# Cabinetmaker
## *On-the-Job Training Guide*

*Cabinetmakers construct, repair, finish and install cabinets, furniture, bedroom suites and architectural millwork such as custom shelving components, paneling and interior trims.*

**Training Requirements:** 6400 hours (4 years) including: four 8-week training sessions delivered at NAIT in Edmonton, Alberta or at SAIT in Calgary, Alberta.

Journeyperson to apprentice ratio for this trade is: 1:2

The information contained in these pages serves as a guide for employers and apprentices. Apprenticeship training is mutually beneficial to both employer and apprentice. The employer's investment in training apprentices results in skilled and certified workers. The following pages summarize the tasks to be covered by the apprentice during the on-the-job portion of apprenticeship training. An apprentice spends approximately 85% of the apprenticeship term training on-the-job.

It is the employer's or journeyperson's training responsibility to supervise an apprentice's practical skills development until a satisfactory level of proficiency has been reached.

**EMPLOYER TRAINING RESPONSIBILITY**

- promote a safety-conscious workplace
- provide mentored, hands-on practice in the use of tools and equipment
- demonstrate procedures for the machining, forming, laminating, application of veneers and laminates, finishing, assembly and installation of cabinets, millwork and furniture as well as for the restoration of these products
- further the apprentice's ability to interpret technical drawings
- introduce the apprentice to the procedures used for estimating materials and costing projects
- ensure that the apprentice can evaluate the end product

Employers should make every effort to expose their apprentices to work experience in as many areas of the trade as possible.

In the following pages, in-school instruction is listed first followed by suggestions to help employers assist the apprentice to prepare for each level of in-school training.

The content of the training components is subject to change without notice.

## Level One

**Safety**
Electrical safety theory
Fire prevention and control
Ladders, step ladders and scaffolds
Housekeeping, PPE and emergency procedures
Hazard assessment and control
OH&S Regulations and WHMIS
Safety committees, safety inspections and industrial health hazards

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *describing the different types of electrical connections; the safe use and care of extension cords and areas where they would be unsafe to use*
- *describing the signs of overload in motors*
- *describing fire prevention and identifying the main classes of fires and the appropriate extinguisher*
- *describing and ensuring the safe use of ladders, step ladders and scaffolds*
- *describing the dangers of hearing loss and ensuring the proper use of personal hearing conservation safety equipment*
- *describing professional accident prevention procedures and ensuring an attitude respecting housekeeping, personal protective equipment and emergency procedures*
- *making the use of personal protective equipment mandatory*
- *describing unsafe working conditions and industrial health hazards and monitoring for actions appropriate to situations*
- *describing and discussing workplace **confined space** situations*
- *ensuring familiarization with the scope and content of the OH&S Regulations regarding employer and employee responsibilities, safety committees and safety inspections*
- *ensuring proper understanding of the WHMIS system and symbols*
- *identifying hazardous materials in the workplace and instructing in the use of the Material Safety Data Sheets*

**Materials and Joinery**
Nature and properties of wood
Primary processing of hard and soft wood
Manufactured sheet and panel products
Adhesives, fasteners and abrasives
Principles of wood joinery

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *describing and then having the apprentice identify wood products with respect to type, grain, quality (grading)*
- *describing and then having the apprentice identify common defects (natural and manufactured)*
- *describing the properties and grading of composite panels, overlays, plywood and bendable sheet goods*
- *explaining the reasons for specific storage requirements for specific products*
- *having the apprentice select appropriate materials for projects*
- *explaining the uses of common adhesives , fasteners and abrasives frequently used in cabinetmaking*
- *explaining how a joint works and why specific joints are used for specific applications*
- *describing the importance of fit, surface quality and grain orientation for wood joints*
- *providing opportunities for the apprentice to fabricate basic and more complex joints*

**Tools, Machines and Equipment**
Measuring and layout tools
Hand planes
Scrapers, chisels, gouges and knives
Assembly, dismantling and clamping tools
Hand drills and saws
Portable power tools
Pneumatic tools and fasteners
Table, panel, radial arm and CNC saws
Tooling for portable and stationary equipment
Band saws and drill presses
Jointers and thickness planers
Explosive actuated tools

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *describing and demonstrating the proper use, maintenance and storage of measuring, layout, alignment and levelling tools; of basic hand and specialty planes; of chisels, gouges and knives; of assembly, dismantling and clamping tools; and of hand saws*
- *explaining the hazards and safety procedures associated with specific equipment*
- *describing and demonstrating the operation, application and general maintenance of power drills and screw guns; portable power saws (circular, jig, reciprocating and mitre); power planes, power sanders, routers and plate jointers*
- *describing and demonstrating the operation, application, regular maintenance, accessories, jigs and safety devices of stationary power saws (table, panel and radial arm and if possible CNC)*
- *describing the design and use of tooling (material, tooth designs, dado heads, maintenance and sharpening; and storage) for stationary power saws*
- *describing and demonstrating the operation, application and regular maintenance of band saws, drill presses, jointers and thickness planers*
- *demonstrating and assisting the apprentice to change bits, blades and knives*
- *demonstrating and having the apprentice repair and sharpen tools*
- *having the apprentice complete repetitive projects using these specific pieces of equipment*
- *assisting the apprentice to troubleshoot equipment failures and complete repairs*
- *having a maintenance schedule for equipment*
- *describing and demonstrating the operation, application, and regular maintenance of pneumatic tools and fasteners*
- *demonstrating safe use, operation, application and regular maintenance of explosive actuated tools and explaining the differences and applications of power loads and fasteners*
- *monitoring the use and care of all tools to ensure competency in their use*

**Shop Drawing**
Drafting basics
Orthographic drawings
Basic drawing standards
Interpreting shop drawings and cutting lists
Orientation to computers and CAD
Residential print reading

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *demonstrating the use of basic drawing instruments*
- *demonstrating how orthographic drawings can produce a three view drawing for a simple shop project*
- *showing examples of shop drawings and explaining how information is provided on them*
- *demonstrating the use and interpretation of basic drawings in order to create orthographic views, sectional views, details and cutting lists*
- *if possible, introducing the apprentice to a CAD system and to the commands used to draw joints with horizontal and vertical lines*
- *explaining projects using freehand sketching techniques c/w dimensions*
- *having the apprentice optimize materials and then reviewing the results*
- *allowing the apprentice to calculate cutting sizes*
- *allowing the apprentice to do material take-offs for various smaller projects*

**Trade Math**
Basic math concepts
Area, perimeter, board feet and volumes
Ratio, proportion and percentage

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *monitoring to ensure the apprentice can perform basic math calculations*
- *clearly demonstrating conversions between metric and imperial*
- *having the apprentice perform calculations involving fractions*
- *having the apprentice perform calculations using the Pythagorean Theorem*
- *having the apprentice use various formulas to calculate area, perimeter and board feet*
- *giving the apprentice basic problems to demonstrate ratio, proportion and percent*

## Level Two

**Materials and Hardware**
Adhesive applications
Cabinetmaking hardware
Plastic laminates and solid surface materials
Mouldings, specialty products and veneers

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *fully explaining why specific glues and adhesives have specific applications*
- *describing required moisture and temperature conditions for the proper setting of different adhesives*
- *explaining pot life and set-up times whenever a new adhesive is used*
- *providing opportunities to apply different types of adhesives*
- *identifying hardware types and applications*
- *having the apprentice install various types of hardware in numerous applications*
- *describing and demonstrating types, sizes, adhesive application and installation of common types of laminate composites and solid surface materials*
- *describing the application of commonly used mouldings, specialty millwork products and veneers*

**Equipment, Machine Use, Assembly and Procedures**
Mortising and tenoning machines
Profiling machines and auto feed devices
Stationary sanding machines
Multiple spindle boring machines
Breakout of solid and sheet materials
Machining and assembly of case work
Interior door, frames and trim
Introduction to Computer Numeric Controlled (CNC) machinery

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *demonstrating the components, use, set-up; and operation and procedures for equipment used to produce mortises and tenons*
- *demonstrating the components, use, set-up; and operation and procedures for equipment used to produce profiles such as overhead and inverted routes, shapers and other auto feed devices*
- *demonstrating the main parts, functions, use and maintenance of stationary sanding machines*
- *describing and demonstrating typical applications, set-up procedures and maintenance of multiple spindle boring machines*
- *assisting the apprentice to change applicable bits, blades and knives*
- *having the apprentice complete repetitive projects using these specific pieces of equipment*
- *assisting the apprentice to troubleshoot equipment failures and complete repairs*
- *having a maintenance schedule for equipment*
- *describing the process to select and break out in sequence solid and sheet materials*
- *showing examples of and then allowing the apprentice to select materials for projects*
- *assisting and allowing the apprentice to plan, fabricate and install casework*

- *describing the fabrication, application and installation procedures of interior passage doors and frames, including related hardware and trim*
- *If possible, exposing the apprentice to types, accessories and applications of CNC machinery*

**Wood Finishing**
Wood finishing safety
Surface preparation
Top coatings

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *describing the hazards and safety equipment required for wood finishing*
- *discussing the MSDS for these products*
- *describing and demonstrating the products, techniques and equipment used to prepare wood products for finishing*
- *describing and demonstrating the products, techniques and equipment for wood finishing*
- *clearly establishing the complete finishing process required to achieve a desired appearance and/or performance*
- *describing the compatibility of different fillers with sealers, stains and top coats*
- *using the proper terminology to describe stains, sealers, wash-coats and top coats*
- *explaining the setting and drying time for these products*
- *having the apprentice clean and maintain the spray equipment*
- *ensuring the apprentice has been taught, and practices, proper spray equipment cleaning procedures, particularly spray guns*

**Shop Drawing and Print Interpretation**
Drawing standards
Commercial print reading
Free-hand sketches
Pictorial drawing and sketching
Kitchen and casework drawings
Material cutting lists and procedural plans
Computer Assisted Drafting (CAD) shop drawings

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *describing shop drawings and demonstrating shop drawing techniques*
- *assisting the apprentice to interpret commercial prints and building codes*
- *helping the apprentice to recognize the parts of blueprints that apply to cabinet making*
- *having the apprentice demonstrate the ability to recognize and use elevations, sectional views, room finish schedules; and cabinet casework and furniture details*
- *assisting in the review of specification sheets and catalogues to determine materials and installation requirements*
- *impressing the importance of manufacturer's printed materials*
- *familiarizing the apprentice with the AWMAC manual*
- *allowing the apprentice opportunities to practice making freehand sketches, shop drawings and material lists to show joinery, layout and other details; to solve construction problems; and to make choices about construction methods*
- *demonstrating the drawing techniques and principles used to produce isometric and oblique drawings*
- *assisting the apprentice to develop kitchen and casework drawings including the development of full-size layouts and layout rods*
- *if possible, demonstrating the use and commands for CAD to draw lines, curves and angles*

**Trade Math**
Material quantity calculations
Bulk material costs
Integrated trade calculations

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *allowing the apprentice to perform necessary calculations from shop drawings to determine cutting lists*
- *assisting the apprentice to calculate bulk material requirements for a large millwork project*
- *allowing the apprentice to continue to perform trade related calculations involving ratio, proportion, volume, area and pressure*
- *having the apprentice calculate waste factors for solid and sheet goods; veneers and finishes*

## Level Three

**Materials, Packaging and Shipping**
Acrylics, glass, metals and plastics in cabinetmaking
Packaging and shipping millwork

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *describing and demonstrating the types, applications, procedures and tools for the cutting and installation of glass, mirrors and related hardware*
- *describing and demonstrating the types, applications, procedures and tools for the cutting, shaping and bending; and installation of acrylic and sheet plastic materials*
- *describing specialized metal products and their applications*
- *describing extruded plastic and metal mouldings by type and application*
- *having the apprentice research (from websites) the glass, metals and plastics used in this industry*
- *explaining scenarios applicable to product protection*
- *having the apprentice determine the stage of delivery (when to ship) for a particular project*
- *describing and/or showing damage that can occur from improperly packed or stored materials*

**Design Theory and Shop Procedures**
Principles and elements of design
Ergonomics
Joinery techniques
Curved elements in wood
Furniture design and architectural terms
Wall and ceiling treatments
Custom veneer matches and production applications
Prototypes
Dry fit

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *describing the elements and principles of design and of the colour wheel and colours*
- *allowing the apprentice to research ergonomics and furniture styles with respect to height, width and clearance requirements for the human anatomy*
- *describing and demonstrating how veneering is accomplished*
- *mentoring the apprentice to visualize the big picture - there are always reasons things are done in a certain way*
- *describing and assisting the apprentice to perform advanced joinery techniques*
- *describing and demonstrating the techniques used for producing curved panels, curved laminations and other curved wood products*
- *ensuring the apprentice is familiar with the terms and definitions for architectural woodworking*
- *describing and demonstrating wall and ceiling treatments with respect to preparation for panelling, assemblies and applications; matching patterns; pre-assembled panel mounting methods, different matching patterns used; and spacing, layout and planning*
- *describing and demonstrating the application of custom veneer principles and practices with respect to selection and preparation of core materials; assorted veneer matches; hand and portable power tools used; and the techniques for veneering*
- *describing the function, layout and design; and selection of materials for prototypes*
- *describing the purpose for and demonstrating the clamping procedures for dry fitting components, including the procedures used to correct defects and faults*

**Machines and Equipment Procedures**
Custom shaper and CNC machining centre production applications
Moulders
Specialized industrial machines
Wood turning
Advanced table saw applications and procedures
CNC manufacturing

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *having the apprentice demonstrate the set up, operation and maintenance of shapers and, if possible, CNC machining centres*
- *having the apprentice demonstrate the set up, operation and maintenance of moulding machines*
- *describing and demonstrating the components, operation, applications and maintenance of wood turning machines*
- *describing and demonstrating advanced table saw applications and operations with respect to use of jigs and fixtures; and cutting and profiling*
- *if possible, describing and demonstrating the set up, operation and maintenance of a CNC manufacturing centre with respect to the operating screen; nesting and bridge nesting; seamless integration; software applications; and simple machining*
- *removing the "installed parameters" and having the apprentice determine new machine settings for a required project*
- *monitoring safety procedures associated with specific equipment*
- *assisting the apprentice to change bits, blades and knives*
- *training the apprentice in the art of balancing cutter heads and altering the shape of cutters*
- *having the apprentice complete repetitive projects using these specific pieces of equipment*
- *assisting the apprentice to troubleshoot equipment failures and complete repairs*
- *ensure equipment maintenance procedures are being followed according to a set schedule*

**Stairs**
Stair design and code
Stair construction
Stair and handrail installation

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *demonstrating and explaining how and where specific code requirements are found that will determine the parameters that a set of stairs, a guardrail or a handrail must be built to*
- *assisting the apprentice to lay out stringers using various total rises and total runs*
- *having the apprentice determine the total length of a stringer using Pythagorean's theory*
- *describing and assisting the apprentice to install and align stairs, guards and handrails including pre-manufactured architectural stair components*

**Shop Drawing - Prints for Commercial Buildings**
Print reading principles
Plans, elevations, sections and details
Specialized plan views
Integrated print reading skills
Interpret commercial prints
Shop drawings from commercial prints
Advanced free-hand sketching
Stair drawings
Computer Assisted Drafting (CAD) and Computer Assisted Manufacturing (CAM)

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *ensuring the apprentice is familiar with the language of lines, symbols, abbreviations and dimensioning styles used in commercial prints*
- *ensuring the apprentice can describe the types of drawings contained in a set of commercial prints and can navigate through these prints*
- *ensuring the apprentice can interpret the information contained in the different views presented within a set of working drawings*

- *demonstrating how to isolate the cabinetmaker's work and interpret inter-related work with other trades from a set of commercial prints*
- *having the apprentice interpret architectural drawings, specifications and site measurements and to integrate this information into useable shop drawings*
- *continuing to allow the apprentice to develop free-hand sketching skills involving irregular, curved or elliptical shapes and evaluating designs with regard to principles of design*
- *giving hypothetical situations involving stairs and stairwells and having the apprentice determine if it will work*
- *demonstrating and having the apprentice perform the layout of common and winder stairs; balusters, handrails, newels, and to design stair routing templates*
- *if possible, exposing the apprentice to CAD software to produce drawings, optimize materials and produce cutting lists*

**Trade Math**
Mechanical advantage
Takeoffs and layout
Job costing
Stair calculations
Cutting speeds

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *having the apprentice perform quantity, spacing and layout problem solving during material takeoff from prints*
- *having the apprentice perform job costing and estimating including material, labour and overhead*
- *having the apprentice perform stair calculations for straight, multiple flight, winder and circular stairs*
- *describing and having the apprentice perform RPM, feed and rim speed calculations for typical wood working machines*

## Level Four

**Related Trade Procedures**
Principles of advanced furniture joinery
Marquetry, parquetry, intarsia and inlay special veneer matches
Fire retardant materials and practices
Basic woodcarving
Commercial millwork
Integrated CNC
Handling, shipping and installation
Custom millwork installation tools and techniques

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *describing, demonstrating and having the apprentice perform advanced joinery techniques used to construct various grades of cabinets and casework; various furniture items; and various types and styles of tables and chairs*
- *describing and demonstrating advanced veneering techniques explaining veneer materials, tools, techniques and various matches; the use of metal, wood, multi-layered veneer banding and inlays; and the materials and methods employed in the art of marquetry, parquetry and intarsia*
- *having the apprentice research materials (from a website if necessary) in order to demonstrate understanding of the adhesives, layout and pressures required for veneering, inlaying and marquetry*
- *describing flame spread and fire ratings and how they apply to the cabinet making trade*
- *ensuring the apprentice understands flame spread rating systems and the principles of fire retardant treatments and finishes for woodwork*
- *discussing the development of curved and irregular components relative to the cutting and routing; and shaping with patterns*
- *describing specialized carving tools and their sharpening procedures; and demonstrating procedures for carving (in the round and chip carving)*
- *assisting the apprentice to perform sharpening and reconditioning procedures*

- *discussing the special requirements, materials and hardware that can arise during the fabrication and installation of components such as for courthouses and food service fixtures*
- *explaining how to find and determine code requirements that are applicable to schools, churches, food services industry, lobbies, etc.*
- *if possible, continuing the apprentice's exposure to integrated CNC equipment by describing and having the apprentice develop a simple program to run on CNC equipment*
- *discussing millwork sizing and spacing with respect to logical considerations for ease of millwork installation; and standard limitations of lifts, trucks, freight elevators, staircases and door openings*
- *reviewing specific installation requirements with respect to equipment required to install; typical methods; typical problems and solutions; effects of site conditions such as temperature and humidity; and inspection of installed millwork*
- *having the apprentice install all types and styles of cabinets and millwork*
- *having the apprentice perform an inspection of a completed project and reviewing the results*

**Industry Practices and Procedures**
Job roles and responsibilities
Contract law
Business structures and practices
Large and small shop practices
Production scheduling
Machine maintenance

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *ensuring the apprentice knows the roles of all authorities (federal, provincial and municipal, architects, engineers and designers)*
- *describing basic contracts and regulations related to the trade such as change of work procedures; the when, why and how of filing a builder's lien; the legal relationship that exists between general contractor and sub-contractors; the job tendering system; bonds, and insurance and construction management risk*
- *having the apprentice obtain a building permit*
- *having the apprentice draw up a bid proposal from a set of prints and evaluate the proposal*
- *ensuring the apprentice understands business structures and practices including planning; effective supervision and leadership; and financial and legal obligations*
- *fully explaining overhead costs vs. project costs*
- *describing production scheduling methods*
- *having the apprentice interact with a general contractor's timetable*
- *ensuring the apprentice is fully familiar with the installation and alignment of cutters and knives*

**Wood Finishing**
Wood finishing applications
Specialized wood finishing

*The employer can assist the apprentice to prepare for this section of technical training by:*
- *monitoring the apprentice during the selection of finishing materials and equipment*
- *ensuring the apprentice is fully familiar with surface preparation and finishing techniques for bleaching, staining, filling, sealing, top coating and oil finishing*
- *continuing to allow exposure to the application of different materials*
- *having the apprentice apply, or at least research, the application techniques for pre-staining or sap staining, shading, toning and glazing; and distressing*
- *monitoring the apprentice to ensure that safety remains a prime consideration*

**Print Reading and Shop Drawing**
Commercial prints with complex architectural elements
Print conflicts and resolution
Two point perspective drawings
Advanced sketching
Commercial layouts
Drawing shop projects
CAD shop drawings

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *having the apprentice determine various details through the interpretation of all types of architectural drawings and prints*
- *assisting the apprentice to interpret reflected ceiling plans and determine installation requirements*
- *having the apprentice determine conflicts between drawings and specifications and assisting to resolve confusing and contradictory issues*
- *continuing to allow the apprentice to produce all types of sketches, layouts, templates, shop drawings and cutting lists*
- *having the apprentice develop and fabricate a full-scale pattern from detailed specifications and instructions*
- *if possible, expose the apprentice to CAD skills used to manipulate drawings for printing, detail clarity and easy editing including 2D CAD commands such as grips, layers and plotting*

**Trade Math**

Job costing
Material optimization
Standard estimating methods
Estimating using yield factors for large projects
Unit and shipping costs
Rule of thumb costing

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *assisting the apprentice to make determinations regarding material waste due to grades and defects*
- *having the apprentice calculate labour costs for a project c/w associated (overhead) costs - give the apprentice specifics such as certain helpers*
- *ensuring the apprentice can perform calculations to optimize solid and sheet stock requirements*
- *having the apprentice use area, volume and capacity calculations to calculate material lists from drawings*
- *having the apprentice develop a time table for production and shipping*
- *describing Rule-of-Thumb costing methods and having the apprentice use this to cost a typical millwork and case work project*

**Workplace Coaching Skills and Advisory Network**

Coaching skills
Interprovincial Standards

*The employer can assist the apprentice to prepare for this section of technical training by:*

- *ensuring the apprentice can relay information clearly to newer employees or apprentices*
- *demonstrating and promoting good mentoring practices and the passing on of skills*
- *ensuring the apprentice is aware of the National Occupational Analysis (NOA) and how it relates to the Interprovincial examinations*

**Consider apprenticeship training as an investment in the future of your company and in the future of your workforce. Ultimately, skilled and certified workers increase your bottom line.**

**Get involved in the apprenticeship training system. Your commitment to training helps to maintain the integrity of the trade.**

**Do you have employees who have been working in the trade for a number of years but don't have trade certification?**

**Contact your local apprenticeship office for details on how they might obtain the certification they need.**

**Saskatchewan Apprenticeship & Trade Certification Commission**
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