructure.

Evaluation Structure:

Theory Testing: 31%

Application Exercises: 25%

Number:	2.4
Title:	Demountable Partitions
Duration:	36 Total Hours
	Theory: 8 hours      Practical: 28 hours
Prerequisites:	Level 1, Unit 6
Co-requisites:	Level 1, Unit 1 – 3, 5 & 6
Cross-reference to Learning Outcomes:	U4326

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to identify and select proper materials, components and installation procedures to install demountable partitions.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.4.1      Select the materials, components, and installation procedures of demountable partitions as per plans and specifications.
- 2.4.2      Install demountable partitions.

Learning Content:

- 2.4.1 Select the materials, components, and installation procedures of demountable partitions as per plans and specifications.
- Identify the components of de-mountable partition walls on a construction project (progressive and non-progressive) as per plans and specifications.
  - Describe the installation of pre-finished tracks on a construction project as per plans and specifications.
  - Describe the framing of rough openings for windows and doors as per plans and specifications.
  - List the steps in the application of pre-finished panels and finished trims and accessories as per plans and specifications.
  - List the properties of sound insulation and sound baffles and describe the installation procedures.
  - List the different products and processes for cleanup procedures for vinyl drywall upon completion of the job.
- 2.4.2 Install demountable partitions.
- Install de-mountable partitions as per plans and specifications.
  - Install pre-finished tracks as per plans and specifications.
  - Frame openings for windows and doors as per plans and specifications.
  - Apply pre-finished panels as per plans and specifications.
  - Apply finished trims and accessories as per plans and specifications.
  - Perform cleanup procedures on the vinyl drywall.

Evaluation Structure:

Theory Testing: 13%

Application Exercises: 21%

Number: 2.5  
Title: Raised-Access Flooring  
Duration: 12 Total Hours  
Theory: 4 hours Practical: 8 hours  
Prerequisites: None  
Co-requisites: Level 1, Unit 1 – 3, 5 - 7  
Cross-reference to Learning Outcomes: U4325

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General Learning Outcome:

To develop in the apprentice knowledge of the materials, components, and installation procedures of raised-access flooring as per plans and specifications.

To develop in the apprentice skill in the selection and installation of raised-access flooring as per plans and specifications.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.5.1 Identify the materials, components and installation procedures of raised-access flooring.
- 2.5.2 Select and install raised-access flooring.

Learning Content:

2.5.1 Identify the materials, components, and installation procedures of raised-access flooring.

- Identify the materials and components of raised-access flooring.
- Apply the principles of construction geometry to the layout of square grid lines.
- Describe the installation of the substructure for raised-access floors as per manufacturers' specifications.
- Describe the installation of access floor panels into the grid using suction lift tool.
- Describe the installation of vinyl baseboard mouldings around perimeter of the floor as per plans and specifications.
- Describe the installation of ramps, stairs, and handrails for raised-access floors as per plans and specifications.

2.5.2 Select and install raised-access flooring.

- Layout grid lines for raised-access flooring as per plans and specifications.
- Install and level the pedestals of the substructure for raised-access floors with a laser level as per manufacturers' specifications.
- Install access floor panels into the grid using suction lift tool.
- Install ramps, stairs, and handrails for raised-access floors as per plans and specifications.

Evaluation Structure:

Theory Testing: 5%

Application Exercises: 6%

Number:	2.6
Title:	Trade Calculations
Duration:	24 Total Hours
	Theory: 24 hours      Practical: 0 hours
Prerequisites:	Level I, Unit 2
Co-requisites:	Level I, Unit 1 - 3
Cross-reference to Learning Outcomes:	U4316.03

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to apply trade calculations to trade applications.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.6.1    Apply knowledge of trade applications of ratio and proportion.
- 2.6.2    Apply equations and formulae used in the trade computations.
- 2.6.3    Apply the basic trigonometric ratios of the right-angles triangle.



Learning Content:

- 2.6.1 Apply knowledge of trade applications of ratio and proportion.
- Relate fractions and ratios.
  - Solve simple ratio equations by cross-multiplication.
  - Apply ratio and proportion computations to scaling up or down of geometric figures.
- 2.6.2 Apply equations and formulae used in the trade computations.
- Apply Pythagoras' theorem to find the unknown length of a side of a right-angled triangle.
  - Apply stair calculation formulae to determine unit rise, unit run, tread size, headroom, and stairwell opening as governed by the Ontario Building Code.
  - Apply roof calculations formulae to determine rafter lengths and truss chord positions for residential steel framing.
- 2.6.3 Apply the basic trigonometric ratios of the right-angles triangle.
- Define the trigonometric ratios of sine, cosine, and tangent for a right-angled triangle.
  - Apply the appropriate trigonometric ratio to find the unknown lengths of the sides of a right-angled triangle.
  - Apply the inverse of the appropriate trigonometric ratio to find the unknown angles of a right-angled triangle.

Evaluation Structure:

Theory Testing: 100%

Application Exercise: -

Number:	2.7
Title:	Plan Reading
Duration:	36 Total Hours
	Theory: 36 hours      Practical: 0 hours
Prerequisites:	Level 1, Unit 3
Co-requisites:	Level I, Unit 1 – 3
Cross-reference to Learning Outcomes:	U4316.01

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to interpret computerized plans and specifications, engineered drawings and section details as well as room finishes and change orders.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.7.1 Interpret computerized plans and specifications.
- 2.7.2 Interpret engineered drawings and section details.
- 2.7.3 Interpret room finishes, finish schedules, and change orders.

Learning Content:

2.7.1 Interpret computerized plans and specifications.

- Access construction drawings on the computer and identify and interpret: lines, symbols, abbreviations, scales, elevations, and floor and ceiling plans.
- Access construction specifications on the computer and determine the requirements for a given job.

2.7.2 Interpret engineered drawings and section details.

- Access engineered drawings on the computer and identify the requirements for a given job.
- Access section details on the computer and determine the requirements for a given job.

2.7.3 Interpret room finishes, finish schedules, and change orders.

- Access finish schedules on the computer and determine the requirements for a given job.
- Access change orders on the computer and determine the requirements for a given job.

Evaluation Structure:

Theory Testing: 100%

Application Exercises: -

Number: 2.8  
Title: Metal Cutting and Welding  
Duration: 36 Total Hours  
Theory: 8 hours Practical: 28 hours  
Prerequisites: None  
Co-Requisites: Level 1, Unit 1  
Cross-reference to Learning Outcomes: U4315.11, U4315.12

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to identify and apply health regulations and safe operation practices for electrical welding equipment, using both Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW).

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.8.1 List and identify the health regulations, safe operation practices, and the setup procedures of electrical welding equipment - Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW).
- 2.8.2 Select and apply specific electrodes for the production of various welded joint designs and thickness.

Learning Content:

- 2.8.1 List and identify the health regulations, safe operation practices, and the setup procedures of electrical welding equipment - Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW).
- Select, wear, and maintain personal protective equipment for SMAW.
  - State the correct procedures for the setup and operation of SMAW equipment.
  - List the units of basic electricity and identify the relationships and principles from which the units are derived.
  - Distinguish between direct and alternating current (AC – DC).
  - Select the current and polarity to perform a welding task.
  - Strike and maintain arc.
  - Select, wear, and maintain personal protective equipment for GMAW.
  - Identify the parts and components of a Metallic Inert Gas (MIG) welder.
  - Identify personal protective equipment pertaining to safety in welding.
  - Distinguish between the types of welding and their applications.
  - Identify the types of welding equipment and their components.
  - Identify the type of fire extinguisher as per type of fire.
- 2.8.2 Select and apply specific electrodes for the production of various welded joint designs and thickness.
- Select specific electrodes as per welding task.
  - Operate SMAW and GMAW equipment to complete a minimum of two tee and lap joints using a variety of electrodes and sizes.
  - Select specific wires for use in the production of various joint designs and thickness.
  - Operate GMAW equipment to complete a minimum of two tee and lap joints using 0.035" wire on a variety of metal thickness.

Evaluation Structure:

Theory Testing: 60%

Application Exercises: 40%

Number: 2.9  
Title: Thermal and Sound Theory and Application  
Duration: 6 Total Hours  
Theory: 6 hours Practical: 0 hours  
Prerequisites: None  
Co-requisites: Level 1, Unit 1 - 3, 5 - 7  
Cross-reference to Learning Outcomes: U4319

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General Learning Outcome:

Upon successful completion of the reportable subject, the apprentice will be able to identify and select the materials, components, and installation procedures of thermal and sound insulation as per plans and specifications.

Learning Outcomes:

Upon successful completion, the apprentice will be able to:

- 2.9.1 Identify the materials, components, and installation procedures of thermal and sound insulation.

Learning Content:

2.9.1 Identify the materials, components, and installation procedures of thermal and sound insulation.

- Identify thermal and sound insulation and barriers as per plans and specifications.
- Select fastening methods as per plans and specifications.
- Describe the installation of insulation or sound attenuation blankets.
- Describe the installation of air-vapour barriers.
- Describe the sealing of air-vapour barriers as per plans and specifications.
- Plan the layout and installation of baffles as per plans and specifications.

Evaluation Structure:

Theory Testing: 8%

Application Exercises: -

## Shop Tool List

- 1 Laser Level and Tripod
- 1 Water Level
- 1 Metal Shears
- 1 Metal Nibblers
- 2 Electric Drills
- 2 Right Angle Drills
- 1 Hammer Drill
- 2 Screw Guns (Heavy Duty)
- 1 Compound Mitre Saw
- 1 Metal Chop Saw
- 1 Circular Saw
- 1 Table Saw
- 2 Powder-Actuated Nail Guns (Low-velocity)
- 1 Set of Benders
- 1 Bolt Cutters (24")
- 1 Deck Punch
- 4 4' Spirit Levels with magnets



## Shop Equipment

- 10** Step Ladders @ 6' (fiberglass or wood)
- 1** Drywall Cart
- 3** Sections scaffolding, leveling jacks, legs, wheels, outriggers, pins, banana clips
- 6** Aluminum Scaffold Planks (approved)
- 8** Baker's Scaffold
- 1** Rigging Kit
- 16** Extension Cords (14-3)
- 1** Shop Vacuum
- 6** Shop Floor Brooms
- 3** Flat Shovels (Cleanup)
- 2** Garbage carts on wheels (Rubbermaid)

Minimum FACILITY REQUIREMENTS for 16 Apprentices

<b>Classroom:</b>	Desks / Tables, Chairs, Audio-Visual Equipment
<b>Computer Room:</b>	16 Computers with capability to run Win 3.1 and CAD program
<b>Welding Shop:</b>	ARC and MIG welding equipment to serve 16 apprentices
<b>Shop Floor Area:</b>	<b>180</b> sq. ft. per apprentice**, adequate power supply & ventilation
	Storage Area of 1500 sq. ft.
	Instructor Office Area adjoining the Shop

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**200 ft<sup>2</sup> per extra apprentice**