Skilled Trades Ontario | Métiers spécialisés Ontario

Apprenticeship Curriculum Standard

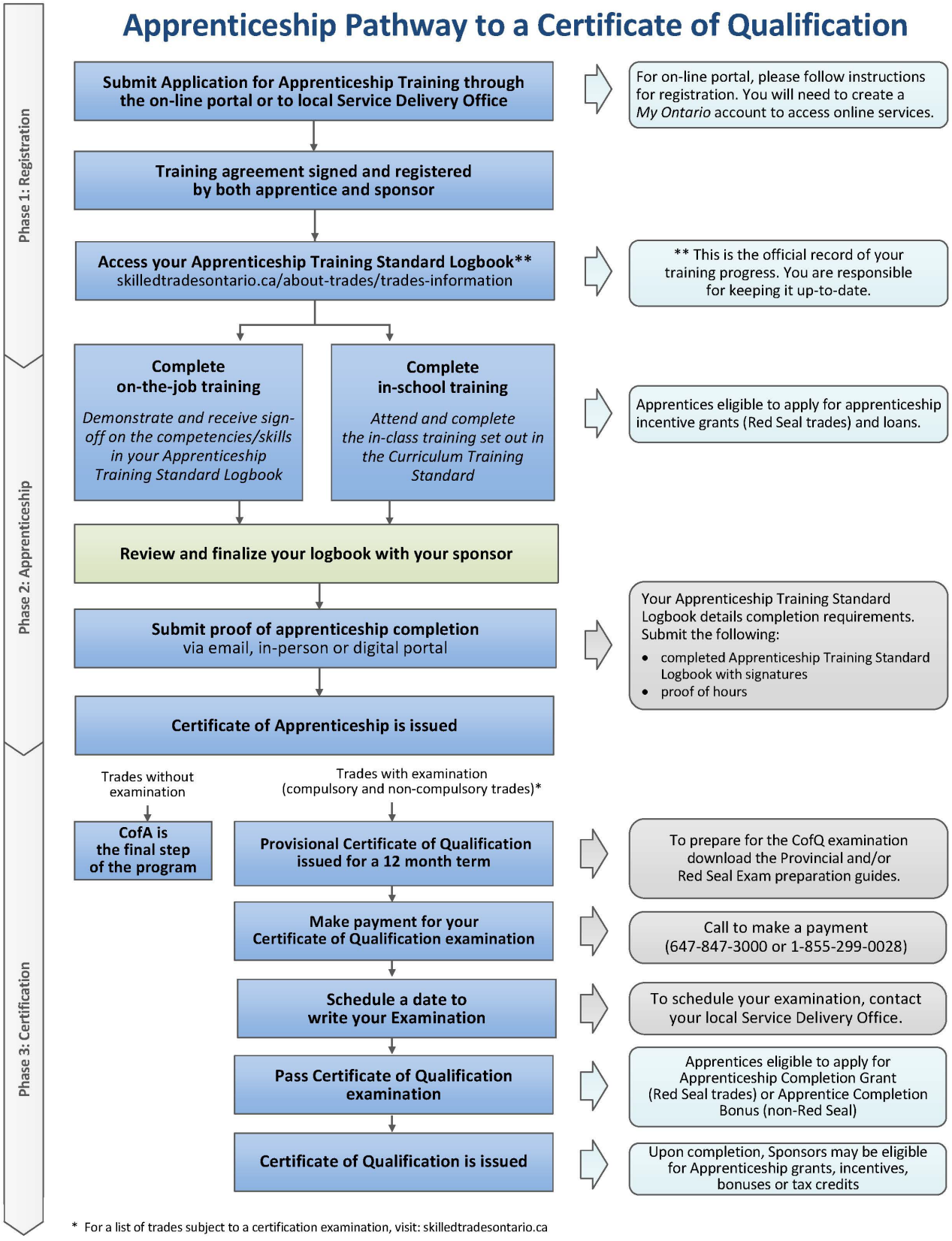
Cabinet Maker

Levels 1, 2, & 3

438A

2011

Apprenticeship Pathway to a Certificate of Qualification



* For a list of trades subject to a certification examination, visit: skilledtradesontario.ca

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Please Note: This Standard has been revised to reflect the visual identity of Skilled Trades Ontario (STO) which replaced the Ontario College of Trades on January 1, 2022. The content of this Standard may refer to the former organization; however, all trade specific information or content remains relevant and accurate based on the original date of publishing.

Please refer to STO's website: **skilledtradesontario.ca** for the most accurate and up to date information. For information about BOSTA and its regulations, please visit ***Building Opportunities in the Skilled Trades Act, 2021* (BOSTA).**

Any updates to this publication are available on-line; to download this document in PDF format, please follow the link: Skilled Trades Ontario.ca.

Maintained with transfer to Skilled Trades Ontario 2011 (V100)

Preface

This curriculum standard for the Cabinet Maker trade program is based upon the on-the-job performance objectives, located in the industry-approved training standard.

The curriculum is organized into 3 levels of training. The Reportable Subjects Summary chart (located on page 2) summarizes the training hours for each reportable subject.

The curriculum identifies the learning that takes place in-school. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship Training Standards.

Employers/Sponsors are expected to extend the apprentice's knowledge and skills through practical training on a work site. Regular evaluations of the apprentice's knowledge and skills are conducted throughout training to verify that all apprentices 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.

Please refer to Skilled Trades Ontario website (www.skilledtradesontario.ca) for the most accurate and up-to-date information about Skilled Trades Ontario. For information on *Building Opportunities in the Skilled Trades Act, 2021 (BOSTA)*) and its regulations, please visit Building Opportunities in the Skilled Trades Act, 2021, S.O. 2021, c. 28 - Bill 288 (ontario.ca)

Pre-requisites
In order to advance to Level 2 of the apprenticeship program, an individual must have completed all of the units outlined in Level 1. Similarly, in order to advance to Level 3 of the program, an individual must have completed all of the units outlined in Level 1 and 2.

Hours Disclaimer
It is agreed that Training Delivery Agents (TDAs) may need to make slight adjustments (with cause) according to particular apprentice needs and may deviate from the unit sequencing and the prescribed practical and theoretical hours shown within the standard. However, all TDAs will comply with the hours at the reportable subject level.

Suggested Equipment for Training Delivery Agencies
The listing of tools on page 139 does not list minimum quantities based on the understanding that the delivering TDA is in the best position to determine the need based on its delivery methodology.

Personal and Safety Equipment: Personal protective equipment is at the discretion of the TDA who must conform to Ontario Provincial Health and Safety Regulations.

Participation by Stakeholders

A consortium of seven Colleges of Applied Arts and Technology, working in collaboration with the Ministry of Training, Colleges and Universities and Industry Stakeholders, participated in the development of this document. The development and subsequent revisions were based on the new training standards that were previously revised by the industry advisory group. The development was completed using a process and format approved by MTCU.

Reportable Subject Summary

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical
Level 1				
S1461	Protect Self and Others	15	10	5
S1462	Applied Trade Calculations	30	26	4
S1463	Trade Drawings & Layouts	30	30	0
S1464	Materials	33	30	3
S1465	Hand Tools & Portable Power Tools	42	11	31
S1466	Stationary Machines & Production Sequences	42	14	28
S1467	Cabinet Construction	48	15	33
Level 2				
S1468	Cutting Tool Theory	12	12	0
S1469	Materials	24	24	0
S1470	Trade Drawings & Layout	33	33	0
S1471	Stationary Machines &Production Sequences	60	12	48
S1472	Cabinet Construction	84	21	63
S1473	Finishing	18	6	12
S1474	Introduction to Computers	9	9	0
Level 3				
S1475	Trade Drawings	30	29	1
S1476	Production Machines	30	9	21
S1477	Production Sequences	48	12	36
S1478	Cabinet Construction	78	15	63
S1479	Finishing	36	18	18
S1480	Site Installation	18	12	6
	Total	720	348	372

Level 1

Reportable Subject Summary – Level 1

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practic
S1461	Protect Self and Others	15	10	5
S1462	Applied Trade Calculations	30	26	4
S1463	Trade Drawings & Layouts	30	30	0
S1464	Materials	33	30	3
S1465	Hand Tools & Portable Power Tools	42	11	31
S1466	Stationary Machines & Production Sequences	42	14	28
S1467	Cabinet Construction	48	15	33
	Total	**240**	**136**	**104**

Number:	S1461		
Title:	**Protect Self and Others**		
Duration:	Total Hours: 15	Theory: 10	Practical: 5
Prerequisites:	None		
Content:	S1461.1	*Occupational Health and Safety Act,* Workplace Safety Insurance Board and Industrial Accident Prevention Association	
	S1461.2	General Safety Standards	
	S1461.3	Workplace Hazardous Materials Information System (WHMIS)	

Number:	S1461.1		
Title:	***Occupational Health and Safety Act*, Workplace Safety Insurance Board and Industrial Accident Prevention Association**		
Duration:	Total Hours: 3	Theory: 2	Practical: 1

General Learning Outcomes

Interpret the *Occupational Health and Safety ACT* (O.H.S.A), Workplace Safety Insurance Board (W.S.I.B) and the Industrial Accident Prevention Association (I.A.P.A.) in accordance with Government safety regulations and the applicable workplace requirements.

Learning Outcomes and Content

1.1 State the meaning of the term “workplace”.
- define workplace
- types of workplaces

1.2 Outline the obligations of the employer
- according to the *Occupational Health And Safety Act*
- according to the W.S.I.B.
- according to the I.A.P.A

1.3 Outline the obligations of the employee
- according to the *Occupational Health And Safety Act*
- according to the W.S.I.B.
- according to the I.A.P.A

1.4 Explain the cooperative mandatory obligations of the employers and employees.
- according to the *Occupational Health And Safety Act*
- according to the W.S.I.B.
- according to the I.A.P.A.
- industry standards and expectations

1.5 Describe main points of the right not to work in an unsafe place.

- environmental quality
- equipment and machine condition
- housekeeping
- fire hazards/means of egress

1.6 Describe the action to be taken in case of accident or death.

- first aid
- legal and moral obligations
- documentation requirements

Number:	S1461.2		
Title:	**General Safety Standards**		
Duration:	Total Hours: 9	Theory: 6	Practical: 3

General Learning Outcomes

The apprentice is able to apply safe work place practices in accordance with Government safety regulations, manufacturers' recommendations, industry standards and company safety rules.

Learning Outcomes and Content

2.1 Identify and apply housekeeping procedures.
- cleanliness and order in the work area
- storing of tools
- securing loose objects, etc.
- removing hazards
- keeping aisle ways clear
- discuss and carry out plant safety rules

2.2 Identify and apply safety practices related to machinery.
- design and proper use of guards
- warning signs and tag systems
- lubrication of moving machinery parts
- grinding wheel guards and tool rests
- two-hand controls
- machine lockout procedure
- crushing and pinching hazards

2.3 Identify defective hand and power tools.
- mushroomed heads, split handles, etc.
- portable electric tools
- poor connections
- electrical hazards
- defective plugs
- proper groundings
- three way plugs

2.4 State safe carrying and handling procedures.
- precautions against dropping tools when working overhead
- methods of carrying tools safely

2.5 State safe operational procedures for tools and equipment.
- pneumatic tools, special precautions
- exposed rotation parts, twist drills
- spark-proof tools in hazardous areas
- grounding of flammable fluid containers

2.6 Identify safe practices related to avoidance of dermatitis.
- importance of personal cleanliness
- protective clothing, barrier creams, etc.
- allergies

2.7 Identify procedures and regulations related to injuries and their avoidance.
- procedure in case of minor and major injuries, and responding appropriately to emergency situations
- importance of first aid
- location of first aid equipment
- goggles, safety glasses, face shields, kick back aprons, etc.
- special protective clothing
- removal and/or reporting of hazards

2.8 Identify classes of fires and types of extinguishers.
- class “A”
- class “B”
- class “C”
- class “D”

2.9 Identify fire protection practices related to.
- location of extinguishers and alarms
- proper procedures in case of clothing igniting
- sprinkler heads
- storage of flammable liquids and materials
- flammable liquids, gases, dust
- static electricity
- axes, blankets, and hoses
- location of fire exits

2.10 Identify safe practices related to high frequency and electrical equipment.
- extension cords of proper length
- floor protection against exposed wires
- third (grounding) wires
- importance of qualified persons in this area
- procedures for removing persons from live equipment
- artificial respiration
- warning signs and tags: recognition, placement, and removal procedures
- correct machine lock out procedures

2.11 Explain the correct method for lifting and carrying materials.
- recommended safe lifting limits
- correct body mechanics and industrial ergonomics

2.12 Identify and use safety devices for protective clothing, eye and respiratory protection.
- glasses
- shields
- clothing
- footwear
- masks
- breathing apparatus

2.13 Describe procedures or safe practices for protection of the environment.
- disposal of hazardous materials
- contamination of atmosphere

2.14 Identify the ergonomic safety concerns for the workplace.
- standing
- sitting
- walking
- machine operation
- office activities

Number:	S1461.3		
Title:	**Workplace Hazardous Materials Information System (WHMIS)**		
Duration:	Total Hours: 3	Theory: 2	Practical: 1

General Learning Outcomes

The apprentice is able to interpret the Workplace Hazardous Materials Information System (WHMIS) in accordance with government regulations and manufacturers' recommendations.

Learning Outcomes and Content

3.1 Identify the different types of WHMIS labels for:
- corrosive materials
- volatile liquids
- flammable liquids
- oxidizing materials
- poisonous substances

3.2 Define the purpose of Material Safety Data Sheets (MSDS)
- personal safety
- safety of others
- workplace facilities

3.3 Identify the legal requirements with respect to worker training.
- safety committees
- safety inspections
- equipment operation and maintenance.
- government workplace-focused legislation

3.4 Identify the types of information required in WHMIS training programs.

- training objectives
- specific workplace activities
- requires Student Resources
  - The *Occupational Health and Safety Act* 1978 and regulations for Industrial Establishments, Ministry of Labour.
  - Standard Safe Working Practices. Toronto, Ontario, Industrial Accident Prevention Association.
  - Woodworking Health and Safety Guide and Sector Specific Training Program WSIB/IAPA Toronto.

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
65%	25%	10%

Number:	S1462		
Title:	**Applied Trade Calculations**		
Duration:	Total Hours: 30	Theory: 26	Practical: 4
Prerequisites:	None		
Content:	S1462.1	Introduction to Trade Related Calculations and Applications	

Number:	S1462.1		
Title:	**Introduction to Trade Related Calculations**		
Duration:	Total Hours: 30	Theory: 26	Practical: 4
Cross- Reference to Training Standards: 6122			

General Learning Outcomes

Upon successful completion the apprentice is able to describe the procedures to solve trade related calculations in accordance with requirements of the specified trade related tasks.

Learning Outcomes and Content

1.1 Define the history and fundamentals of measuring systems.

- imperial measuring system.
- metric measuring system

1.2 Describe the fundamentals, mathematical formulas and procedures to solve trade related problems for:

- whole numbers
  - addition
  - subtraction
  - division
  - multiplication
  - order of operations

- fractions
  - the concept of fractions
  - the need and use of fractions
  - explanation of terms
  - fraction
  - denominator
  - numerator
  - common fractions
  - proper fractions and improper fractions
  - mixed fractions
  - brackets
  - the need for the common denominator (lowest)

- decimals
  - concepts
  - transition of fractions to decimals
  - omission of the denominator and substitution of the decimal point
  - rounding of decimals
  - decimal equivalent tables

- square root
  - squaring a number
  - square root by calculation
  - square root by estimation
  - division and average

- area
  - basic units of square measure
  - calculations
  - square
  - panel processing
  - yield
  - rectangle
  - triangle
  - circle, cylinder, sphere
  - trade related problems

- volume
  - units of volume measure
  - calculations
  - chemical mixes, glues and finishes
  - rectangular or triangular forms
  - cylinders

- percentage
  - chemical mixes, glues and finishes

- board measure

- ratios

- C.N.C. basic co-ordinates
  - incremental
  - absolute

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
70%	20%	10%

Number:	S1463		
Title:	**Trade Drawings and Layouts**		
Duration:	Total Hours: 30	Theory: 30	Practical: 0
Prerequisites:	None		
Content:	S1463.1	Introduction to Trade Related Drawings and Layouts	
	S1463.2	Production and application of Trade Related Drawings and Layouts	

Required Student Resources

Sundberg, Elmer W. and Proctor, Thomas E. *Building Trades Print reading Part 1*

Umstattd, WM.D, Davis C. W., *Modern Cabinetmaking.* Goodheart-Willcox Co. Inc.Tinley Park, Illinois PC I11.I SBN#1-56637-271-2 (1996)

Number:	S1463.1		
Title:	**Introduction to Trade Related Drawings and Layouts**		
Duration:	Total Hours: 12	Theory: 12	Practical: 0
Cross-Reference to Training Standards: 6123			

General Learning Outcomes

Upon successful completion the apprentice is able to describe the fundamentals and design features of trade related drawings and layouts in accordance with requirements of the specified trade related tasks.

Learning Outcomes and Content

1.1 Define the history, purpose and fundamentals of trade related drawings and layouts.

- historical applications and designs.
- fundamental geometric construction features.
- Identify common symbols used on drawings and layouts for:
  - materials
  - plan
  - elevation
  - section
  - plumbing
  - electrical

- Identify common abbreviations
  - Architectural drawing number systems
  - Specification writers (tender document) section and drawing number systems

- Interpret the alphabet of lines
  - object
  - hidden
  - centre
  - extension
  - dimension
  - projection
  - cutting plane
  - break
  - others

- Identify standard mechanical drafting techniques and format.
- Interpret blueprints, architectural drawings and engineering drawings
- Identify drafting and sketching tools and equipment
  - scales
  - squares
  - compass/dividers
  - pencils
  - masks and templates

1.2 Describe the design features, types and applications of trade related drawings and layouts.

- Identify the types of drawings and sketches
  - conventional
  - isometric
  - schematic
  - elevation
  - part
  - oblique
  - one and two-point perspective
  - multi-view

- Interpret notes and title blocks including:
  - construction dimensions
  - size dimensions
  - location dimensions
  - cylinders and arcs
  - holes and counter bores
  - angles
  - centers
  - base line dimensions
  - tolerances
  - decimal and fractional dimensions
  - dimensions

- Interpret single view, two view, three view and isometric trade related drawings
  - blueprints,
  - architectural
  - engineering

- Identify the following views:
  - front
  - right side
  - left side
  - bottom
  - back
  - top

Number:	S1463.2		
Title:	**Production and Application of Trade Related Drawings and Layout**		
Duration:	Total Hours: 18	Theory: 18	Practical: 0

General Learning Outcomes

The apprentice is able to produce trade related drawings and layouts in accordance with requirements of the specified trade related tasks.

Learning Outcomes and Content

2.1 Produce samples of trade related elementary sketches.

- arrange and identify the following views:
  - front
  - right side
  - left side
  - bottom
  - back
  - top
  - section

2.2 Produce samples of trade related drawings and layouts.

- use drafting and sketching tools and equipment
  - scales
  - squares
  - compass/dividers
  - pencils
  - masks and templates

- develop the following views:
  - front
  - right side
  - left side
  - bottom
  - back
  - top
  - section

2.3 Produce a bill of materials to job specifications and calculate material quantities.

- job specifications
  - write rough size cutting list (lumber)
  - shop drawings

- calculating material quantities.
  - solid lumber
  - sheet goods
  - volume calculating for finishing material

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
90%	0%	10%

Number:	S1464		
Title:	**Materials**		
Duration:	Total Hours: 33	Theory: 30	Practical: 3
Prerequisites:	None		
Content:	S1464.1	Introduction to Lumber and Wood Materials	
	S1464.2	Lumber Processing Fundamentals	
	S1464.3	Wood Drying or Seasoning	
	S1464.4	Lumber Grading	
	S1464.5	Adhesive-Abrasive	

Number:	S1464.1		
Title:	**Introduction to Lumber and Wood Materials**		
Duration:	Total Hours: 15	Theory: 13	Practical: 2
Cross-Reference to Training Standards: 6125, 6128.05, 6129			

General Learning Outcomes

The apprentice is able to describe fundamentals types and applications of lumber and wood materials in accordance with requirements of the specified trade related tasks.

Learning Outcomes and Content

1.1 Describe the growth characteristics, properties and identifying features of wood.

- outline the historical aspects of lumber and use of wood materials.
- describe the conversion of the log to lumber
- parts of tree
- section of trunk
  - early wood/late wood
  - spring growth/summer growth
  - growth rings
  - heart/sap
  - cell structure
  - rays
  - pith
  - cambium layer

- properties of wood
  - appearance
  - moisture content
  - shrinkage
  - weight
  - density
  - specific gravity
  - working qualities
  - mechanical properties

- identify the characteristics of veneer and plywood materials

1.2 Describe the composition and applications of various wood panel products.

- properties of wood panel products
  - appearance
  - moisture content
  - shrinkage
  - weight
  - density
  - specific gravity
  - working qualities
  - mechanical properties

- Characteristics of veneer and plywood materials
  - plywood
  - particle board

1.3 Describe the construction features, types and applications of lumber and wood materials.

- describe the physical characteristics and properties of wood
- describe the conversion of the log to lumber
- parts of tree
- section of trunk
  - early/late
  - spring/summer
  - growth rings
  - heart/sap
  - cell structure
  - rays
  - pith

- domestic softwoods:
  - fir
  - pine
  - spruce
  - cedar
  - tamarack
  - hemlock

- domestic hardwoods:
  - ash
  - basswood
  - beech
  - birch
  - elm
  - hickory
  - maple (various)
  - walnut
  - poplar
  - cherry
  - red oak
  - white oak
  - American yellow poplar (whitewood)

- exotic hardwoods:
  - teak
  - rosewood
  - ebony
  - mahogany (various)

Number:	S1464.2		
Title:	**Lumber Processing Fundamentals**		
Duration:	Total Hours: 3	Theory: 3	Practical: 0

General Learning Outcomes

The apprentice is able to describe the fundamentals of lumber processing in accordance with the National Hardwood Lumber Association standards, Canadian Softwood Guidelines and Government Safety Regulations.

Learning Outcomes and Content

2.1 Define the history, purpose and fundamentals of lumber processing.

- history of wood cutting
- lumber mills
- hazards
- waste processing
- debarking
- types of mill saws

2.2 Explain the process of sawing lumber.

- flat/plain
- rift
- quarter/edge

Number:	S1464.3		
Title:	**Wood Drying or Seasoning**		
Duration:	Total Hours: 6	Theory: 5	Practical: 1

General Learning Outcomes

The apprentice is able to determine the moisture content of wood in accordance with the National Hardwood Lumber Association Standards and Canadian Softwood Guidelines.

Learning Outcomes and Content

3.1 Explain the purpose and fundamentals of drying or seasoning wood

- describe the relationship between moisture and wood
  - hydroscopic
  - relative humidity
  - equilibrium moisture content
  - shrinkage
  - kiln drying/air drying
  - defects due to seasoning
  - moisture content and measuring

3.2 State the principles and methods of how wood air-dries.

- stacking methods
- free/bound water
- moisture evaporation
- air flow
- humidity and moisture content (relative/equilibrium)
- shrinkage
- free/bound water in the cell structure

3.3 Outline the method of determining moisture content using the oven drying method.

- time
- temperature
- original moisture section
- oven dry moisture section
- formula for calculating moisture content

3.4 Determine the moisture content of lumber during the various stages of the drying or seasoning process.

- use of moisture meters
- resistance-type
- power-loss type
- stacking methods
- drying schedules
- air circulation
- humidity
- kiln efficiency
- cost factors

Number:	S1464.4		
Title:	**Lumber Grading**		
Duration:	Total Hours: 6	Theory: 6	Practical: 0

General Learning Outcomes

The apprentice is able to recognize basis for grading of lumber in accordance with the National Hardwood Lumber Association and Canadian Softwood Guidelines.

Learning Outcomes

4.1 Explain the terms used in lumber grading:
- cuttings
- cutting unit
- sound defects
- unsound defects
- grading face
- clear cuttings

4.2 Identify defects and blemishes in wood, and their effect on the grade:
- white sap
- stain
- discolouration
- loose knots
- rot
- checks and splits
- mineral streaks
- gum pockets

4.3 Outline the rules for grading lumber:
- firsts and seconds
- selects
- #1 common
- #2 common

Number:	S1464.5		
Title:	**Adhesive and Abrasive**		
Duration:	Total Hours: 2	Theory: 2	Practical: 0

General Learning Outcomes

The apprentice is able to recognize types of glues and abrasives.

Learning Outcomes

5.1 Identify the following types of adhesives and discuss the advantages and disadvantages and applications of each:

- animal
- casein
- polyvinyl
- plastic resin
- aliphatic
- resorcinol
- contact (water and solvent based)
- epoxy
- urea

5.2 Identify types of abrasives and discuss the advantages and disadvantages and applications of each:

- Silicon Carbide
- Aluminum Oxide
- Garnet
- Emery

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
80%	10%	10%

Number:	S1465		
Title:	**Hand Tools and Portable Power Tools**		
Duration:	Total Hours: 42	Theory: 11	Practical: 31
Prerequisites:	None		
Content:	S1465.1	Hand Tools	
	S1465.2	Portable Power Tools	
	S1465.3	Jigs, Templates and Fixtures	

Number:	S1465.1		
Title:	**Hand Tools**		
Duration:	Total Hours: 16	Theory: 4	Practical: 12
Cross-Reference to Training Standards: 6124			

General Learning Outcomes

The apprentice is able to use and maintain hand tools to build woodworking projects in accordance with government safety regulations, manufacturers' recommendations and industry standards

Learning Outcomes and Content

1.1 Define the history, purpose and fundamentals of trade related hand tools.

- evolution of hand tools
- quality features vs. cost factors
- basic purpose for each type of hand tool

1.2 Describe the construction features, types and applications of trade related hand tools.

- layout and checking/devices
  - tape measure
  - marking gauge
  - combination square
  - sliding T bevel
  - divider
  - framing square
  - level
  - scratch awl
  - trammel points
  - plumb bob and line
  - depth gauge

- impelling tools
  - curved claw hammer
  - ball peen hammer
  - ripping hammer
  - mallet

- edge cutting tools
  - block plane
  - smooth plane
  - fore plane
  - jack plane
  - jointer plane
  - rabbet plane
  - router plane
  - bull nose plane
  - scraper plane
  - cabinet scraper

- sawing tools
  - rip saw
  - cross cut saw
  - back saw
  - dovetail saw
  - compass saw
  - keyhole saw
  - coping saw
  - hacksaw
  - veneer saw

- drive systems
  - slotted screwdrivers
  - phillips screwdrivers
  - robertson screwdrivers (square recess)
  - yankee screwdrivers
  - posi-drive screwdrivers
  - scrulox screwdrivers

- boring tools
  - countersink
  - forester bit
  - multi-spur bit
  - spade bit
  - twist drill
  - auger bit
  - brad point drill
  - doweling jig
  - hand brace

- clamping devices
  - “c” clamp
  - bar clamp
  - spring clamp
  - band clamp
  - edge clamp
  - miter/corner clamp
  - pipe clamp

- abrading tools
  - single cut file
  - double cut file
  - rasp
  - sanding block

- sharpening stone

1.3 Explain the operating principles of trade related hand tools.

- tool holding methods
- applied angles
- applied pressure

1.4 Perform inspection, evaluation and maintenance of trade related hand tools.

- visual inspection for:
  - fractures
  - wear
  - damaged cutting edges
  - mushroomed ends
  - sharpness

- calibration checks for:
  - levels
  - squares

- maintenance procedures for hand tools:
  - sharpening
  - lubricating
  - aligning
  - adjusting
  - tightening
  - corrosion protection

1.5 Use hand tools to perform trade related tasks.

- sawing
- surfacing
- boring
- sanding
- routing
- lay-out
- screw driving
- sharpening

Number:	S1465.2		
Title:	**Portable Power Tools**		
Duration:	Total Hours: 16	Theory: 4	Practical: 12

General Learning Outcomes

The apprentice is able to use and maintain portable power tools to build woodworking projects in accordance with government safety regulations, manufacturers' recommendations and industry standards.

Learning Outcomes and Content

2.1 Define the history, purpose and fundamentals of trade related portable power tools.

- evolution of portable power tools
- quality features vs. cost factors
- basic purpose for each type of portable power tool

2.2 Describe the construction features, types and applications of trade related portable power tools.

- applications for portable power tools:
  - electrical
  - cordless
  - pneumatic

- types of portable power tools
  - bench grinder
  - hand drills
  - electric
  - pneumatic
  - cordless

- hand sanders
  - oscillating (electric)
  - oscillating (pneumatic)
  - orbital (electric)
  - orbital (pneumatic)
  - in-line (electrical)

- saws
  - sabre saw
  - jig saw
  - circular saw

- trimmers
  - laminate trimmer (electric)
  - laminate trimmer (pneumatic)

- hand Router
  - electrical
  - pneumatic

- guns
  - staple gun
  - nail gun
  - plate jointing machine

- motorized mitre saw

- motorized compound mitre saw

- hinge boring and insertion machine

- construction features:
  - power requirements
  - materials
  - wiring
  - voltage/amperage
  - wattage
  - motor

- cordless tools
  - materials
  - wiring
  - voltage/amperage
  - wattage
  - motor

- pneumatic
  - air pressures
  - air motor

2.3 Explain the operating principles of trade related potable power tools

- electrical
  - power and performance
  - speed control

- cordless
  - power and performance
  - speed control

- pneumatic
  - power and performance
  - air pressures

2.4 Perform inspection, evaluation and maintenance of trade related portable power tools

- visual inspection for:
  - case fractures
  - wear
  - frayed wiring
  - loose components
  - air leaks on pneumatic tools

- performance tests for:
  - specified speeds
  - power output

- maintenance procedures for power tools:
  - lubrication
  - tightening of fasteners
  - repair of electrical cords
  - adjusting
  - tightening

2.5 Use portable power tools to perform trade related tasks.

- sawing
- surfacing
- boring
- sanding
- routing
- screw driving
- sharpening

Number:	S1465.3		
Title:	**Jigs, Templates and Fixtures**		
Duration:	Total Hours: 10	Theory: 3	Practical: 7

General Learning Outcomes

The apprentice is able to fabricate jigs, templates and fixtures to support specified tool operations for building woodworking projects in accordance with government safety regulations, manufacturers' recommendations and industry standards.

Learning Outcomes

3.1 Define the purpose and fundamentals of jigs, templates and fixtures.

- purpose of:
  - jigs
  - templates
  - fixtures

- fundamentals:
  - alignment features
  - stability
  - safety advantages
  - accuracy

3.2 Describe the construction features, types and applications of jigs, templates and fixtures.

- types of jigs
- types of templates
- types of fixtures
- construction and design features
  - materials
  - angles
  - fastening methods

3.3 Explain the operating principles of jigs, templates and fixtures.

- alignment features
- tool guiding features
- safety features
- hold down devices
- work piece guiding

3.4 Perform inspection, evaluation and maintenance procedures of jigs, templates and fixtures.

- visual inspection for:
  - cracks
  - wear
  - loose components
  - effectiveness of safety features

- performance tests for:
  - accuracy
  - alignment

- maintenance procedures for hand tools:
  - set-up procedures
  - tightening of fasteners
  - adjusting

3.5 Use jigs, templates and fixtures to perform trade related tasks.

- sawing
- surfacing
- boring
- sanding
- routing
- lay-out
- screw driving
- sharpening

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
30%	60%	10%

Number:	S1466		
Title:	**Stationary Machines and Production Sequences**		
Duration:	Total Hours: 42	Theory: 14	Practical: 28
Prerequisites:	None		
Content:	S1466.1	Stationary Machines	
	S1466.2	Production Sequences	

Number:	S1466.1		
Title:	**Stationary Machines**		
Duration:	Total Hours: 26	Theory: 10	Practical: 16

General Learning Outcomes

The apprentice is able to operate, troubleshoot and maintain stationary machines in accordance with equipment manufacturers' recommendations, government regulations, and industry standards.

Learning Outcomes and Content

1.1 Identify the history, purpose and fundamentals of stationary machines.

- machine evolution
- industry applications
- quality vs. cost
- tool geometry
- safety features and accessories

1.2 Describe the construction features, types and application of stationary machines.

- machine types and applications for the following woodworking activities:
  - sawing
  - surfacing
  - routing
  - edge banding
  - shaping

- safety features and accessories

- construction features
  - body/frame
  - control devices
  - mountings and hold down methods
  - drive systems
  - devices and work pieces
  - safety guards
  - work piece characteristics

1.3 Explain the principles of operation for stationary machines.

- operating speeds
- tool geometry/nomenclature
- cutting and milling characteristics
- lubrication
- safety features and accessories
- cuts per inch

1.4 Inspect, test and troubleshoot stationary machines.

- visual inspection for:
  - loose fasteners and components
  - fractures
  - missing components
  - contamination
  - ventilation
  - rotation
  - safety device location and adjustments

- test machine for:
  - speed
  - accuracy
  - performance/safety
  - vibration

1.5 Operate stationary machines in accordance with manufacturers' recommendations and government safety regulations.

- outline the machine set-up procedures.
  - adjustments
  - speed settings
  - jigs and fixtures

- perform stationary machine operations for:
  - sawing
  - surfacing
  - routing
  - edge banding
  - shaping

1.6 Perform stationary machine maintenance procedures in accordance with manufacturers' recommendations and government safety regulations.

- lubrication
- cleaning
- leveling

Number:	S1466.2		
Title:	**Production Sequences**		
Duration:	Total Hours: 16	Theory: 4	Practical: 12

General Learning Outcomes

The apprentice is able to perform production sequences in accordance with equipment manufacturers' recommendations, government safety regulations, and industry standards.

Learning Outcomes and Content

2.1 Identify the purpose and fundamentals of production sequences by defining terms
- breakout
- reference surface
- machine sequence
- machining
- finish machining
- rough milling
- sanding
- sub assembly
- unit assembly

2.2 Determine the sequence of machine operations for:
- rough end process
- machinery sequences
- jigs/templates
- sanding

2.3 Perform basic break out/rough mill operations taking into consideration raw material form and size.
- application of theory and safety practices
- set up of tool jigs, templates and fixtures
- sawing, surfacing and sanding
- evaluate machining performance

2.4 Produce a reference surface and true up stock.
- inspect, orient and rough-size stock
- initiate-lanning sequence
- evaluate machining performance
- squaring

2.5 Describe the order of sub-assembly operations on appropriate equipment, assembly jigs and/or fixtures.
- glue up time
- case sub-assemblies
- doors
- drawers
- plantons/ornamental components

2.6 Perform basic fitting assembly operations.
- cut to final size
- doors drawers and shelves
- plantons/overlays/ornamental components

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
30%	60%	10%

Number:	S1467		
Title:	**Cabinet Construction**		
Duration:	Total Hours: 48	Theory: 15	Practical: 33
Prerequisites:	None		
Content:	S1467.1	Introduction to Basic Cabinet Construction	
	S1467.2	Cabinet Construction Joints	
	S1467.3	Cabinet Construction Fasteners and Hardware	
	S1467.4	Machining, Sanding and Assembly	

Number:	S1467.1		
Title:	**Introduction to Basic Cabinet Construction**		
Duration:	Total Hours: 3	Theory: 3	Practical: 0
Cross-Reference to Training Standards: 6126.01, 6127, 6128, 6129			

General Learning Outcomes

Upon successful completion the apprentice is able to describe the fundamentals and design features of basic cabinet construction in accordance with government safety regulations, acceptable industry standards and the requirements of the specified trade related tasks.

Learning Outcomes and Content

1.1 Define the purpose and fundamentals of basic cabinet construction.

- cabinet standards
  - Ontario Building Code – Barrier Free
  - North American Quality Standards for Architectural Millwork
  - interpret cabinet standards.
- define the following terms:
  - dowels
  - plate joinery
  - adhesives
  - joints

1.2 Describe the design features, types and applications of basic cabinet construction.

- cabinet types and applications**:**
  - household
  - kitchen
  - store
  - office
  - economy grade
  - custom grade
  - premium grade

- cabinet materials:
  - hard woods
  - soft woods
  - laminated woods
  - manufactured sheet materials
    - solid wood vs. laminated wood
    - plastic materials

Number:	S1467.2		
Title:	**Cabinet Construction Joints**		
Duration:	Total Hours: 27	Theory: 7	Practical: 20

General Learning Outcomes

Upon successful completion the apprentice is able to perform basic cabinet joint construction in accordance with government safety regulations, acceptable industry standards and the requirements of the specified trade related tasks.

Learning Outcomes and Content

2.1 Define the history, purpose and fundamentals of basic cabinet construction joints.

- historical evolution of cabinet joints
- selection of basic joinery based on materials used

2.2 Identify the types and applications of basic cabinet construction joints.

- joint types:
  - butt
  - butt dowel
  - tongue and groove
  - rabbet
  - dado
    - blind or stop
    - rabbet and dado
    - dovetail dado
    - half dovetail dado
  - lap
    - dovetail
    - cross lap
    - edge cross lap
    - t-lap
    - wedge or dovetail lap
    - scarf lap

- mitre
  - flat
  - edge
  - compound
  - lock mitre
  - lap

- mortise and tenon
  - blind
  - through
  - haunched
  - barefaced
  - multiple
  - wedged

- dovetail
- box or finger
- lock

2.3 Describe the functions of cabinet construction joints.

- describe the makeup and functions of:
  - butt joints
  - butt dowel
  - tongue and groove joints
  - rabbet joints
  - dado joints
  - lap joints
  - mitre joints
  - mortise and tenon joints
  - dovetail joints
  - box or finger joints
  - lock joints
  - plate joinery

2.4 Explain methods of strengthening cabinet joints by using:

- corner blocks
- glue blocks
- corner brackets
- splines
- keys
- screws
- clamp nails
- pin nails
- corrugated fasteners

2.5 Outline the use and application of plate joinery in cabinet work.

- demonstrate samples of the plate joinery process.
- outline the advantages and disadvantages of the plate joinery process.

2.6 Perform basic cabinet joint construction procedures.

- butt joints
- butt dowel
- tongue and groove joints
- rabbet joints
- dado joints
- lap joints
- mitre joints
- mortise and tenon joints
- dovetail joints
- box or finger joints
- lock joints

Number:	S1467.3		
Title:	**Cabinet Construction Fasteners and Hardware**		
Duration:	Total Hours: 6	Theory: 3	Practical: 3

General Learning Outcomes

Upon successful completion the apprentice is able to describe the fundamentals, types and applications of cabinet construction fasteners and hardware in accordance with government safety regulations, industry standards and the requirements of the specified trade related tasks.

Learning Outcomes and Content

3.1 Define the purpose and fundamentals of cabinet construction fasteners and hardware.

- quality vs. cost
- reliability
- strength and durability

3.2 Identify the types, applications and functions of cabinet construction fasteners and hardware.

Fastening devices:

- identify the types of nails in cabinet making and describe their uses:
  - casing
  - finishing
  - common
  - spiral
  - brads
  - t-nails

- identify the following metal fasteners used in cabinet making and describe their application:
  - standard
  - twin fast
  - self drilling

- identify the following metal fasteners used in cabinet making and describe their application:
  - chevrons
  - clamp nails
  - mending plates
  - brackets

- identify the types of staples used in cabinet making and describe their application:
  - divergent point
  - chisel point
  - convergent chisel point
  - walking leg
  - resin coated

- identify various types of bolts and their uses.

- identify various types of hinges and their uses:
  - butt
  - semi-concealed (inset, overlay
  - concealed
  - continuous (piano)
  - European (inset, half overlay, full overlay)
  - self closing

- identify knock down fittings and describe their uses.

- identify types of door catches and describe their uses:
  - friction
  - roller
  - magnetic
  - touch

Number:	S1467.4		
Title:	**Machining, Sanding and Assembly**		
Duration:	Total Hours: 12	Theory: 2	Practical: 10

General Learning Outcomes

Upon successful completion the apprentice is able to perform basic machining, sanding and assembly of cabinet component parts in accordance with government safety regulations, industry standards and the requirements of the specified trade related tasks.

Learning Outcomes and Content

4.1 Describe the required sequence of machining, sanding and assembly of cabinet component parts.

- machining sequence
  - rough machining/breakout planing
  - finish machining/edging, joinery, shaping
  - sub assembly component machining/finishing

- sanding sequence
  - grits sequence
  - flushed sanding
  - mould/edge sanding
  - roughing
  - polishing

- assembly sequence
  - sub assembly
  - final assembly
  - cut to fit
  - unfinished wood
  - inspection

4.2 Perform basic machining, sanding and assembly of cabinet component parts for the assigned projects.

- machining process
- sanding process
- assembly process

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
30%	60%	10%

Level 2

Reportable Subject Summary-Level 2

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practic
S1468	Cutting Tool Theory	12	12	0
S1469	Materials	24	24	0
S1470	Trade Drawings & Layout	33	33	0
S1471	Stationary Machines &Production Sequences	60	12	48
S1472	Cabinet Construction	84	21	63
S1473	Finishing	18	6	12
S1474	Introduction to Computers	9	9	0
	Total	240	117	123

Number:	S1468		
Title:	**Cutting Tool Theory**		
Duration:	Total Hours: 12	Theory: 12	Practical: 0
Prerequisites:	Level 1		
Content:	S1468.1	Cutting Tool Fundamentals	
	S1468.2	Cutting Tool Performance	

Number:	S1468.1		
Title:	**Cutting Tool Fundamentals**		
Duration:	Total Hours: 6	Theory: 6	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to define the fundamentals of cutting tools in accordance with government safety regulations, acceptable industry standards and the requirements of the specified trade related tasks.

Learning Outcomes and Content

1.1 Define the purpose and fundamentals of cutting tools.

- define cutting tool geometry
- define cutting tool nomenclature
- identify the cutting characteristics of various materials
- outline safety related procedures and cautions

1.2 List and explain cutting feed criteria.

- speeds (cuts per inch)
- angles
- knife cuts per inch
- knife projection

1.3 Identify and explain work piece characteristics, machine design, feed characteristics and tool geometry that affect cut control.

- work piece characteristics
  - grain direction
  - hardness of material
    - hardwood-softwood
  - moisture content

- machine tool design
  - machine speeds/adjustability
  - machine stability

- feed characteristics
  - hand feed
  - power feed
  - number of cutters

- tool geometry
  - number of tool cutters
  - type of cutting material/surface

Number:	S1468.2		
Title:	**Cutting Tool Performance**		
Duration:	Total Hours: 6	Theory: 6	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to describe the characteristics of cutting tool performance in accordance with government safety regulations, industry standards and the requirements of the specified trade related tasks.

Learning Outcomes and Content

2.1 Identify the characteristics of the material being machined
- type of shavings produced
- type of material(characteristics of machining)
- relationship of chip breaker to the work

2.2 Identify chip formation as it applies to hand tools and peripheral milling
- size
- shape

2.3 Describe the evaluation criteria required to produce a surface finish to product specifications.
- internal (non-visible cabinet components)
- compartment components
- face components
- show component (tops and fine finishing/rubbed areas)

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
90%	0%	10%

Number:	S1469		
Title:	**Materials**		
Duration:	Total Hours: 24	Theory: 24	Practical: 0
Prerequisites:	Level 1		
Content:	S1469.1	Plywood and Veneers	
	S1469.2	Composite Sheet Material, Plastic Laminates and Melamine Sheets	
	S1469.3	Innovative Products	

Number:	S1469.1		
Title:	**Plywood and Veneers**		
Duration:	Total Hours: 12	Theory: 12	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to describe the types, manufacturing methods and applications of veneer and plywood materials in accordance with manufacturers' procedures and industry specifications and standards.

Learning Outcomes and Content

1.1 Identify the types of plywood and veneer materials. types of plywood

- curve ply
- lumber core
- veneer core
- particle core
- medium density fibre board core
- combinationcore (multi-core)

Types of veneers and their applications:

- rotary cut
- flat sliced
- quarter sliced
- fancy
- face and back
- cross banding
- burls/crotch

1.2 Describe the manufacturing methods of plywood and veneer materials.

- manufacturing process of plywood.
  - substrate
  - backer
  - face
  - multi-ply
  - washing
  - adhesives

- manufacturing methods of veneers.
  - rotary
  - flat sliced
  - half round slicing
  - rift
  - quarter

1.3 Describe the applications of plywood and veneer materials.

- doors and drawers
- cabinet top, bottom and back
- banding
- paneling
- gables and shelves
- architectural paneling
- architectural screens, glazing and custom doors
- applications, advantages and disadvantages of plywood and veneers
- handling and storage

Number:	S1469.2		
Title:	**Composite Sheet Material, Plastic Laminates and Melamine Sheets**		
Duration:	Total Hours: 11	Theory: 11	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to describe the types, manufacturing methods and applications of composite, plastic laminates and melamine sheet material in accordance with the manufacturers' procedures and industry specifications and standards.

Learning Outcomes and Content

2.1 Identify the types of composite, plastic laminates and melamine sheet material.

- identify and state the advantages and disadvantages of:
  - particle boards
  - MDF boards
  - wheat board
  - fire rated materials
  - kerf core
  - flexible plywood

- state the advantages and disadvantages of hardboard

2.2 Outline the manufacturing methods of composite, plastic laminates and melamine sheet material, and identify and state the following:

- types and grades
- sheet sizes and thickness
- finishes and textures
- fire retardant grades
- backers
- substrate
- handling and storage
- machining
- adhesives
- care and maintenance

2.3 Describe the applications of composite, plastic laminates and melamine sheet material.

2.4 Explain the theory and process of bending and forming curved products.

- cutting from solids
- steam bending
- laminating
- curve ply
- kerf cutting
- segmented laminating

Number:	S1469.3		
Title:	**Innovative Products**		
Duration:	Total Hours: 1	Theory: 1	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to describe the types, manufacturing methods and applications of innovative materials in accordance with the manufacturers' procedures and industry specifications and standards.

Learning Outcomes and Content

3.1 Identify various types of innovative materials and state their advantages and disadvantages:

- water resistant particle boards
- green MDF boards
- wheat board
- light weight panels
- other new products

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
90%	0%	10%

Number:	S1470		
Title:	**Trade Drawings & Layouts**		
Duration:	Total Hours: 33	Theory: 33	Practical: 0
Prerequisites:	Level 1		
Content:	S1470.1	Blueprints, layouts and drawings	
	S1470.2	Template Design and Patterns	
	S1470.3	Project Estimating	

Number:	S1470.1		
Title:	**Blueprints, Layouts and Drawings**		
Duration:	Total Hours: 12	Theory: 12	Practical: 0

General Learning Outcomes

The apprentice is able to produce and interpret trade related drawings and layouts in accordance with industry specifications and standards.

Learning Outcomes and Content

1.1 Read and interpret blueprints, architectural drawings and engineering drawings.

- quantity/architectural takeoff
- sizing information for cutting lists and bill of materials
- orthographic projection

1.2 Produce shop drawings, rod and stick layouts, working drawings and full-size layouts to job specifications.

- three views
- all necessary dimensioning
- detail drawing(s) of joinery
- moulding profiles selected from available cutters or to specifications
- full size details of component parts where applicable

Number:	S1470.2		
Title:	**Template Design and Patterns**		
Duration:	Total Hours: 12	Theory: 12	Practical: 0

General Learning Outcomes

Upon successful completion, the apprentice is able to design trade related templates and patterns in accordance with industry specifications and standards.

Learning Outcomes and Content

2.1 Outline the design process for templates and patterns for a specific cabinet construction project.

- minimum of two views
- showing full sized curves and shapes
- methods of securing components
- safety issues

2.2 Produce a sample template and pattern for a specific cabinet or furniture project.

- minimum of two views
- show full sized curves and shapes
- methods of securing components
- safety issues

Number:	S1470.3		
Title:	**Project Estimating**		
Duration:	Total Hours: 9	Theory: 9	Practical: 0

General Learning Outcomes

The apprentice is able to produce project time and cost estimates in accordance with industry specifications and standards.

Learning Outcomes and Content

3.1 Make cutting lists to job specifications and calculate material quantities using cutting list criteria:

- rough size/finish size
- material type and quantity
- solids
- veneer/laminate components
- specialty components

Material quantities calculation criteria:

- waste factors
- set-up pieces
- board measure
- square measure for panel products

3.2 Estimate production times and labour costs:

- estimating production times
- discuss estimating process
- materials
- labour
  - direct
  - indirect
- overhead
- profit

3.3 Prepare a material bill for a major cabinet or furniture project:

- materials
- labour
- overhead
- profit
- prepare a machining and assembly process

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
90%	0%	10%

Number:	S1471		
Title:	**Stationary Machines and Production Sequences**		
Duration:	Total Hours: 60	Theory: 12	Practical: 48
Prerequisites:	Level 1		
Content:	S1471.1	Stationary Machines	
	S1471.2	Production Sequences	

Number:	S1471.1		
Title:	**Stationary Machines**		
Duration:	Total Hours: 45	Theory: 9	Practical: 36

General Learning Outcomes

The apprentice is able to operate, maintain and evaluate performance of stationary machines in accordance with industry specifications and standards.

Learning Outcomes and Content

1.1 Identify the types and application of sanding machines used for cabinet making projects.

- stroke sander
- edge sander
- drum sander
- contour sander
- wide belt sander
- portable sanders
- makes and types of sanding machines
- functions of sanding machines
- grades of sanding belts, discs, etc.
- lubrication and maintenance

1.2 Explain the set up and operating procedures of sanding machines used for cabinet making projects.

- selection of proper grade and grits of sanding belts, etc.
- fitting, centering and adjusting tension
- adjustment to tables
- adjusting contact shoes
- adjusting platens
- setting speeds
- centering belts
- sanding solid wood parts
- sanding veneered panels
- precautions to avoid waste, burns, sand through, etc.
- apply proper safety measures

1.3 Identify the types and application of veneering equipment used for cabinet making projects.

- clipper
- veneer/stitcher
- glue roller
- veneer press (hot, cold or vacuum)
- edge bander
- plastic laminate slitter
- pinch roller
- edge banding
- post forming machines

1.4 Explain the set up and operating procedures of veneering equipment.

- determine reference surfaces, edges and points as they relate to the direction of motion of the cutting tool to the work piece and/or the direction of motion of the work piece to the cutting tool.
- adjustments for cutting tools
- precautions to avoid waste, burns, sand through, etc.
- apply safety measures
- explain the considerations for machining man-made boards

1.5 Outline the maintenance procedures for sanding, veneering and plastic laminate post form equipment.

- visual inspection
- cleaning daily/weekly/monthly
- specified adjustments
- lubrication
- sharpening of cutting edges

1.6 Explain the set-up and operation of turning equipment.

- Turning stock between centers
- Turning stock with a face plate
- Turning stock with a chuck
- Outboard turning
- Speed adjustment
- Tooling
- Accessories

Number:	S1471.2		
Title:	**Production Sequences**		
Duration:	Total Hours: 15	Theory: 3	Practical: 12

General Learning Outcomes

The apprentice is able to perform finishing and assembly operations of cabinet construction project in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

2.1 Perform break out/rough mill operations.
- consider the following:
  - raw material form and size
  - finished product form and size
  - apply principles of yield waste optimization.

2.2 Describe the sequence to finish machine operations including sanding.
- finish machine operation sequence
- sanding finishing operation sequence

2.3 Operate machinery and assemble jigs and fixtures.
- machine operations
- jig and fixture assembly

2.4 Describe the order of sub-assembly operations.
- main sub-assembly procedures
  - part assembly

2.5 Perform the required project assembly operations.
- main project assembly operational sequence

2.6 Perform the required finishing operations.
- final sanding
  - hand sanding

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
25%	65%	10%

Number:	S1472		
Title:	**Cabinet Construction**		
Duration:	Total Hours: 84	Theory: 21	Practical: 63
Prerequisites:	Level 1		
Content:	S1472.1	Cabinet and Furniture Design	
	S1472.2	Cabinet/Furniture Construction Project	

Number:	S1472.1		
Title:	**Cabinet and Furniture Design**		
Duration:	Total Hours: 12	Theory: 9	Practical: 4

General Learning Outcomes

The apprentice is able to perform furniture and cabinet designs of a cabinet construction project in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

1.1 Describe the selection criteria required for cabinet joints.
- materials used
- product end use
- types of tools
- machinery available

1.2 Describe the selection criteria for the required fasteners and hardware.
- size
- weight
- type of materials
- type of furniture
- appropriate colour, texture and furniture/cabinet style

1.3 Design furniture and cabinetry using standard sizes and design criteria.
- design criteria:
  - history of furniture/cabinet style
  - architectural design
  - end use
- produce a project design as assigned using standard sizes.

Number:	S1472.2		
Title:	**Cabinet/Furniture Construction Project**		
Duration:	Total Hours: 72	Theory: 12	Practical: 60

General Learning Outcomes

The apprentice is able to perform a cabinet and/or furniture construction project in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

Note:
The student will construct an assigned cabinet project. Students will make drawings and documentation. The student will select material, machine necessary parts and sand and assemble the project to accepted trade standards.

2.1 Perform cabinet construction techniques.

- Compare construction techniques for:

- veneered and panel construction
  - high pressure laminates
  - vinyl overlay
  - solid wood construction
  - face frame custom cabinets, European design (32 mm) and frameless

- Joint selection process based on:
  - materials
  - solids
  - particleboard
  - melamine board
  - medium density fiber board
  - veneered particle board
  - product end use
  - types of tools and machinery available

- Select and use fasteners and hardware
  - overlay
  - concealed
  - semi-concealed
  - decorative
  - continuous (piano)
  - European (32mm)
  - self closing
  - catches
  - friction
  - touch latch
  - bullet
  - roller

- Manufacturing systems:
  - 32 mm
  - Flat line
  - Modular Knock Down (K.D.)
  - Read to Assemble (R.T.A.)

- Install all required moldings, edge banding, hinges, drawer guide system, shelf supports and pulls:
  - dowels
  - plastic or metal inserts
  - shelf standard

2.2 Perform door construction techniques

- Compare construction techniques for:
  - veneered panel construction
  - high pressure laminates
  - vinyl overlay
  - solid wood frame and panels
  - plywood frame and panels

- Joint selection process based on:
  - materials
  - product end use
  - types of tools and machinery available

- Select and use fasteners and hardware

- Door hardware
  - pulls
  - knobs
  - pulls (finger)
  - locks

2.3 Perform cabinet drawer construction techniques

- Compare construction techniques for:
  - veneered panel construction
  - high pressure laminates
  - vinyl overlay
  - solid wood construction

- Style
  - flush
  - rabetted
  - overlay

- Joinery
  - butt
  - rabbet
  - dado
  - dovetail (machine made)
  - dovetail (hand made)

- Guides
  - center
  - side
  - top (metal)
  - bottom (metal)
  - full extension

- Joint selection process based on:
  - materials
  - product end use
  - types of tools and machinery available

- select and use fasteners and hardware
  - drawer hardware
  - pulls
  - knobs
  - pulls (finger)
  - locks
  - drawer slide hardware

2.4 Perform furniture construction techniques of base and crown assemblies

- Joint selection process based on:
  - materials
  - product end use
  - types of tools and machinery available
- select and use fasteners and hardware

2.5 Select and install hardware, glass and mirrors according to specifications

- perform hardware installation
- perform glass installation
- perform mirror installation

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
30%	60%	10%

Number:	S1473		
Title:	**Finishing**		
Duration:	Total Hours: 18	Theory: 6	Practical: 12
Prerequisites:	Level 1		
Content:	S1473.1	Pre- Finishing	
	S1473.2	Spray Finishing Equipment	
	S1473.3	Sealer and Top Coat Materials	

Number:	S1473.1		
Title:	**Pre-finishing**		
Duration:	Total Hours: 3	Theory: 2	Practical: 1

General Learning Outcomes

The apprentice is able to perform cabinet and/or furniture pre-finishing procedures in accordance with government safety regulations, manufacturers' recommendations and acceptable industry specifications and standards.

Learning Outcomes and Content

1.1 Explain the methods of repairing unfinished wood units for finishing
- dents
- cracks
- chipped, split or torn veneers
- broken or chipped surfaces

1.2 Describe the sanding requirements for a unit.
- types of abrasives
- applied pressure
- dry
- wet (except white wood)
- type of coating used

1.3 Discuss appropriate sanding grits for woods and the selected finish
- Open pore and closed pore woods
- Oil finishes
- Penetrating finishes
- NGR finishes

1.4 Explain the influence of surface preparation on colour control
- wood grain – clarity with fineness absence of scratch patterns
- surface smoothness
- uniformity of scratch pattern and colour control
- ability of stains to penetrate

1.5 Identify surfaces ready for finishing

- light inspection/ scratch pattern
  - broken corners
  - defect control
  - control of any “masked parts”

Number:	S1473.2		
Title:	**Spray Finishing Equipment**		
Duration:	Total Hours: 11	Theory: 2	Practical: 9

General Learning Outcomes

The apprentice is able to describe the construction, operating and procedures in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

2.1 Describe the construction features and function of a conventional air spray system

- compressor
- filtering devices
- regulating devices
- spray booth
- material containers
- hoses
- spray guns
- define the terms:
  - high volume low pressure (H.V.L.P.)
  - low volume low pressure (L.V.L.P.)
  - transfer efficiency

2.2 Describe the construction features and function of a conventional air spray gun

- Construction features:
  - air cap
  - fluid tip
  - fluid needle
  - trigger
  - fluid adjustment screw
  - spreader adjustment screw
  - air valve
  - package

- Describe the differences, purposes, and advantages of:
  - separate or attached containers
  - bleeder or non-bleeder guns
  - internal or external mix
  - suction or pressure feed

- Identify and choose the proper nozzle combinations for a particular gun:
  - suction or pressure feed
  - needle tip combination

- Observe the effect of adjustments to the spreader valve on spray patterns.

- Observe the effect of adjustments to the fluid control valve on spray patterns.

- Identify and explain the operation of:
  - suction cup
  - pressure tank
  - material pump
  - gravity bucket

2.3 Describe the inspection, troubleshooting and maintenance procedures of a conventional air spray gun

- Identify normal spray patterns

- Identify the reasons for a number of defects in the spray patterns.
  - particle size
  - malformations
  - fluttering spray

- Describe spraying techniques.
  - steady hand movement
  - distance from part
  - hand movement speed of spray gun

- Identify the effect of poor spraying techniques.
  - runs
  - bubbles

- Outline maintenance procedures.
  - cleaning
  - wear

Number:	S1473.3		
Title:	**Sealer and Topcoat Materials**		
Duration:	Total Hours: 4	Theory: 2	Practical: 2

General Learning Outcomes

The apprentice is able to describe the properties and characteristics of sealer and topcoat materials procedures in accordance with government safety and environmental regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

3.1 Identify and describe the purpose and application of sealers and topcoats.

- Identify a variety of common industrial topcoats and state their advantages and disadvantages.
  - sanding sealers
  - lacquers
  - catalyzed lacquers
  - water based lacquers
  - U.V. coatings
  - polyester
  - conversion varnish
  - acrylics

- Identify the purpose and application of wash coats and sealers.

- Wash coats
  - percentage of solids
  - viscosity
  - protection of stains
  - lacquer-based
  - acrylic-based

- Sealers
  - sealing of fibers
  - importance of sanding

- Describe the properties of sealer and topcoat finishing materials.
  - vehicle
  - binder
  - volatile thinner
  - pigment
  - additives

- Outline the drying process for various finishing materials:
  - evaporation
  - oxidation
  - polymerization

- Outline government and industry safety and environmental protection regulations for finishing applications.
  - VOC (Volatile Organic Compounds)
  - personal protective equipment
  - disposal and storage of materials
  - maintenance and operation of a spray booth
  - grounding and bonding
  - general handling of finishing materials
  - environmental awareness

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
25%	65%	10%

Number:	S1474		
Title:	**Introduction to Computers**		
Duration:	Total Hours: 9	Theory: 9	Practical: 0
Prerequisites:	Level 1		
Content:	S1474.1	Computer Operating Systems.	
	S1474.2	Word Processing.	

Number:	S1474.1		
Title:	**Computer Operating Systems**		
Duration:	Total Hours: 3	Theory: 3	Practical: 0
Cross- Reference to Training Standards: 6122			

General Learning Outcomes

Upon successful completion, the apprentice is able to describe computer functions in accordance with the requirements of specified cabinet construction projects.

Learning Outcomes and Content

Upon successful completion, the apprentice is able to:

1.1 Define the purpose, function and application of computer operating systems.

- introduction to the computer
  - components
  - device names and designations
- data storage and retention

- software management
  - installation
  - formatting
  - directory set-up
  - file naming
  - copying
  - deleting
  - renaming

Number:	S1474.2		
Title:	**Word Processing**		
Duration:	Total Hours: 6	Theory: 6	Practical: 0
Cross- Reference to Training Standards: 6122			

General Learning Outcomes

Upon successful completion, the apprentice is able to describe computer functions in accordance with the requirements of specified cabinet construction projects.

Learning Outcomes and Content

2.1 Describe basic word processing and information accessing procedures.

- introduction to word processing programs
  - menu structure
  - naming/saving folders/files
  - searching/replacing
  - documentation
  - page layout
  - coping/moving data

- practical use
  - letters
  - reports
  - accessing manufacturers' specifications and procedures
  - project estimating information

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
90%	0%	10%

Level 3

Reportable Subject Summary-Level 3

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practic
S1475	Trade Drawings	30	29	1
S1476	Production Machines	30	9	21
S1477	Production Sequences	48	12	36
S1478	Cabinet Construction	78	15	63
S1479	Finishing	36	18	18
S1480	Site Installation	18	12	6
	Total	**240**	**95**	**145**

Number:	S1475		
Title:	**Computer Trade Drawings**		
Duration:	Total Hours: 30	Theory: 29	Practical: 1
Prerequisites:	Level 2		
Content:	S1475.1	Create and Edit Solid Features.	
	S1475.2	Generate Dimensioned 2D Working Drawings from the Model.	
	S1475.3	Cost Estimating	

Number:	S1475.1		
Title:	**Create and Edit Solid Features**		
Duration:	Total Hours: 8	Theory: 7	Practical: 1

General Learning Outcomes

Upon successful completion the apprentice is able to produce a rod layout in accordance with the specifications of a cabinet or furniture-making project.

Learning Outcomes and Content

1.1 Define work planes and axes

- Create base sketches
- Apply geometric and dimensional constraints
- Use extrusion and revolution tools to develop the model
- Modify the model using placed features such as fillets, chamfers and holes

Number:	S1475.2		
Title:	**Generate Dimensioned 2D Working Drawings from the Model**		
Duration:	Total Hours: 17	Theory: 17	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to produce dimensioned 2D working drawings from the model to industry standards.

Learning Outcomes and Content

2.1 Create and Edit Assemblies

- insert parts into the assembly environment
- create new parts within the assembly environment
- apply and edit assembly constraints

2.2 Create and Edit Drawing Views and Presentations

- set-up a drawing including border, title block and dimension
- styles
- place base, and projected views
- create detail and section views
- dimension the drawing using automatic and added
- dimensions

Number:	S1475.3		
Title:	**Cost Estimating**		
Duration:	Total Hours: 5	Theory: 5	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to prepare the drawings and patterns required to make jigs and templates specified for a major cabinet or furniture construction project in accordance with the manufacturers procedures and industry specifications and standards.

Learning Outcomes and Content

3.1 Outline the difference between costing and estimating
- costing factors
  - direct use of time study
- estimating factors
  - use of historical data
  - use of historical knowledge
  - pre-determined time study

3.2 Describe the benefits of sound record keeping for costing purposes.
- accounting accuracy
- good customer relations
- cost consistency
- maintaining productivity in contracts

3.3 Define the purpose and benefits of route sheets.
- purpose
  - direction to production departments
  - production costing
  - production scheduling control
  - incentive system control
- benefits
  - plant organization
  - plant production overhead utilization
  - cost control productivity

3.4 Produce a cost estimate for the time and materials of a major cabinet or furniture construction project.

- - Make cutting lists to job specifications and calculate material quantities.
  - cutting list criteria
    - rough size
    - finished size

- material quantities calculation criteria
  - overage/set-up allowances

- estimate production times and labour costs.
  - estimating production times
  - discuss estimating process
    - materials
    - labour
    - overhead
    - profit

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
45%	45%	10%

Number:	S1476		
Title:	**Production Machines**		
Duration:	Total Hours: 30	Theory: 9	Practical: 21
Prerequisites:	Level 2		
Content:	S1476.1	Stationary Machine Set-Up and Operation	
	S1476.2	Stationary Machine Performance and Troubleshooting	

Number:	S1476.1		
Title:	**Production Machine Set-Up and Operations**		
Duration:	Total Hours: 21	Theory: 6	Practical: 15
Cross- Reference to Training Standards: 6125, 6126, 6127, 6128			

General Learning Outcomes

Upon successful completion the apprentice is able to set-up, operate and maintain production process stationary machines in accordance with manufacturers' recommendations, government safety regulations and industry standards.

Learning Outcomes and Content

1.1 Describe the setup, types and application of stationary machines.

- Machine types and applications for the following woodworking activities:
  - sawing
  - surfacing
  - routing
  - edge banding
  - blade/cutting tool geometry
  - control devices
  - sanding
  - veneering/laminating
  - shaping/moulding
  - computer numeric control (CNC)

- Advanced tooling nomenclature
  - selection
  - use
  - evaluation

- Set up procedures for:
  - control devices
  - mountings and hold down methods
  - drive systems
  - devices and work pieces
  - safety guards
  - work piece characteristics
  - body/frame

1.2 Design, lay out and fabricate a jig, fixture or template.

- advanced machine jigs, forms and fixtures:
  - hold down techniques
  - replicate a part to specifications

1.3 Explain the principles of operation for stationary machines.

- operating speeds
- tool geometry
- cutting and milling characteristics
- lubrication
- controls
- drive mechanisms

1.4 Operate stationary machines.

- perform stationary machine operations for:
  - boring
  - sawing
  - surfacing
  - routing
  - edge banding
  - veneering/laminating
  - shaping/moulding
  - sanding

1.5 Apply the principles of Computer Numerical Control and Computer Aided Design (CAD) in the manufacture of wood components.

- define Computer Numeric Control (CNC)
  - CNC Router
  - CNC Point to Point
- define Computer Aided Design (CAD)
- draw a simple object using CNC software
- draw a simple object using CAD software

1.6 Perform stationary machine maintenance procedures.

- lubrication
- cleaning
- leveling
- safety guard adjustments
- maintenance check off schedule

Number:	S1476.2		
Title:	**Production Machine Performance and Troubleshooting**		
Duration:	Total Hours: 9	Theory: 3	Practical: 6

General Learning Outcomes

Upon successful completion the apprentice is to evaluate performance and troubleshoot production process stationary machines in accordance with manufacturers' recommendations, government safety regulations and industry standards.

Learning Outcomes and Content

2.1 Inspect and test stationary machines.

- visual inspection for:
  - loose fasteners
  - fractures
  - missing components
  - contamination
  - ventilation
  - safety guards

- test machine for:
  - speed
  - accuracy
  - alignment

2.2 Evaluate stationary machine performance.

- perform a sample machining operation and check accuracy.
- observe appearance of machined surface area.

2.3 Troubleshoot stationary machines.

- troubleshoot machine for:
  - accuracy
  - consistency
  - reliability
  - machining quality

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
35%	55%	10%

Number:	S1477		
Title:	**Production Sequences**		
Duration:	Total Hours: 48	Theory: 12	Practical: 36
Prerequisites:	Level 2		
Content:	S1477.1	Production Sequences	
	S1477.2	Woodworking Shop Productivity and Efficiency	

Number:	S1477.1		
Title:	**Production Sequences**		
Duration:	Total Hours: 44	Theory: 8	Practical: 36
Cross- Reference to Training Standards: 6125, 6126, 6127, 6128, 6129			

General Learning Outcomes

The apprentice is able to finish and assemble a cabinet construction project in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

1.1 Perform break out/rough mill operations.
- consider the following:
  - raw material form and size
  - finished product form and size
  - apply principles of yield optimization

1.2 Describe the sequence to finish machine operations including machine sanding.
- machine finishing operation sequence

1.3 Perform operations on machinery and assemble jigs and fixtures.
- machine operations
- jig and fixture assembly

1.4 Describe the main sub-assembly procedures.

1.5 Perform the sequence to finish machine operations including machine sanding operations.

1.6 Perform project assembly operations.

Number:	S1477.2		
Title:	**Woodworking Shop Productivity and Efficiency**		
Duration:	Total Hours: 4	Theory: 4	Practical: 0

General Learning Outcomes

The apprentice is able to describe factors that improve shop efficiency and productivity in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

2.1 Define the terms Productivity and Efficiency.
- productivity
- output vs. input
- efficiency

2.2 Write-up a set of unit part route sheets.
- part name and number
- quantities required
- rough and finished sizes
- materials to be used
- equipment to used and operations to be performed
- work centre

2.3 Describe efficiency measures in wood products manufacturing.
- purchased material
- material utilization
- labour savings
- allowances for variances
- fool proofing

2.4 Describe methods to increase productivity.
- product engineering considerations:
  - standardization of unit parts and operations
  - scheduling
  - modularization

- operational considerations:
  - methods improvement
  - placing materials at machines
  - regular clean-up of machine work areas
  - mechanization and conveyorization

2.5 Identify and explain the methods of yield maximization of the wood shop

- breakout
- finish machining
- multiple part consideration
- machining allowances
- saw kerf sizes

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
25%	65%	10%

Number:	S1478		
Title:	**Cabinet Construction**		
Duration:	Total Hours: 78	Theory: 15	Practical: 63
Prerequisites:	Level 2		
Content:	S1478.1	Cabinet Design	
	S1478.2	Materials Selection	
	S1478.3	Joint, Hardware and Fastener Selection	
	S1478.4	Cabinet/Furniture Construction	

Number:	S1478.1		
Title:	**Cabinet Design**		
Duration:	Total Hours: 3	Theory: 3	Practical: 0

General Learning Outcomes

The apprentice is able to modify construction designs in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

1.1 Describe modular designs in the woodworking trade.
- knock down
- flat line
- ready to assemble

1.2 Outline the importance of standardizing component parts.
- efficiency
- productivity
- production

1.3 Modify design options by changing applied mouldings, legs, bases and crown moulds.
- historical designs of wood
- standardization of parts

1.4 Modify design options by changing hardware, door styles and finishing colours.
- custom cabinet construction
- standard base cabinet with add-on modules

Number:	S1478.2		
Title:	**Materials Selection**		
Duration:	Total Hours: 4	Theory: 3	Practical: 1

General Learning Outcomes

The apprentice is able to select the materials required for specified construction projects in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

2.1 Select lumber species suitable for a project's end use.

- lumber species selection criteria for:
  - kitchen cabinets
  - architectural millwork
  - bathroom cabinets
  - furniture (chairs and tables)
  - windows/doors

2.2 Select grain and orientation of annual rings in lumber for a project's end use.

- lumber grain selection criteria for:
  - kitchen cabinets
  - architectural millwork
  - bathroom cabinets
  - furniture (chairs and tables)
  - windows/doors

2.3 Select veneer stock most appropriate for a project's end use

- veneer selection criteria for:
  - kitchen cabinets
  - architectural millwork
  - bathroom cabinets
  - furniture (chairs and tables)
  - windows/doors

Number:	S1478.3		
Title:	**Joint, Hardware and Fastener Selection**		
Duration:	Total Hours: 3	Theory: 3	Practical: 0

General Learning Outcomes

The apprentice is able to select joints, hardware and fasteners for specified construction projects in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

3.1 Select construction joints for unit specifications and application.

- joint selection process based on:
  - materials
  - solids
  - particleboard
  - medium density fiber board
  - veneered particle board
  - product end use
  - types of tools and machinery available

3.2 Select hardware and fasteners for unit specifications and application.

- select and use appropriate fasteners and hardware
  - hinges
    - concealed
    - semi-concealed
    - decorative
    - continuous (piano)
    - European (32mm)
    - self closing
  - catches
    - friction
    - touch latch
    - bullet
    - roller

- manufacturing systems:
  - 32 mm
  - flat line
  - Modular Knock Down (K.D.)
  - Ready to Assemble(R.T.A.)

Number:	S1478.4		
Title:	**Cabinet/Furniture Construction**		
Duration:	Total Hours: 62	Theory: 2	Practical: 60

General Learning Outcomes

The apprentice is able to perform a cabinet and/or furniture construction project in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

Major Project

The apprentice will construct a woodworking project, which has been designed in Level II. The documentation must be complete before the project is started.

4.1 Perform cabinet construction project techniques.

- construction techniques for
  - veneered panel construction
  - high pressure laminates
  - vinyl overlay
  - solid wood construction
  - face frame custom cabinets

- joint selection process based on:
  - materials
  - solids
  - particleboard
  - medium density fiber board
  - veneered particle board
  - product end use
  - types of tools and machinery available

- select and use fasteners and hardware
  - hinges
    - concealed
    - semi-concealed
    - decorative
    - continuous (piano)
    - European (32 mm)
    - self closing

- catches
  - friction
  - touch latch
  - bullet
  - roller

- manufacturing systems:
  - 32 mm
  - flat line
  - modular Knock Down (K.D.)
  - Ready to Assemble(R.T.A.)

- install all required moldings, edge banding, hinges, drawer guide systems, shelf supports and pulls:
  - shelf support system
    - dowels
    - plastic or metal inserts
    - shelf standard

4.2 Perform door construction techniques.

- construction techniques for:
  - veneered panel construction
  - high pressure laminates
  - vinyl overlay
  - solid wood frame and panels
  - plywood frame and panels

- perform joint selection process based on:
  - materials
  - product end use
  - types of tools and machinery available

- select and use fasteners and hardware door hardware
  - pulls
  - knobs
  - pulls (finger)
  - locks
  - drawer slide hardware

4.3 Construct cabinet drawers.

- compare construction techniques for:
  - veneered panel construction
  - high pressure laminates
  - low pressure laminates
  - solid wood construction

- style
  - flush
  - rabetted
  - overlay

- joinery
  - butt
  - rabbet
  - dado
  - dovetail (machine made)
  - dovetail (hand made)

- guides
  - center
  - side
  - top (metal)
  - bottom (metal)
  - full extension

- joint selection process based on:
  - materials
  - product end use
  - types of tools and machinery available

- select and use fasteners and hardware.
  - drawer hardware
    - pulls
    - knobs
    - pulls (finger)
    - locks
    - drawer slide hardware

4.4 Perform chair construction project techniques

- define chair component terminology:
  - legs
  - stretchers
  - seats
  - arms
  - arm posts and back posts
  - splats
  - rails (seat)
  - rails (crest)
  - saddle

- describe chair geometry and terminology
  - dining and desk chairs
  - easy chairs
  - lounge chairs
  - arm chairs

4.5 Apply assembly techniques

- doors
- drawers
- hardware
- glass
- trim

Number:	S1478.5		
Title:	**Quality Assurance**		
Duration:	Total Hours: 4	Theory: 2	Practical: 2

General Learning Outcomes

The apprentice is able to describe the quality assurance process for the wood working construction process in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

5.1 Identify and compare the quality assurance issues during the production process.

- mass production
  - faster speed
  - less cost per unit
  - productivity
  - effect on production
- custom manufacturing processes
  - slower process
  - more time available per unit
  - higher cost per unit
  - specialized high/end applications

5.2 Describe the duties and responsibilities of a quality assurance inspector.

- visual inspection of unit and related parts
- record the condition of the unit
- communicate the details of the report to the production team
- report any safety issues
- work with others to assure quality

5.3 Perform inspections on construction project parts or units.

- visual inspection identifying:
  - loose or missing parts
  - cracks or dents
  - finish defects

5.4 Explain the relationship between the engineering, manufacturing and quality assurance departments.

- identify the function of the engineering departments
- identify the function of the manufacturing departments
- identify the function of the quality control departments

5.5 Identify how manufacturing faults are corrected by machining operations.

- remanufacturing of defective parts

5.6 Perform inspections on construction project parts or units.

- verify that dimensions are as specified
- verify that the parts, or units are made to drawings and specifications
- identify the quality of materials
- observe the quality of the project finish

Number:	S1478.6		
Title:	**Packing and Shipping**		
Duration:	Total Hours: 2	Theory: 2	Practical: 0

General Learning Outcomes

The apprentice is able to describe the packing and shipping requirements for cabinet/ furniture units in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

6.1 Define "Rule 41" of the Canadian Freight Classification
- Rule 41 details

6.2 Describe what is meant by "corrugated board"
- single faced
- single wall
- double wall
- "A" Flute
- "B" Flute
- "C" Flute

6.3 Define the term "packaging".
- corrugated board
- shrink wrap
- blanket wrap

6.4 Identify the methods of corner protection.
- boxing in
- foam corner protection
- corrugated corner protection

6.5 Outline construction unit shipping requirements.
- weight guidelines
- manufacturers' labels

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
20%	70%	10%

Number:	S1479		
Title:	**Finishing**		
Duration:	Total Hours: 36	Theory: 18	Practical: 18
Prerequisites:	Level 2		
Content:	S1479.1	Finishing Products.	
	S1479.2	Finishing Material Application	
	S1479.3	Finishing Tests	

Number:	S1479.1		
Title:	**Finishing Products**		
Duration:	Total Hours: 9	Theory: 9	Practical: 0

General Learning Outcomes

The apprentice is able to perform pre-finishing operations on cabinets/furniture in accordance with government safety regulations, manufacturers' recommendations and industry specifications and standards.

Learning Outcomes and Content

1.1 Define the purpose and fundamentals of finishing products.

- Stains
  - water based
  - non-grain raising
  - aniline dye
- toners
- wash coats
- fillers
- glaze
- sealers
- shaders

1.2 Identify the types, advantages and disadvantages of stains.

- oil stain
- water stains
- non-grain raising stains
- sap stains
- glazing stains
- padding stains
- aniline dye

1.3 Identify the main types, advantages and disadvantages of topcoats.

- lacquers
- catalyzed lacquers
- water based lacquers
- acrylics
- conversion varnish
- polyurethane
- polyester
- ultraviolet (UV)

1.4 Explain the purpose and application for fillers.

1.5 Identify the drying times and environment for finishing materials.

Number:	S1479.2		
Title:	**Finishing Material Applications**		
Duration:	Total Hours: 24	Theory: 7	Practical: 17

General Learning Outcomes

Upon successful completion the apprentice is able to apply finishing materials in accordance with the government safety regulations, manufacturers' specifications for the major cabinet or furniture construction project and industry standards.

Learning Outcomes and Content

2.1 Describe alternate spray systems and methods of applications.

- alternate spray systems:
  - explain the principles, advantages and disadvantages of airless spray
  - explain the principles, advantages and disadvantages of air-assisted airless spray
  - describe the application of spray systems to the production environment:
    - automated systems
    - panel coating spray systems
    - conveyorized production finishing
  - explain the principle of electrostatic spraying
  - explain the principle of hot spray finishing and discuss its advantages and disadvantages

- alternate methods of application
  - describe the difficulties of:
    - flow coating
    - curtain coating
    - roller coating
    - dipping
    - tumbling

- explain the process of applying finish by brush:
  - choice of brush
  - method of use
  - maintenance

- describe the process of application for oils and waxes:
  - linseed oil
  - varnish oil
  - other oil finishes
  - oil waxes

2.2 Apply finishing materials to match a specified colour.

- stains
- toners
- wash coats
- glaze
- shaders
- sanding sealers and top coat materials

Number:	S1479.3		
Title:	**Finishing Tests**		
Duration:	Total Hours: 3	Theory: 2	Practical: 1

General Learning Outcomes

Upon successful completion the apprentice is able to test the final finish in accordance with the specifications of a major cabinet or furniture construction project and industry standards.

Learning Outcomes and Content

3.1 Outline the standard test procedures used to evaluate the finishing process.
- testing criteria:
  - film build wet/dry
  - adhesion
  - print test
  - viscosity

3.2 Outline the optimal working environment for applying finishing products.
- lighting conditions
- workflow
- dust conditions
- air flow
- temperature
- relative humidity
- type of equipment

3.3 Describe the process of rubbing out a finish.
- explain the reason for rubbing finishes
- identify the materials used in rubbing and polishing:
  - steel wool
  - abrasive papers
  - abrasive powders
  - rubbing compounds
  - abrasive pads
- describe the method of rubbing by hand and machine

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
45%	45%	10%

Number:	S1480		
Title:	**Site Installation**		
Duration:	Total Hours: 18	Theory: 12	Practical: 6
Prerequisites:	Level 2		
Content:	S1480.1	Site Safety and Environment	
	S1480.2	Cabinet Installation	
	S1480.3	Windows, Doors and Stairs	
	S1480.4	Rod Layout	

Number:	S1480.1		
Title:	**Site Safety and Environment**		
Duration:	Total Hours: 3	Theory: 3	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to describe the site installation safety practices in accordance with the government safety regulations, manufacturers' specifications of an assigned cabinet or furniture-making project.

Learning Outcomes and Content

1.1 Outline site safe practices and housekeeping requirements.
- safe storage of cabinets and related parts

1.2 Describe the requirements to provide an environment suitable for cabinetry and millwork to acclimatize at the site prior to installation.
- proper site relative humidity check
- proper on site acclimatization times
- proper site controls and protection of cabinet/millwork

1.3 Work professionally with other trades persons on site to safety and accurately install cabinetry and millwork.

Number:	S1480.2		
Title:	**Cabinet Installation**		
Duration:	Total Hours: 8	Theory: 2	Practical: 6

General Learning Outcomes

Upon successful completion the apprentice is able to install cabinets on site in accordance with the government safety regulations, manufacturers' specifications and industry standards for an assigned cabinet or furniture construction project.

Learning Outcomes and Content

2.1 Provide the blocking or bridging required to mount cabinetry and millwork.
- blocking devices
- blocking hardware
- blocking tooling

2.2 Describe the adjustments that are required to maintain quality site installation standards.
- define the abbreviations (A.W.M.A.C. and G.I.S.)
- interpret the specific site installation standards
- define architectural tender documents
- outline common adjustments required during a site installation
- define substantial completion

2.3 Clean and touch-up cabinetry and millwork as required.
- cleaning materials
- finishing touch-up process
- identifing common damage
- issuing a guarantee

2.4 Perform installation trim and fit procedures.
- co-operate with associated trades protecting cabinets and millwork
- perform the installation at the most convenient time for the team
- explain installation of adjustable shelves, standards, brackets and shelf clips or pins

- define the installation of wall paneling and architectural woodwork
- identify site woodwork activities involving other trades persons requiring fitting of electrical, communications, plumbing, computer and mechanical equipment
- describe site leveling, aligning and site touch up/clean-up

Number:	S1480.3		
Title:	**Windows, Doors and Stairs**		
Duration:	Total Hours: 5	Theory: 5	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to describe the construction features of windows, doors and stair assemblies in accordance with the government safety regulations manufacturers' specifications and industry standards for an assigned cabinet or furniture construction project.

Learning Outcomes and Content

3.1 Identify the different types and applications of windows.
- casement
- horizontal and vertical slides
- double hung
- pivoting
- awning

3.2 Describe the construction features and function of windows.
- sash – sill/jambs/stops/munton
- glazing – weather seal
- spacer

3.3 Identify the different types and applications of doors.
- solid doors
- frame and panel doors
- exterior
- interior
- fire-rated

3.4 Describe the construction features and function of doors.
- stiles
- lock rails
- frieze rail
- top and bottom rails
- panels

3.5 Identify the different types and applications of stairs.

- straight
- L-shape
- U-shape
- dog leg
- open
- closed
- combination open, combination closed
- winder

3.6 Describe the construction features, function and layout of stairs.

- Stair Components:
  - stringer
  - riser
  - tread
  - wedges
  - nosing
  - nosing return

- Stair Railings:
  - handrail
    - newel post
    - baluster
    - balustrade
    - easement
    - volute

- Stair layout:
  - total rise
  - unit rise
  - total run
  - unit run
    - headroom
    - clearance
    - landing
    - winder
    - circular

Number:	S1480.4		
Title:	**Rod Layout**		
Duration:	Total Hours: 2	Theory: 2	Practical: 0

General Learning Outcomes

Upon successful completion the apprentice is able to produce a rod layout in accordance with the specifications of an assigned cabinet or furniture making project.

Learning Outcomes and Content

4.1 Produce a full-size rod layout for an assigned cabinet construction project.

- Outside dimensions of the main cabinet
- Inside dimensions of the main cabinet
- Dimensions of all sub components

Evaluation Structure		
Theory Testing	Practical Application Testing	Final Assessment
60%	30%	10%

APPENDIX C: Tools and Equipment List

This list describes wood machining processes and not specific machines. This is to allow some flexibility in training from college to college and to encompass regional industrial differences.

Wood Machining Process	Level 1	Level 2	Level 3
Sawing	**Rip / Xcutting**	Angles / Curves	Production
Surfacing	**Edge & Face**	Specialty (i.e., Tapering)	Production (i.e., Facer/planer)
Shaping/Moulding		Straight & curved Edges and Faces	Moulders& Production Shaping
Routing	**Straight & curved edges**	Surfaces / Using patterns & plunge	Production & CNC
Boring	**Single vertical boring**	Horizontal & multi boring	32mm / Production & CNC point to point
Edge Banding	**Manual**	Semi-automatic (bench-type)	Automated
Turning		Between centers & face plate	Patterns & Production lathes
Sanding	**Face & edge**	Large surfaces & Profiles	Production
Assembly		Frame, Case & Assembly clamps	Radio Frequency & Production clamping
Veneering		Cut, Splice & laminate	
Plastic Laminate		Face & edge any shape	
CNC			CNC operation

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