Cabinetmaker

Unit: A1 Orientation: Structure and Scope of the Trade

Level: One
Duration: 8 hours
Theory: 8 hours
Practical: 0 hours

Overview:
One sign that an apprentice has mastered a cabinetmaking task is that he or she may be asked to share this knowledge. The shop-floor exchange of skills has been fundamental to trade teaching and learning for many centuries. It occurs even among seasoned journeypersons. Such sharing of trade knowledge, however, is influenced by a complex mix of factors. These can include shop ‘politics,’ personal attitudes, and the demands of production schedules. As adult trade-learners, apprentices need to use their eyes, ears, prior knowledge, and interpersonal skills in ways that will encourage their journeypersons to help teach or coach them as well as to supervise. This requires understanding trade dynamics, including the roles and responsibilities that order working life in cabinet shops. This unit profiles the trade’s historical and modern significance, its core tasks and skill requirements, its job ladders, as well as the nature of “production” shop and “custom shop” cabinetmaking. Unit content also includes information about learning styles/strategies, stressing their importance to apprenticeship and to actual work on the bench. The unit also introduces the concept of skills stewardship, emphasizing the significant contribution journeypersons make to the workplace learning of apprentices, and in turn, the obligation that apprentices themselves will eventually share in assisting those who follow them into the trade. A sound grasp of the roles, workplace relationships, and possibilities introduced in this unit is fundamental to effective learning in the apprenticeship context. The present unit concentrates on ‘learning to learn’ in this system of Manitoba adult education. In Level Three, senior apprentices are offered information about learning to teach in this system – one of the oldest and most significant foundations of ‘journeywork’ in the trade.

Objectives and Content:

1. Describe structure and scope of the modern cabinetmaker trade. 40%
   a. Historical background, incl. apprentice experience
   b. Structure/scope of the trade
      • Custom shops
      • Production shops
      • Trade organizations
   c. Opportunities and career ladders
   d. Generalists and specialists
   e. ‘lead hands’ and other immediate supervisors
   f. Geographic mobility
   g. Job hierarchies and innovations

2. Describe Manitoba’s Cabinetmaker Apprenticeship Program. 30%
   a. Concept and significance of skills stewardship
      • To the trade
      • To apprentices
      • To journeypersons
      • To employers
      • To the community

Percent of Unit Mark (%)

Rev. November 2003
b. Practical Training (on-the-job)
   - Roles/responsibilities of employer and journeyperson(s)
   - Roles/responsibilities of Apprenticeship Training Coordinator (ATC)
   - Roles/responsibilities of apprentice(s), including Practical Training Record Book (PTRB) documentation

c. Technical Training (in-school)
   - Role/responsibilities of instructors (including ‘Related’-area faculty)
   - Role/responsibilities of apprentice(s)

3. **Explain special challenges and opportunities re: apprenticeship training.**  
   30%

a. Adapting personal learning goals to program contexts
   - Needs and expectations re: adult education
   - Description/recognition of learning and teaching styles
   - Work culture (incl. shop-floor hierarchy), interpersonal skills, and trade-learning
   - Integrating Technical Training (‘formal’) and Practical Training (‘informal’) content
   - Possibilities and perils of peer-learning
   - Budgeting and other necessary personal arrangements
   - Handling common varieties of stress at work and in school

b. On-the-job challenges/opportunities
   - Description/recognition of shopfloor teaching styles/roles
   - Communicating with journeypersons and employers
   - Coverage/documentation of formally prescribed tasks and subtasks (PTRB)
   - Personal record of achievements/needs: the Trade Learning Journal option
   - Getting help and fixing mistakes

c. In-school opportunities/challenges
   - Personal arrangements that support in-school progress
   - “Baggage handling” – self-assessing potential impacts of previous school experience on current learning (favourable/unfavourable); resources
   - Techniques for note-taking, record-keeping, and review
   - Relations with instructors (including ‘Related’-area faculty)
   - College resources (library, support services, etc.)
   - ‘Missed Units’ – policies re: supplementals, re-tests, make-up assignments, etc.

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Overview:

Apprentices have a special obligation to understand and to minimize the considerable hazards of cabinetmaking. As trade 'newcomers,' they are often under pressure to prove themselves, but at the same time still have lots to learn about trade safety. This can be a dangerous mix – and not just for apprentices themselves. Trade safety is a basic requirement of both on-the-job and in-school learning. It needs emphasizing whenever a task or training objective is discussed, attempted, and repeated. For the individual apprentice as an adult learner, there is no substitute for determination to master the requirements of trade safety and health. This includes developing a personal outlook that includes the maturity and self-confidence to reject the ' unofficial' but all-too-real value which some still place on dispensing with push sticks, tool guards, and personal protective equipment. A deeper value within trade culture recognizes that even newcomers must think carefully about the kind of trade-safety skills and knowledge they are developing, because these are the same qualities they will eventually model as journeypersons for those who follow them on the apprenticeship path. This unit of instruction supplements health and safety concerns which are addressed throughout the program, and concentrates on special aspects of the subject. Those who complete the unit will have demonstrated knowledge required to earn recognized certificates re: First Aid, Cardiopulmonary Resuscitation (CPR), the Workplace Hazardous Materials Inventory System (WHMIS), and Explosive-Activated Tools. This knowledge should be broadened and renewed periodically in accord with individual needs, work situations, and employer responsibilities. Apprentices are also urged to pay particular attention to instructional-unit content concerning Shop Safety protocols prescribed by their Technical Training provider. Failure to comply with Shop Safety protocols may result in sanctions that could prevent a trade learner from satisfying the program’s Practicum requirements.

Objectives and Content:

1. Outline scope of occupational health/safety (OHS) considerations re: cabinetmaking shops and jobsites.  
   a. On the shop floor and on the bench  
      • Laws and regulations  
      • Employer requirements  
      • Tools and equipment (including manufacturer warnings)  
      • Quality of light, air  
      • Temperature control  
      • Adhesives, solvents/thinners (e.g., acetone), wood-finish, etc.  
      • Harmful dusts, vapours, and fumes (e.g. overspray of adhesives and finishes)  
      • Personal protective equipment  
      • Work-station access, housekeeping  
      • Fire protection equipment and techniques  
      • Policy/procedure re: accidents  
      • Other (specified by instructor)  
   b. On other trade jobsites (e.g. kitchen-cabinet installation; large construction sites)
- Laws and regulations (including liability)
- Employer, client, and/or contractor requirements (e.g. accident reporting)
- First Aid supplies
- Special site characteristics and precautions (e.g. electrical-power supply/ distribution; heating/cooling; damp area; confined space; working alone, etc.)
- Jobsite access, incl. clients, children, other trades, and guardrails/barriers
- Jobsite housekeeping, incl. safe transport and storage of tools/equipment
- Ladders, scaffolding, and other access equipment
- Fire protection equipment and techniques
- Other (specified by instructor)

2. **Describe/demonstrate all Shop Safety protocols and expectations re:**
   Technical Training provider’s requirements (e.g. College Shop Safety Rules).
   
3. **Fulfill requirements re: earning/renewing a recognized First Aid Certificate (or equivalent). 10%**
   a. Describe/demonstrate basic First Aid requirements and techniques
      - Scope and limits of First Aid intervention
      - Specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
   b. Interface with other services and agencies (e.g. OHS inspectors; Workers’ Compensation claims)

4. **Fulfill requirements re: earning/renewing a recognized CPR Certificate (or equivalent). 10%**
   a. Describe/demonstrate basic CPR requirements and techniques
      - Scope and limits of CPR intervention (incl. varieties of CPR certification)
      - Specific interventions (symptomatology; choking/suffocation; severe angina, cardiac arrest, etc.)
   b. Interface with other services and agencies (e.g. Emergency Ward personnel)

5. **Fulfill requirements re: earning/renewing a recognized WHMIS Certificate (or equivalent). 10%**
   a. Description of WHMIS (incl. varieties of WHMIS Certification)
   b. Typology of WHMIS labels, symbols, and classifications
   c. Scope and use of Materials Safety Data Sheets (MSDS)
   d. Special considerations re: Cabinetmaking trade (e.g. handling thinners; ingestion of adhesive vapours, etc.)

6. **Fulfill requirements re: earning a recognized Explosive-Activated Tools Certificate (or equivalent). 10%**
   a. Safety (incl. storage and transport)
   b. Scope and variety of explosive-actuated tools and accessories
   c. Uses and applications
   d. Care, maintenance, and operation (incl. safe storage)
   e. Practical exercises re: set-up and firing E-A tools
   f. Demonstrate competence selecting accessories and firing tools

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Cabinetmaker

Unit: B1 Trade Mathematics I: Applied Basic Skills

Level: One

Duration: 24 hours
- Theory: 24 hours
- Practical: 0 hours

Overview:

Cabinetmaking requires the ability to use mathematics and geometry with precision, resourcefulness, and confidence. Many fundamental problems in design, estimation, set-up, layout, milling, and assembly involve careful work with numbers and geometric principles. Real-life trade practice involves a constant dialogue between measured or specified quantities and the performance of precision work to achieve a desired fit or tolerance among the components of a built object. Many of the trade’s most indispensable tools and techniques -- whether old or new, simple or complex -- essentially are aids for reliably translating abstract numbers and shapes into milled stock, workpieces and finished products. This unit of instruction, then, is intended to help make the world of numbers and shapes work for, rather than against, the apprentice cabinetmaker. For this reason, the unit includes up-to-date information about the nature of ‘math anxiety and how it can be overcome. Unit content also includes a brief review of basic math concepts and operations, but its major focus concerns applications in actual trade practice. A companion unit in Level Two pursues this subject in greater depth, as do more specialized units that deal with computer-based estimation and materials optimization.

Note: Although this unit includes a review of math basics, and provides some tools for building skill and confidence in applying them, it is not a remedial math course. Unit content assumes a prior familiarity with math basics. Apprentices who might require upgrading in this area are strongly encouraged to consult with their Apprenticeship Training Coordinator (ATC) and/or their Instructor early in the program to identify suitable options and resources, preferably before attending Level One Technical Training.

Objectives and Content:

1. Describe the practical importance of math disciplines to the trade. 15%
   a. Definition and scope of relevant math disciplines
   b. Detailed examples ‘past and present’
      - Plane geometry and dovetail joinery
      - Ratio/proportion and technical drawing to scale
      - Cartesian coordinate matrix and CNC production
      - Other (specified by instructor)
   c. Time-sheets, wages, and personal budgeting
   d. Engineering of tools and equipment
   e. Manufacture of wood and non-wood products
   f. Trade documents
   g. Standards, codes, and other specifications
   h. Computer technology/applications
   i. Design/technical drawing
   j. Estimation and bidding
   k. Production planning
   l. Materials procurement and inventory
   m. Machinery and equipment set-up
   n. Measurement and lay-out
2. **Describe “math anxiety” and its remedies.**  
   a. Definition  
   b. Recognition  
   c. Options, resources, and techniques for overcoming math anxiety  
   d. Other common problems  
      * Importance of adult learner's recognition of problems  
      * Importance of early resolution during term of apprenticeship  
      * Options/resources for remedial math instruction and other assistance  

3. **Review general math concepts and use of electronic calculator.**  
   a. Basic operations  
      * Addition  
      * Subtraction  
      * Multiplication  
      * Division  
      * Order of operations  
      * Fractions and decimals  
   b. Ratio and proportion  
   c. Percentage calculations  
   d. Constructing/solving simple equations  
   e. Trigonometry functions  
   f. Units of measure  
      * Imperial  
      * Metric (SI)  
      * Conversion factors  
   g. Calculator use  
      * Basic operation keys/functions  
      * Percentage keys/functions  
      * Trig keys/functions  
      * Keys/functions re: memory and constants  

4. **Perform trade-related calculations as specified by instructor.**  
   a. Linear measurement  
      * Locate cabinets for installation as per plans  
      * Prepare bill of materials for architectural trim as per plans  
      * Rectangular/triangular dimensions  
      * Radius/diameter/circumference  
   b. Area and volume  
      * Prepare cut-list for sheet goods  
      * Calculate board feet  
      * Squares/rectangles  
      * Triangles  
      * Circles/cylinders  
      * Ovals/ellipses  
      * Irregular shapes  
   c. Ratio/proportion  
      * Determine rate of feed  
      * Mix finish materials  
      * Interpret scale drawing  
      * Ratios  
      * Percentages  
      * Rates  
      * SI/Metric Units (incl. conversions)  
   d. Geometry  
      * Determine centres for evenly spaced pigeon-holes inside a carcase of known size  
      * Design a trammel-bar jig to execute a large curve of specified dimensions  
      * Pythagorean Theorem  
      * Angles  
      * Bisectors  
      * Normals  
      * Arcs and tangents  
      * Circles (including radius/diameter)  
      * Polygons
Cabinetmaker

Unit: C1 Introduction to Design Principles and Technical Drawing

Level: One
Duration: 35 hours
Theory: 35 hours
Practical: 0 hours

Overview:

This unit is one of three in Level One Technical Training which lay the basis for a well-rounded working knowledge of conventional design, drafting and blueprint-reading skills. The topic is so important that recent research on Cabinetmaker apprenticeship goes so far as to characterize technical drawing as the cabinetmaker's 'second language.' ‘Doing drawings’ must be learned not only to perform journey-level work but even just to benefit fully from in-school and on-the-job trade teaching. Drawings and design represent a discipline in its own right. Its methods can be as simple as drawing a pencil sketch on a scrap of off-cut, or as elaborate as producing a computerized image which special equipment can then ‘read’ to control saw blades and rotary cutters, and to generate a “one-to-one scale” (full-size) shop-floor template on top of which cabinet-work is actually built and assembled. The gateway to these advanced trade practices lies in achieving a good, thorough grasp of the uses and requirements of conventional design, drawing, and blueprint-reading practice. The present unit of instruction outlines the basic design considerations and technical drawing conventions that Level One apprentices require. The other Level One units in this course-area explore the basic requirements for using blueprints and computers to perform cabinetmaking tasks. Although the program also offers further opportunities to develop design skills beyond the basics, apprentices are strongly encouraged as adult learners to define for themselves their design-related individual needs and interests as these evolve through their own ongoing experience of trade practice.

Objectives and Content:

1. Describe/demonstrate the major uses and categories of technical drawing re: the modern practice of cabinetmaking.
   a. Uses
      - Design of objects (form/function; aesthetics; production planning; cost considerations, etc.)
      - Problem-solving and trouble-shooting
      - Communication among builders, drafting workers, designers, clients, architects, etc.
      - Bidding/contracting practices
      - Others as specified by instructor
   b. Types/Techniques and Terminology
      - Freehand sketches and ‘brainstorming’
      - Development of sketches/drawings from photographs
      - Pictorial drawings
      - Shop drawings (including cutting diagrams for break-out of panels, etc.)
      - Working drawings
      - Drawings to specification
      - Blueprints and blueprint components (for simple case goods and light construction) including blueprint schedules (specialties, millwork, etc.)
      - Layout (including use of layout-rods/sticks)
      - Computer Assisted Drawing and Design (CADD) drawings

Percent of Unit Mark (%)

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit Mark (%)</th>
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<tbody>
<tr>
<td>Describe/demonstrate the major uses and categories of technical drawing</td>
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<td>re: the modern practice of cabinetmaking.</td>
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<td>a. Uses</td>
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<td>considerations, etc.)</td>
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<td>- Communication among builders, drafting workers, designers, clients,</td>
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<td>architects, etc.</td>
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<td>- Bidding/contracting practices</td>
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<td>- Others as specified by instructor</td>
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<tr>
<td>- Computer Assisted Drawing and Design (CADD) drawings</td>
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</tbody>
</table>
2. **Describe/demonstrate basic design principles and trade-accepted conventions re: 'good design.'**
   - a. Elements of design
   - b. Design change -- significance/examples of market forces (incl. fashion), technology and other factors in cabinetry and furniture design
   - c. Design continuity – ergonomics
   - d. Design of case goods
   - e. Design of furniture
   - f. Design/composition of architectural moulding profiles

3. **Describe/demonstrate use and selection of conventional drafting equipment/materials.**
   - a. Rules and straight edges (including T-square, parallel rule)
   - b. Architect's scales (Imperial and SI)
   - c. Pencils and leads (especially re: line-weight)
   - d. Erasers
   - e. Set squares
   - f. Protractors
   - g. Tools for curved work (e.g. compass; French curves)
   - h. Papers (vellum, grades, “tooth”, etc.)
   - i. Specialty templates
   - j. Standards
   - k. Other (specified by instructor)

4. **Describe/demonstrate specified principles, conventions and techniques in relation to joinery and casework construction/installation.**
   - a. Basic Orthographic projection
     - visualization, matching, sketching
     - Plan view
     - Elevation view
     - Side view
     - Sectional view
   - b. Basic Oblique projection
   - c. Basic Isometric Projection
   - d. Applied geometry
     - Constructing angles
     - Constructing circles, arcs, tangents etc.
     - Dividing lines
     - Constructing regular polygons
   - e. Line work and weight
     - Object line
     - Hidden line
     - Extension line
     - Dimension line
     - Centre line
     - Break line
     - Cutting-plane line
   - f. Common architectural symbols (for joinery, casework, and light/residential construction)
   - g. Measurement and drawing scale (Metric; Imperial)
   - h. Lettering
     - Basic knowledge of legibility and other requirements
     - Basic use of lettering templates/guides

5. **Design and draw a cabinetmaking specialty per instructor specifications.**
   - a. Interpretation of other drawings/materials to identify/solve a problem
   - b. Use of scale, accepted conventions re: line-weight, lettering, etc.
   - c. Sequence
     - Freehand sketch
     - Shop drawing
     - Specified detail sketch
     - Finished drawing, including application of line-weights
Cabinetmaker

Unit: C2 Computers and the Cabinetmaker Trade

Level: One
Duration: 35 hours
Theory: 35 hours
Practical: 0 hours

Overview:

This unit of instruction is designed to provide apprentice cabinetmakers with basic skills and knowledge required to benefit from computer technology as it currently applies to their trade. The unit serves as a gateway to other program components which focus upon such trade-related computer applications as drafting, automated machine control, materials utilization, and communications. Equally important, the unit offers essential information and basic techniques intended to equip apprentices with the skills necessary to locate, select, and use electronic learning resources. Although many apprentices already will be familiar with basic components/functions of personal computer technology, this unit will help round out their prior knowledge, and help establish a thorough foundation for developing competence regarding trade-specific computer applications.

Objectives and Content:

<table>
<thead>
<tr>
<th>Percent of Objectives and Content</th>
<th>Unit Mark (%)</th>
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<tbody>
<tr>
<td>1. Describe basic computer components and their functions.</td>
<td>10%</td>
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<tr>
<td>a. Aspects of Windows-platform software</td>
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<td>b. Auxiliary drives (A, B, C, etc.)</td>
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<td>c. Care/handling of diskettes and CD-ROMs</td>
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<td>d. CPU</td>
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<td>e. DOS</td>
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<td>f. Hard drive</td>
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<td>g. Input/output devices</td>
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<td>h. Keyboard</td>
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<td>i. Monitor</td>
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<td>j. Mouse</td>
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<td>k. Parallel/serial ports</td>
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<td>l. Printer (impact/non-impact)</td>
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<td>m. RAM and ROM</td>
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<td>2. Perform basic word-processing operations.</td>
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<tr>
<td>a. Boot computer and start applications</td>
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<td>b. Execute common commands</td>
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<td>c. Perform file-management tasks</td>
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<td>3. Describe Internet system components.</td>
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<td>a. Conceptualizing the Web</td>
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<td>b. Routers</td>
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<td>c. File servers</td>
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<td>d. Network addresses</td>
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<td>e. Bookmarks</td>
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<td>f. Search engines (e.g., Dogpile; Google)</td>
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</tbody>
</table>
4. **Perform Web searches using various search engines.** 10%
   a. Accessing search engines via URL addresses
   b. Selecting/using key words to guide searches
   c. Filtering/refining and organizing search results

5. **Send/receive e-mail messages.** 25%
   a. Accessing public domain e-mail services
   b. E-mail addresses
   c. Sending/retrieving e-mail
   d. Replying to/forwarding e-mail
   e. E-mail attachments (text/graphics)
   f. E-mail website links

6. **Identify/describe important areas of trade practice to which computer technology is being applied.** 20%
   a. Communications and general documentation
   b. Business records (including payroll) and project management
   c. Cost estimating, preparing tenders, and cost control
   d. Optimized use of sheet-goods and other construction materials
   e. Architectural, survey, and other technical drawings (e.g. CAD platforms)
      CAD, CAD/CAM and CNC applications in production (e.g., case goods, architectural millwork and trusses)
   f. Kitchen/bathroom design
   g. Customer relations (e.g., 3D-rendering of renovation projects)
   h. Other (as instructor may wish to specify)

7. **Identify computer-related methods/resources for trade learning.** 25%
   a. Conventional trade periodicals and books
   b. Subject-specific websites, e-publications, and listserv groups (e.g. WOODWEB)
      CD-ROMs and other instructional software

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Cabinetmaker

Unit: C3 Blueprint Use I: Casegoods; Residential Construction

Level: One
Duration: 35 hours
   Theory: 35 hours
   Practical: 0 hours

Overview:
Working cabinetmakers must be able to use blueprints and entire sets of blueprints with ease and accuracy. Blueprint interpretation involves learning to make sense of special symbols, codes, and conventions used to convey information to those on the bench, shop floor, and installation jobsite. For a large jobsite such as an institutional building or complex structure, the required set of blueprints is organized like a book containing hundreds of cross-referenced, dimensioned images, multiple perspectives, and construction details. But even the blueprints for building and installing a single fixture or cabinetry component can seem complex until blueprint use is mastered. Some of these codes and conventions -- e.g., linework and line-weight - were introduced in Unit C1, which also provided some hands-on experience in using them to communicate ideas about cabinet design and building. Unit C3, however, emphasizes blueprint use to glean information about how cabinetmaking specialties are dimensioned and constructed, and how they are to be located in relation to other important components of a built structure (e.g., mechanical systems). The unit also describes how blueprints are produced and used by specialists who are responsible for different aspects of the process. A companion unit in Level Two revisits many of these themes, but does so in the more complex context of institutional/commercial blueprint use.

Objectives and Content:

1. Describe the basic taxonomy of blueprints with particular reference to casegoods and residential construction. 15%
   a. Divisions
      i. Architectural
      ii. Structural
      iii. Mechanical
      iv. Electrical
      v. Millwork
   b. Other major categories
      i. Sheet drawings
      ii. Specifications
      iii. Book (Table of Specifications)
      iv. Addenda

2. Describe the uses/preparation of blueprints with particular reference to casegoods and residential construction. 15%
   a. Detailed 'mapping' of site/site characteristics.
   b. Visual representation of the construction and/or location of a built structure
   c. Specification of essential details
      i. Shape
      ii. Size
      iii. Function
• Materials used
• Access
• Assembly details
• Standards for construction, installation etc. (e.g. AWMAC; National Building Code standards)
d. Aid in estimating and optimizing materials
e. Aid in identifying and coordinating tasks among the trades
f. Roles and responsibilities in preparing blueprints
  • Client
  • Specification writers
  • Designer
  • Architect
  • Mechanical engineers (electrical; HVAC; plumbing)
  • General contractor
  • Subtrades
g. Sequence of blueprint preparation, distribution, and use

3. **Describe/demonstrate the use of casegoods/residential blueprints to derive specified information.**
   a. Use of blueprints to perform specified take-offs
      • Costs
      • Materials
      • Quantity
      • Labour/personnel
      • Shipping
   b. Use of blueprints to identify production/coordination requirements
      • Tools and equipment
      • Capacity and other characteristics of physical plant

4. **Describe/demonstrate production of a shop drawing using casegoods/residential blueprints as per instructor-provided specifications.**
   a. Analysis of blueprints and specifications to identify/isolate all requisite information
   b. Production of shop drawings

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Cabinetmaker

Unit: D1 Tools and Equipment I: An Overview

Level: One
Duration: 24 hours
Theory: 24 hours
Practical: 0 hours

Overview:

All Level 1 Cabinetmaker apprentices acquire some practical knowledge of their trade’s tools and equipment long before they begin in-school Technical Training. Most have purchased at least a few basic tools of their own, and know something about tool use and misuse. They will build on this knowledge long afterward, too, for tool use is one key area of trade competence that requires special commitment to lifelong learning. The materials, technology, and practical methods that define much of the cabinetmaker’s world of work continue to evolve. The productivity, the quality, and the safety of trade-life thus depend on continuously updating personal knowledge about tool selection, use, and maintenance. Unit D1 surveys these skill requirements through a broad general overview of the modern cabinetmaker’s tool-set, including conventional hand tools as well as portable/stationary power equipment. A companion unit offers hands-on experience with basic techniques for safe use and maintenance. Other units refine this overview in terms of more advanced, specialized techniques for using and troubleshooting tools. The present unit concentrates on the variety and major kinds of tools and equipment available to the cabinetmaker. The unit explores how they are used and why, with some reference to the relationship between hand-tools and their motorized, air-driven, and computer-controlled counterparts. The unit even includes some practical guidance about how and when to collect the basic tools needed to practice the trade. Elsewhere in the program, apprentices have the further opportunity to refine their joinery and case-building skills by producing a toolbox in which to store and carry those tools in keeping with their cost and importance.

Objectives and Content:

1. Describe the use/selection/maintenance of tools and equipment in general. 10%
   a. Relevant background re: development of modern trade technology, techniques, and markets
   b. Identification/definition of major categories re: the trade’s modern tool-set
      - Hand tools
      - Portable power tools and equipment
      - Stationary power tools and equipment
      - Air-driven
      - Explosive-activated
      - Computer-assisted/controlled
      - Comparison/contrast between common hand-tools and their power-tool equivalents
      - Persisting importance of hand-tools and hand-tool skills (e.g., for specialized tasks; a foundation for power-tool skill development; as required in ‘coach-trade’ cabinetmaking, etc.)
      - Tools for working with metals, plastics, and other non-wood materials
   c. General considerations re: use of cabinetmaker tools/equipment
      - Safety precautions incl. use of personal protective equipment
      - Manufacturer and employer requirements
      - Securing workpieces and project components – benches, assembly tables, vises, clamps, work surfaces, tool rests, stop blocks, etc.
   d. General considerations re: selection of tools/equipment
Variation in the cost, quality, and capacity of cabinetmaker tools
Importance of matching job requirements to available tools/equipment
Importance of ‘knowing the limits’ when selecting and setting up for a given job
Appropriate use of jigs, aids to extend capacity of tools/equipment
Trade culture re: borrowing (and returning) tools
Variation in employer policy re: self- vs. shop-provided tools/equipment
Instructor’s recommendations re: selecting tools/equipment for personal acquisition (budgeting; arrangements with employer, etc.)

e. General considerations re: maintenance of cabinetmaker tools/equipment
   - Safety
   - Common sites, symptoms, and consequences of bad practice re: maintenance
   - Routine vs. scheduled maintenance requirements (e.g. manufacturer and/or employee expectations)
   - Costs/benefits of maintenance options (e.g. commercial sharpening)
   - Ways and means re: ongoing development of inspection/troubleshooting skills

2. **Identify hand tools, and describe their use, selection, and maintenance.**

a. Tools for measuring, marking, and lay-out tools, including:
   - Angle finder
   - Centre punch
   - Chalk line
   - Compass
   - Contour/profile gauge (‘copycat’)
   - Dividers
   - French curves
   - Levels (incl. electronic/laser)
   - Marking/mortise gauge
   - Nail sets
   - Plumb bob
   - Scratch awl
   - Sliding T-bevel
   - Squares and rules (Imperial and metric)
   - Stud finder
   - Tape measure (Imperial and metric)
   - Trammel points/beam
   - T-square; set squares

b. Edge tools, including:
   - Scrapers – incl. specialty scrapers for mouldings, curved work, etc.
   - Chisels
   - Drawknife
   - Mitre-trimmer (‘guillotine’)
   - Planes (incl. low-angle block plane, smoothing plane, and foreplane)
   - Rasps, rifflers
   - Spokeshave
   - Utility knife
   - Wood-carving chisels

c. Handsaws (incl. coping saw and keyhole saw)

d. Tools for drilling and boring, including:
   - Auger bits
   - Hand-drills, incl. wheel-brace (‘egg beater’); brace-and-bit
   - Countersink/counterbore bits
   - Dowel jig
   - Expansion bit

e. Tools for applying fasteners, adhesives, and hardware, including
   - Hammer
   - Screwdrivers
   - J-roller

f. Tools for work with metals, plastics, and other non-wood materials, including:
   - Glass cutter
   - Cold chisels
   - Files
• Hacksaw
• Metal shears
• Surform
g. Vises and clamps, including:
  • Bar clamps
  • Band clamps
  • Belt clamps
  • C Clamps
  • Hand-screws
  • Spring clamps
  • Vise-grips
h. Common aids for hand-tool use/maintenance (e.g., shooting boards, bench hooks, honing guides/stones, mire-box, burnisher, etc.)
i. Tools for maintaining equipment (e.g. grease gun, oil can, wheel dresser)
j. Other
  • Mallets
  • Pliers (including linesman’s, needlenose, and channel-lock
  • Wrecking bar

3. **Identify portable power tools, and describe their use, selection, and maintenance.** 35%
a. Saws and saw-blades
  • ‘Biscuit’ joiner (for splining)
  • Chopsaws, incl. sliding compound mitre-saw
  • Circular saw
  • Jigsaw
  • Reciprocating saw
  • Blades for non-ferrous and other metals
  • Fences and guides
b. Drills and drill-bits
c. Routers, including
  • laminate trimmer
  • commonly used router-bits
d. Sanders, including
  • Belt sander
  • Detail sander
  • Disc sander
  • Orbital sander
  • Palm sander
e. Tools for work with metals, plastics, and other non-wood materials, including
  • Heat gun
f. Equipment re: power-driving nails, staples, and treadered/corrugated fasteners
  • Air compressor, couplings, etc
  • Nail guns
  • Staple guns
g. Equipment re: applying adhesives and finishes
  • Spray gun, incl. high-volume low-pressure (HVLP) system
h. Angle grinder
i. Powder-actuated tools
j. Portable power planes (‘pocket’ thickness planer; hand-held)

4. **Identify stationary power tools, and describe their use, selection, and maintenance.** 25%
a. Saws
  • Bandsaw (incl. re-saw bandsaw)
  • Table saw
  • Panel saw
  • Power feeds
  • Radial arm saw
  • Scoring saw (incl. sliding scoring saw)
  • Scroll saw
b. Drilling and boring equipment, including:
  • Drill press
c. Equipment for dimensioning and shaping stock, including
   - Jointer
   - Overhead pin router
   - Sticker machine
   - Thickness planer
   - Shaper
   - Wood lathe

d. Sanders and grinders
   - Bench grinder
   - Belt sander (incl. 'Timesaver' type for large panels)
   - Disc sander
   - Oscillating sander
   - Profile/moulding sander
   - Spindle sander
   - Stroke sander

e. Equipment re: applying adhesives and finishes, including
   - Case clamp
   - Continuous gluing machine
   - Edgebander
   - Glue gun
   - Heat press
   - Pneumatic press
   - Spray systems, incl. spray-booths
   - Vacuum bag
   - Veneer press

f. Other, as specified by instructor (e.g., laser-equipped tools/equipment)

5. Describe electrical-power supply considerations re: maintaining/troubleshooting 5% cabinet-shop tools and equipment.
   a. Hazards and precautions re: electricity in cabinet-shop and on jobsite (e.g., manufacturer standards and warnings; use of metal ladders)
   b. Importance of manufacturer standards and warnings
   c. Inspection of cords and connections
   d. Inspection of jobsite conditions (e.g., damp areas)
   e. Requirements for proper grounding
   f. Power ratings and their significance (e.g. ‘developed power’ under load)
   g. Legal and regulatory requirements
   h. Other (specified by instructor) ***
Cabinetmaker

Unit: D2 Practicum: Hand-Tool Use and Shop Safety

Level: One  
Duration: 28 hours  
Theory: 0 hours  
Practical: 28 hours

Overview:

This unit of instruction offers the apprentice cabinetmakers the opportunity to refine and extend hand-tool skills required in preparing solid stock, as well as an opportunity for supervised practice in laying out and executing wood-joints in accordance with accepted standards of fit, finish, and general workmanship.

Objectives and Content:

<table>
<thead>
<tr>
<th>Objectives and Content</th>
<th>Unit Mark (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Use handplanes to dimension stock per instructor specifications.</strong></td>
<td>10%</td>
</tr>
<tr>
<td>a. Identification and observance of all relevant safety considerations</td>
<td></td>
</tr>
<tr>
<td>b. Rationale for project (e.g. relevance specified on skills/techniques)</td>
<td></td>
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<tr>
<td>c. Project requirements re: tool selection and technique</td>
<td></td>
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<tr>
<td>• Sharpening of plane irons, incl. micro-bevel and honing</td>
<td></td>
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<tr>
<td>• Restoring edge of cabinet-scraper – jointing, filing, burnishing</td>
<td></td>
</tr>
<tr>
<td>d. Size and squareness of finished stock</td>
<td></td>
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<tr>
<td>e. Appearance and finish</td>
<td></td>
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<tr>
<td>f. Discussion/demonstration re: contrast between planed vs. sanded surfaces</td>
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<tr>
<td><strong>2. Produce the ‘Bracket with Brace’ Project per instructor specifications.</strong></td>
<td>30%</td>
</tr>
<tr>
<td>a. Identification and observance of all relevant safety considerations</td>
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<tr>
<td>b. Rationale for project (e.g. relevance specified on skills/techniques)</td>
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<tr>
<td>c. Project requirements re: tool selection and technique</td>
<td></td>
</tr>
<tr>
<td>• Sharpening of chisels, incl. micro-bevel and honing</td>
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<tr>
<td>d. Size/squareness, and shaping of ends</td>
<td></td>
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<tr>
<td>e. Accurate layout and execution of joints (per drawing)</td>
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<tr>
<td>f. Fit</td>
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<tr>
<td>g. Appearance and Finish</td>
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<tr>
<td><strong>3. Produce the ‘Square of Joints’ Project’ per instructor specifications.</strong></td>
<td></td>
</tr>
<tr>
<td>a. Identification and observance of all relevant safety considerations</td>
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<tr>
<td>b. Rationale for project (e.g. relevance specified on skills/techniques)</td>
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<tr>
<td>c. Project requirements re: tool selection and technique</td>
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<tr>
<td>• Discussion/demonstration of hand-saw sharpening techniques and aids (saw-set, etc.)</td>
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<tr>
<td>d. Size and squareness</td>
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<tr>
<td>e. Accurate execution of joints (per drawing)</td>
<td></td>
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<tr>
<td>f. Fit</td>
<td></td>
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<tr>
<td>g. Appearance and Finish</td>
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</tbody>
</table>

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Rev. November 2003
Cabinetmaker

Unit: E1 the Materials of Cabinetmaking

Level: One

Duration: 12 hours

Theory: 12 hours

Practical: 0 hours

Overview:

This unit introduces the diverse materials employed by cabinetmakers in producing modern case-goods, fixtures, furniture, and architectural finishes. It offers an overview of these wood and non-wood products, including practical information about their manufacture, special characteristics, preferred uses, and relative cost. Content also includes some attention to the classification and dimensioning systems (e.g., board-foot versus lineal measurement) which are used in estimating, ordering, and milling these materials. Cabinetmakers routinely work with wood – one of the most ancient of building materials – and yet they are also called upon to use relatively new synthetic materials which require special knowledge and techniques. The employability, productivity, and usefulness of their skills depend partly on knowing the materials of the trade. Successful completion of this unit of instruction will refine apprentices’ appreciation of familiar materials, but will also alert them to new materials and practices which they might not yet have encountered in their on-the-job Practical Training.

Objectives and Content:

1. Identify/describe the materials of cabinetmaking and their preferred use(s). 60%
   a. Manufacture and use of wood and wood products
      • Solid stock
      • Panel goods
   b. Manufacture and use of non-wood products
      • Plastic, resin, and composite materials
      • Metal, glass, stone, and other specialty materials

2. Explain wood technology concepts in relation to cabinetmaking practice. 10%
   a. Classification, properties, and stewardship of wood species
   b. Practical recognition of commonly-used domestic and ‘exotic’ species
   c. Cell structure and growth properties
   d. Grain and wood-fibre characteristics and their significance
   e. Requirements for storage and selection of wood and wood products
   f. Relevance of common flaws/defects in wood and wood products

3. Explain the classification and dimensioning of wood and wood products. 10%
   a. Solid stock
      • Nominal vs. finished dimensions
      • Softwood (e.g. 2” X 4”) vs. hardwood (e.g. 8/4)
      • Lineal-foot vs. board-foot measure
      • Grading/marketing of solid wood products (e.g. “G1S”)
      • Common profiles/applications of architectural finish materials
   b. Panel goods
      • Nominal vs. finished thicknesses
- Standard sheet sizes (e.g. Baltic birch vs. MDF)
- Manufacture and grading/marketing of panel goods (e.g. particle-core vs. veneer-core)

4. Explain the manufacture and use of plastic laminates. 20%
   a. Variations and selection
   b. Requirements for storage and handling
   c. Special products and requirements (e.g. Corian “ticket”) aminates
Cabinetmaker

Unit: E2 Fasteners, Adhesives, and Hardware

Level: One
Duration: 14 hours
Theory: 14 hours
Practical: 0 hours

Overview:

Modern cabinetmakers rely on glues, metal fasteners, and specialty hardware which would have astounded their forebears in the trade. Metal screws of any description once were produced individually and thus were a rare object on the bench. The heated pot of hide-glue derived from animal products remained a fixture of cabinet shops well into the 20th century. (It still enjoys limited application in restoration, veneer, and fine furniture work.) Today, the threaded fasteners, space-age glues, intricately-adjustable hinges, drawer-slides, and specialty locksets available to cabinetmakers are so varied as to warrant special attention. Even on routine jobs, cabinetmakers need to know which fasteners and glues represent the best choice for a given application – itself a function of the materials and intended uses associated with that job. On custom work, moreover, cabinetmakers sometimes must learn about new mechanisms or adhesive products which may be required to ensure a secure, stable assembly well-suited to its intended end-use. In this, they have much in common with cabinetmakers and joiners of the past. A basic requirement for achieving this goal in trade practice today is familiarity with the modern glues, fasteners, and hardware which are now at the cabinetmaker’s disposal. Successful completion of this unit will help equip apprentices to recognize and select the products best suited to general cabinetmaking tasks. In Level two, a companion unit introduces content regarding more-specialized hardware requirements and products.

Objectives and Content:

1. Identify/describe threaded/nonthreaded fasteners and their preferred use(s).
   a. Classification, properties, and selection of fasteners
      - Non-threaded fasteners (incl. air-driven nails brads, staples, etc)
      - Threaded fasteners
      - Specialty fasteners (metals, plastics, etc.)
   b. Requirements for effective selection/use
      - Length, diameter, thread configuration, and metallurgy
      - Resistance to withdrawal from a given material
      - Appropriate distribution (placement/quantity)
   c. Basic techniques and tools for using fasteners
   d. Common errors in selection/use

2. Identify/describe adhesive products and their preferred use(s).
   a. Classification, properties, and selection of adhesive products
      - For use with wood materials
      - For use with non-wood materials
   b. Specialty adhesive products
      - Contact cement(s)
      - ‘Hide’/animal-byproduct glues
      - Epoxies
• Cyanoacrylates
• Hot glues
• Caulks and fillers
c. Chemical/mechanical considerations for effective use
   • The nature of glue-bonds in wood fibre (incl. ‘cross-linking’)
   • Role of temperature, pressure, heat, humidity, and time
   • Area of glued contact-surfaces (e.g. dowel joint vs. mortise/tenon)
   • Radio frequency
d. Basic techniques and tools for using adhesive products
   • Application to workpiece (incl. masking of workpiece)
   • Clamping of assemblies
   • Mechanical reinforcement with metal and other fasteners
   • Biscuit joinery – alignment and reinforcement
   • ‘Production line’ glue-ups
   • ‘Air-bag’ method
   • Abrasives and solvents for clean-up
e. Common errors in selecting and using adhesive products
   • Neglect of health and safety requirements (ventilation; masks, etc.)
   • Faulty selection
   • Failure to observe manufacturer specifications (‘open time’, ‘curing time’, etc.)
   • Starved joints
   • Chilled joints
   • Racked/deformed assemblies
   • Spills/smears and/or inadequate clean-up of visible surfaces
   • Incompatibility with metal fasteners and/or wood finishes

3. Identify/describe specified cabinetmaking hardware re: its use and variation. 20%
a. Classification and selection of specified hardware
   • Common hinge types
   • Door/drawer/tabletop slides and related products
   • Pulls and knobs
   • Catches, latches, locks, and stays
   • Shelf supports and pilasters
   • Casters and glides
b. Basic techniques and tools for specified hardware installation
   • Locating/installing drawer slides (32mm system; traditional)
   • Locating/installing and adjusting hinges (32 mm system; traditional)
c. Common errors in installing cabinet hardware

4. Demonstrate selection/use of fasteners and adhesives for specified task(s). 15%

5. Perform materials take-off for fasteners and hardware using provided specifications. 5%
Cabinetmaker

Unit: F1 Joinery and Casework Fundamentals

Level: One
Duration: 14 hours
Theory: 14 hours
Practical: 0 hours

Overview:

One fundamental challenge for the apprentice cabinetmaker is to master skills for selecting and executing joinery required in building furniture, casework, and fixtures. Beginners are often preoccupied with the sheer complexity of traditional wood joints in all their variations, not to mention the basic need to refine the layout and tool-use skills for fabricating them in a precise and workmanlike fashion. The subject is further complicated by unfamiliar, old-fashioned-seeming technical terminology which relates to the lengthy history of joinery techniques which are still in use today. The learner is often hard pressed to ‘cope’ with this new world of pegs and scarfs, laps and foxtails, tongues and shoulders, much less to understand why specific and time-tested joinery components are applied to a particular workpiece. This unit of instruction stresses an approach to the subject of joinery which the apprentice can build upon throughout his or her subsequent career in the trade. The basic repertoire of traditional wood joints is described, but not in isolation from the ‘real-life’ choices working cabinetmakers must make to ensure the mechanical and structural integrity of casework and other pieces they build. The unit describes basic woodworking joints in terms of their traditional variety and uses, with special emphasis upon understanding why particular joints are chosen to achieve specified purposes. Another focus of the unit concerns understanding the parallels between traditional options and the corresponding new joinery techniques and systems which are used in modern industry. A final major focus relates joinery to basic techniques and standards which apply to the machining and assembly of casework. The unit also illustrates certain joinery options in the context of the practical projects that apprentices will undertake throughout their in-school technical training.

Objectives and Content:

1. Describe general considerations and choices re: joinery and casework. 15%
   a. Components and assembly points with respect to joinery applications
      - Built-up panels
      - Traditional carcases
      - Rail and stile assemblies
      - Frame and panel assemblies (incl. glass installation)
      - Drawer boxes – corners, bottoms, backs, and traditional slides
      - Table and chair legs
      - Cabinet and table tops
      - Leg, apron, and tabletop assemblies
      - Others specified by instructor
      b. Anticipating/analyzing forces that will act on a workpiece, assembly, and/or its components
      - Forces due to properties of wood and other materials (e.g. movement due to moisture-content changes; the significance of grain and wood-species characteristics; cupping, warping etc.)
      - Forces due to design characteristics (e.g. stress at corners)
      - Forces due to anticipated use(s)
   c. Common causes and sites of joint failure (e.g. corners; dowel joints in chair-leg frames)
2. **Describe traditional joinery applications, their rationale, and preferred techniques for laying out and executing specified joints.**  
25%

a. **Major joints, including variations (e.g., haunched tenon) and common uses**
   - Butt
   - Coped; cope-and-mitre
   - Cove-and-bead
   - Dado/groove
   - Dovetail
   - Dowel
   - Edge
   - Finger (box)
   - Lap/half-lap
   - Mitre
   - Mortise and tenon
   - Plate (biscuit)
   - Rabbet (rebate)
   - Rule
   - Spline
   - Tongue-and-groove
   - Other (as specified by instructor)

b. **Variants of common joinery applications for special purposes**
   - Reinforcement of joints (e.g. mechanical fasteners and adhesives)
   - Concealment/exposure of joints (e.g. design preferences)

3. **Describe/explain contemporary and other variants of traditional joinery and casework.**  
25%

a. **Major joints used in modern cabinetmaking**

b. **Basic requirements/standards for ensuring the structural integrity of casework**

c. **Impacts of production-cost considerations**

d. **Impacts of technological change (e.g. materials, equipment, fasteners, adhesives, etc.)**

e. **Impacts of design preference and fashion (e.g. exposure vs. concealment of joinery)**

f. **Impacts of local and regional traditions (e.g. Colonial furniture; Asian joinery)**

g. **Face-frame vs. contemporary ‘European’ cabinet construction**

4. **Explain machining/assembly practices re: basic casework.**  
25%

a. **Materials list and layout**

b. **Construction standards (e.g., squareness and general finish)**

c. **Solid stock preparation (including materials optimization)**

d. **Sheet goods preparation (including materials optimization and lamination/veneering of components)**

e. **Machining (incl. joinery)**

f. **Sub-assembly (e.g., webframes, doors, drawer-boxes; hardware location/installation on components, etc.**

g. **Final assembly**

h. **Specialty components and requirements (e.g. curved work, inlays, etc.)**

i. **Other (specified by instructor)**

5. **Describe/explain practical wood-joinery and casework requirements as applied to technical training projects in the Cabinetmaker Apprenticeship Program.**  
10%

a. **Level 1**

b. **Square of Joints**

c. **Bracket w/ Brace**

d. **Modular Lower Unit**

e. **Level 2**

f. **Cabinetmaker’s Toolbox**

g. **Interior Door Frame**

h. **Louis XVI Table**

i. **Level 3**

j. **Platform Balcony w/Stairs**

k. **Capone Cabinet**

l. **Level 4**

m. **Roll-top Desk**

***
Cabinetmaker

Unit: F3 Practicum: Level One Project (Modular Lower Unit)

Level: One
Duration: 35 hours
Theory: 0 hours
Practical: 35 hours

Overview:

This unit features the first of four prescribed, major projects – one for each Level of Technical Training – which offer apprentices the opportunity to integrate and showcase their skill-development to date. This aspect of the program has roots in rites of passage that have marked progress toward journey-level trade status for centuries. In most countries, trade learners have been required to produce independently a complex project which exhibits their expertise. Renowned cabinetmaker James Krenov has described how feverishly he and other apprentices in postwar Sweden strove to make piston-fit drawers that passed muster as demonstration work, but which became useless immediately afterward due to humidity changes. Manitoba cabinetmaker apprentices are introduced to the traditional challenge of demonstration-quality work by undertaking the Modular Lower Unit Project. This highlights their ability to produce basic casework using provided specifications, to fit doors and drawers, to handle widely-used materials, to install hardware, and to apply edge-treatment and assemble counter/backsplash components. All of the major elements of modern production-shop casework are represented in this project. Apprentices who complete this project at a high level of achievement thus may be confident that they have not only built something useful (and humidity-proof), but have also begun to share personally in a time-honoured tradition of cabinetmaker trade learning. Equally important, they will have demonstrated practical skills that enhance their employability in the many shops that specialize in producing modular cabinetry units for residential and non-residential installation alike.

Objectives and Content:

<table>
<thead>
<tr>
<th>Percent of Unit Mark (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify/comply with all safety requirements relevant to the Project.</td>
</tr>
<tr>
<td>2. Demonstrate proper technique in selecting/using required tools and equipment.</td>
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<tr>
<td>3. Interpret all materials (drawings, handouts, etc.) re: Project specifications.</td>
</tr>
<tr>
<td>4. Complete the Project as per accepted standards of execution and quality.</td>
</tr>
<tr>
<td>a. Machining/assembly of casework</td>
</tr>
<tr>
<td>b. Door: machining, assembly, and installation</td>
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<tr>
<td>c. Drawer: machining, assembly, and installation</td>
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<tr>
<td>d. Veneer work</td>
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<tr>
<td>e. Plastic laminate work</td>
</tr>
<tr>
<td>f. Edge treatment</td>
</tr>
<tr>
<td>g. Hardware location/installation per European (32mm) system</td>
</tr>
<tr>
<td>* Hinges</td>
</tr>
<tr>
<td>* Drawer slides</td>
</tr>
<tr>
<td>* Pilasters</td>
</tr>
<tr>
<td>h. Cleanliness and general appearance of finished project</td>
</tr>
<tr>
<td>i. Other (as specified by instructor)</td>
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</tbody>
</table>
Cabinetmaker

Unit: G1 Packaging, Shipping and Installation

Level: One
Duration: 14 hours
Theory: 14 hours
Practical: 0 hours

Overview:

The noise, stress, and immediate practical requirements of the cabinetmaking shop-floor often seem a world away from the situations in which the trade’s specialties are used and enjoyed by clients. Even in small custom shops, where the designer and builder may be the same person, the rigors of machining and assembly generally leave working cabinetmakers little opportunity to reflect upon how the furniture component or set of ‘boxes’ on their bench will fit into the workplaces and homes of other people. First-rate cabinetmaking, however, requires trade practitioners to think continually about the way that even somewhat simple tasks – such as locating drawer slides and pulls or ‘breaking’ the sharp corners of a countertop -- will affect the usefulness, functionality, and appearance of their finished product in actual use. The most direct link, however, between the production and the end-use of cabinetmaker trade specialties concerns the tasks of packaging, shipping, and especially, of installation. As trade veteran Carl Hagstrom explains: “It falls on the installer to adapt these products of precision to an imperfect world.” This unit concentrates on introducing the skills required to ensure that costly, carefully-manufactured products make the transition from shopfloor through installation in keeping with accepted trade standards of safety, cost-effectiveness, and client satisfaction. Content concentrates on the phases, mechanics, and basic techniques involved in this important process.

Objectives and Content:

1. Describe packaging and shipping procedures. 25%
   a. Examples of substandard practice/techniques, and consequences
   b. Importance of thorough, systematic planning (including site-visit w/notes)
      - Scheduling and organization of process
      - Coordination with client(s) (e.g. keys; bathroom arrangements)
      - Orientation and task-assignment of personnel (bench-hands; shippers/receivers; carrier; installation crew, etc.)
      - Procurement of all required tools, equipment, materials
      - Loading/unloading sequence, schedule
      - In-transit conditions (heat/cold; humidity)
      - On-site storage requirements
      - Specific site characteristics – problems/solutions (e.g. warped walls; access for large fixtures; electrical supply)
   c. Procedures and techniques re: packaging
      - Identification-coding and other documentation
      - Cost considerations
      - Bulk (size) and mass considerations
      - Packaging and protective-covering materials (including blankets and tarps)
      - Ties, tapes and other materials for binding packaged goods
      - Specialty tools and equipment (e.g. for metal strap-banding)
      - Crates and pallets – standards and other requirements
      - Special requirements for fragile components (e.g. corners, mouldings, glass doors,
laminated surfaces, etc.) and/or extreme conditions in transit
  • Considerations re: knock-down (KD) and ready-to assemble (RTA) goods
  • Packaging of site-installed hardware (e.g. cup hinges) and documentation

2. Describe installation requirements and procedures. 75%
   a. Preparation and use of a site-visit checklist
      • Vehicle access/parking
      • Doorway and other access
      • Wall and floor characteristics
      • Plumbing, electrical, HVAC characteristics as relevant
      • Size and readiness of work area
      • Arrangements re: keys, alarms, occupants, consultation during installation process
      • Requirements re: abatement of noise, dusts, etc. and disposal of jobsite waste materials
      • Other
   b. Installation checklist re: tools, equipment, etc. as per notes from site-visit
      • Hand and power tools as required
      • Extension cords and lighting
      • Specialty tools/equipment (e.g. stud-finder; caulking gun, ladders, vacuum; wipes/cleaning agents; portable work surface, etc.)
      • Hardware (incl. selection of threaded/other fasteners, extra shelf clips, hinges, door bumpers, etc.)
   c. Installation checklist re: materials as per notes from site visit
      • Caulks, putties, and finishes
      • Adhesives and abrasives
      • Shims
      • Extra lengths of trim material
      • Scraps of sheet-material and dimensional lumber
   d. Site preparation
      • Clearing/cleaning installation jobsite as required
      • Break-out and unpackaging of shipped goods; disposal of packaging materials
      • Distribution/storage of goods as per jobsite blueprints, room schedules, wall elevations, etc. pending installation
      • Distribution/set-up of tools and equipment as required
   e. Layout
      • Use of drawings and plans
      • Code requirements (e.g. re: clearance above cooktops, etc.)
      • Establishing reference lines
      • Use of story sticks (story poles)
      • Location of studs/backings
   f. Dealing with wall and floor characteristics
      • Use/selection of fasteners for hollow vs. solid walls, incl. metal-stud framing
      • Strapping of severely warped walls
      • Alignment/adjustment requirements
   g. Basic operations for completing installation
      • Order of operations (e.g. upper vs. lower units; corner unit versus other units)
      • On-site correction of shop-floor mistakes and defects
      • Levelling
      • Plumbing
      • Squaring
      • Shimming
      • Clamping and fastening adjacent units in a run of upper/lower cabinet boxes
      • Scribing (scribe strip)
      • Trimming (incl. baseboard, kickplate trim, etc.)
• Caulking/filling as required (e.g. countertop members and backsplash joint)
• Cleaning (e.g. use of acetone with plastic-laminated surfaces)

h. Inspection and final adjustments
• Reconciliation with all drawings and job specifications
• Drawers
• Doors
• Sign-off requirements, as applicable
• Communications with general contractor, building inspectors, client representatives, etc.

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