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MINISTRY OF SKILL DEVELOPMENT
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Facilitator Guide

Sector
Interiors, Furniture and Fixtures

Sub-Sector
Furniture Business Development, Installation & After Sales

Occupation
Furniture Installation & After Sales

Reference ID: **FFS/Q2203, Version: 3.0, NSQF Level: 4.5**

Carpenter

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> Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.

Shri Narendra Modi
Prime Minister of India

Acknowledgements

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The preparation of this Facilitator Guide would not have been possible without the Furniture and Fittings industry's support. Industry feedback has been extremely encouraging, from inception to conclusion, and it is with their input that we have tried to bridge the skill gaps existing today in the industry.

This Facilitator Guide is dedicated to the aspiring youth, who desire to achieve special skills, which would serve as lifelong assets for their future endeavours.

About This Guide

The Carpenter guide is designed to enable training for the specific Qualification Pack (QP). Each National Occupational Standard (NOS) is addressed through dedicated Unit(s). Key Learning Objectives for the relevant NOS are presented at the beginning of each Unit to guide the learner's progress. The Carpenter plays the role of conducting physical site surveys and recce of the worksite. The person is responsible for reading and interpreting blueprints, drawings, and sketches to determine specifications and calculate requirements while making suitable preparations for the worksite. The individual must have physical strength, good stamina, problem-solving and analytical skills, with a willingness to learn and perform. The person must be organized, diligent, methodical, safety-conscious, and a prompt decision-maker. The individual must be a good listener with skills to comprehend and communicate. The individual should be honest, trustworthy, reliable, flexible, and innovative.

Symbols Used

Ask


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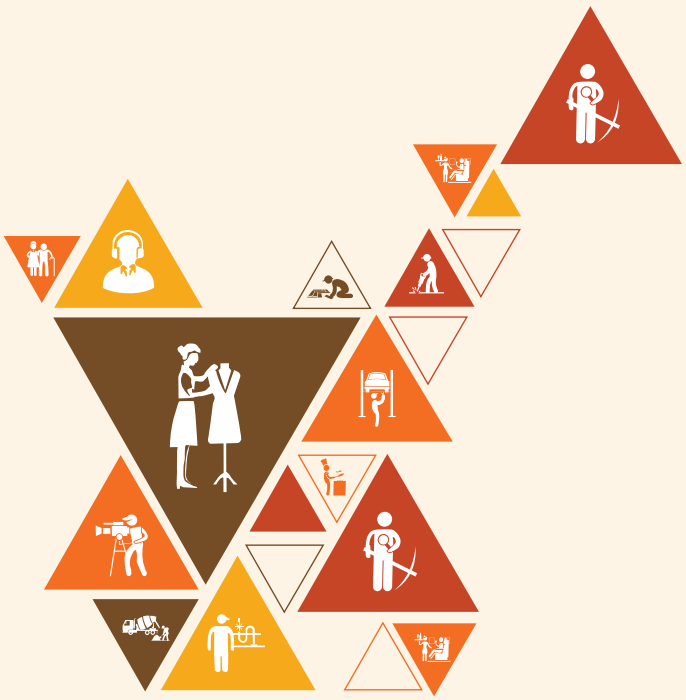
1. Advanced Understanding of the Furniture and Interiors Industry



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Explain how the furniture and interiors industry play a crucial role in supporting India's economic development by contributing to sectors such as urban housing, commercial infrastructure, retail, and institutional projects.
2. Discuss how the ongoing growth of real estate, urbanisation, and interior demand in both metropolitan and tier-2 cities is driving the expansion of the Indian furniture and interiors sector.
3. Describe the specific ways in which furniture contributes to making spaces more functional, including storage, seating, display, and partitioning purposes in residential and commercial environments.
4. Explain how aesthetic elements of furniture—such as style, finish, shape, and material—impact the overall interior look, ambience, and user perception of a space.
5. Identify and name allied sectors that work in coordination with the furniture industry, including architectural services, interior design firms, material manufacturers, paint and polish companies, lighting suppliers, and hardware solution providers.
6. List various professional roles and trades that directly or indirectly contribute to furniture projects, such as carpenters, polishers, installers, CAD technicians, designers, vendors, and on-site project supervisors.
7. Recognize the key market trends driving growth in the modern furniture industry, including the rise in demand for modular systems, space-saving solutions, personalised designs, and eco-conscious products.
8. Explain how sustainability practices, such as the use of FSC-certified wood, low-VOC finishes, and recycled boards, are increasingly influencing customer expectations and regulatory norms in furniture manufacturing.
9. Describe how the use of digital technologies like 3D modelling, CNC machining, and augmented reality is transforming furniture design, production, and customer experience.
10. Differentiate between traditional furniture businesses and emerging models such as ready-to-assemble furniture, online custom furniture brands, and interior service aggregators.
11. Evaluate different entrepreneurial options within the furniture domain, such as setting up a small-scale fabrication unit, starting an on-site carpentry service, launching a bespoke furniture brand, or offering modular kitchen and wardrobe installations.
12. Read and interpret a design brief to extract relevant details regarding furniture layout, user needs, preferred materials, and the overall design theme.
13. Explain the role of layout plans, elevations, and mood boards in communicating client expectations and design direction to fabrication teams.
14. Describe how furniture choice must align with key interior elements such as floor and wall finishes, ceiling patterns, natural and artificial lighting, and color schemes to achieve visual balance and functional integration.
15. Assess a sample interior furniture project by evaluating quality expectations, the suitability of materials selected, ergonomic and comfort factors, space constraints, and client-specific requirements.

Unit 1.1: Scope and Significance of the Furniture and Interiors Industry

Unit Objectives

At the end of this unit, participants will be able to:

1. Explain the current and emerging role of the furniture and interiors industry in India's economic and urban development.
2. Describe how furniture enhances both utility and aesthetics in modern interior environments.
3. Identify the key sectors and professions that directly or indirectly support the furniture and interior industry.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the scope and growing importance of the furniture and interiors industry, especially in the context of India's development. We will explore how furniture contributes to both functionality and aesthetics in modern spaces and understand the various sectors and career opportunities linked to this field. The unit also highlights current trends, innovations, and the industry's impact on the economy and urban lifestyles.

Ask

Ask the participants the following questions:

- What are some common places where we use furniture in our daily life?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Scope and Significance of the Furniture and Interiors Industry

The furniture and interiors industry is a vital part of modern living, combining utility, design, and innovation. It plays a main role in shaping how people interact with their environment—whether at home, at work, or in public spaces. This unit highlights the economic, functional, and cultural importance of the industry, along with the growing career opportunities it offers.

1. **Contribution to Economic Growth and Employment**
    - The furniture and interiors sector is a major contributor to India's economy, providing jobs to millions of skilled and semi-skilled workers across design, manufacturing, sales, and installation.
    - It boosts allied industries such as timber, plywood, adhesives, and upholstery, and supports both domestic consumption and exports.
    - Government schemes such as "Make in India" and the rising demand for local craftsmanship have further strengthened the growth of this industry.

2. **Functional and Aesthetic Value in Interior Spaces**
    - Furniture is not just about appearance—it directly impacts how a space functions. Properly designed furniture improves productivity, comfort, and safety in homes, offices, and public environments.
    - It also adds character and mood to a space by aligning with interior themes like minimalism, classic, or industrial styles, making spaces visually appealing and culturally expressive.

3. **Wide Scope Across Sectors and Consumer Markets**
    - The industry supplies to a broad range of sectors, including residential housing, corporate offices, hospitality (hotels and restaurants), educational institutions, and hospitals.
    - It caters to a diverse customer base—from budget-conscious consumers to luxury buyers—offering both mass-produced and customized furniture options.
    - This wide scope has opened career paths in design, sales, project management, customer service, and installation.

4. **Growing Demand and Innovation Opportunities**
    - The growth of urban centres, changing lifestyles, and smaller living spaces have increased the demand for smart, modular, and multi-functional furniture.
    - Technological advancements such as CAD software, CNC machines, and sustainable material use have brought innovation in design and production.
    - There's a rising trend toward eco-friendly and ergonomic furniture, presenting new opportunities for designers and manufacturers to cater to environmentally and health-conscious consumers.

Say

Let us participate in an activity to study the unit a little more.

Activity

- Arrange the class in a semi-circle/circle.
- Each of us will tell the class their name, hometown, hobbies and special quality about themselves, starting with the 1st letter of their name. I will start with mine.
- Say your name aloud and start playing the game with your name.
- Say, “Now, each of one you shall continue with the game with your names till the last person in the circle/ semi-circle participates”.
- Listen to and watch the trainees while they play the game.
- Ask questions and clarify if you are unable to understand or hear a trainee.Remember to:

Activity	Duration	Resources used
Ice Braker	60 minutes	Pen, Notebook etc.

- Discourage any queries related to one’s financial status, gender orientation or religious bias during the game
- Try recognising each trainee by their name because it is not recommended for a trainer to ask the name of a trainee during every interaction

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage teams to think about both utility and aesthetics in each furniture example.
- Answer all the queries/doubts raised by the trainees in the class.
- Encourage other trainees to answer problems and boost peer learning in the class.

Unit 1.2: Business Dynamics and Opportunities in the Furniture Sector

Unit Objectives

At the end of this unit, participants will be able to:

1. List key allied industries such as laminates, plywood, adhesives, foams, and describe their integration into carpentry workflows.
2. Explain how interdependencies with these sectors impact material sourcing, production planning, and final installation.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the business dynamics and interconnected opportunities in the furniture sector. Participants will learn how various allied industries—such as plywood, laminates, adhesives, foams, and upholstery—support furniture production. We will explore how these sectors work together to influence material sourcing, manufacturing processes, and final installation outcomes. This unit highlights how understanding these interdependencies can improve efficiency, quality, and business growth in the furniture trade.

Ask

Ask the participants the following questions:

- Can you name any materials or industries that help in making furniture besides wood?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Business Dynamics and Opportunities in the Furniture Sector

The furniture sector operates within a complex network of industries that provide essential raw materials, finishing products, and services. Understanding these interconnections helps carpentry professionals plan workflows efficiently and explore various business opportunities. This unit introduces how the furniture industry collaborates with allied sectors and how these relationships influence day-to-day operations, production planning, and overall growth potential.

1. **Allied Industries and Their Role in Carpentry Workflows**

   - **Laminates and Veneers**

     These are surface finishing materials used to enhance the appearance and durability of wooden furniture. Laminates provide a decorative outer layer, often in a variety of colours and textures, and are widely used in making cabinets, tabletops, and modular furniture.

   - **Plywood and MDF**

     These engineered wood products form the core structure of most furniture items. Plywood is known for its strength and flexibility, while Medium Density Fibreboard (MDF) offers a smooth surface ideal for painting or laminating. They are commonly used in carcass building, panelling, and shelving.

   - **Adhesives and Fasteners**

     Strong adhesives like PVA glue, contact cement, and epoxy are essential for bonding components. Fasteners such as screws, nails, and brackets help assemble parts firmly. Together, they ensure structural integrity and finish quality.

   - **Foams and Upholstery Materials**

     Used in making sofas, chairs, and beds, foams add comfort and cushioning, while fabrics or leather provide visual appeal. These materials support the ergonomic and aesthetic demands of modern furniture.

2. **Interdependence and Its Impact on Furniture Production**

   - **Material Sourcing and Availability**

     The timely availability of plywood, laminates, or adhesives directly affects project timelines. If any of these inputs are delayed, the entire production cycle may slow down, affecting delivery commitments.

   - **Production Planning and Workflow Integration**

     Furniture manufacturing requires coordinated planning. For example, surface materials like laminates must be ordered based on the dimensions of plywood parts, and upholstery work is usually done after structural assembly. This interdependence calls for precise scheduling.

   - **Costing and Vendor Coordination**

     The cost of raw materials from allied industries influences pricing decisions. Moreover, maintaining good relationships with suppliers ensures better deals, priority service, and consistent quality — all of which contribute to business success.

   - **Final Installation and Quality Control**

     The quality of products from allied sectors impacts the final finish and performance of the furniture. A poorly made foam cushion or substandard laminate can reduce customer satisfaction, making quality checks essential before final installation.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Exploring a Furniture Supply Chain Challenge and Response

Group Size: 4–6 participants

Materials Needed:

- Whiteboard or flipchart
- Markers
- Sticky notes (different colours)
- Scenario cards (examples provided below)
- Chart paper and pens

Activity Duration: 60 minutes

Instructions

Step 1: Introduction

Introduce the objective of the activity:

To understand how the furniture sector relies on allied industries and how challenges or changes in these industries impact production, costing, and delivery. Briefly review key allied sectors: laminates, plywood, adhesives, foam, etc.

Step 2: Scenario Card Distribution

Distribute one scenario card per group. Each card describes a challenge or situation involving one or more allied industries. The group must analyse its impact and propose a response.

Step 3: Group Analysis and Planning

Each group will discuss the scenario using the following prompts:

- Which allied industry is affected, and how?
- How does the situation impact carpentry workflows, such as sourcing, finishing, or installation?
- What steps can your team take to resolve or adapt to the challenge?
- Can this lead to new business opportunities or improvements?

The group should create a solution plan on chart paper using arrows, color-coded notes, or diagrams.

Step 4: Group Presentations

Each group will present:

- Their scenario
- The impact on the furniture workflow
- Their response plan and suggested improvements

Encourage discussion from the other groups—especially if they faced a similar industry in their scenario.

Step 5: Debrief and Key Takeaways

Facilitate a class discussion:

- What were the common dependencies across scenarios?
- How can carpenters or furniture designers better prepare for such challenges?
- What opportunities can arise from developing better relationships with allied industries?

Examples of Scenario Cards

Scenario 1

A sudden price increase in plywood causes delays in procurement for your project. How will you manage customer timelines and explore alternatives?

Scenario 2

Your supplier has run out of a specific laminate shade your client approved. What process will you follow to resolve this without affecting client satisfaction?

Scenario 3

There is a temporary ban on a certain adhesive due to environmental regulations. How do you find compliant alternatives and adjust production planning?

Activity	Duration	Resources used
Exploring a Furniture Supply Chain Challenge and Response	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (different colours), Scenario cards (examples provided below), Chart paper and pens etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Provide Basic Aids**

  Ensure groups have reference posters or handouts on allied sectors and common carpentry materials.

- **Encourage Creative Thinking**

  Push groups to explore alternative suppliers, eco-friendly options, or workflow changes.

- **Promote Peer Learning**

  Allow cross-questioning during presentations to help reinforce interdependencies and practical responses.

Unit 1.3: Project Planning and Interior Design Essentials

Unit Objectives

At the end of this unit, participants will be able to:

1. Interpret design briefs to identify client expectations related to layout, style, and theme.
2. Describe the importance of harmonizing furniture selection with colour palettes, lighting, and spatial layout.
3. Assess interior project requirements based on quality standards, material compatibility, and user comfort.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential aspects of project planning and interior design, including how to understand client requirements through design briefs, align furniture choices with lighting, colours, and space layout, and assess quality and comfort in design decisions. This unit will help learners approach interior projects with clarity, coordination, and a focus on practical functionality and aesthetics.

Ask

Ask the participants the following questions:

- What is the first thing you would ask a client before planning the layout of their room?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Project Planning and Interior Design Essentials

Interior design and furniture planning require a blend of creativity and functionality. This unit emphasizes how to understand a client's expectations through design briefs, create a harmonious relationship between furniture and other design elements, and assess interior projects based on quality, comfort, and compatibility.

1. **Interpreting Design Briefs to Identify Client Expectations**
   - **Understanding the design brief**

     A design brief acts as the foundation for any interior project. It contains the client's requirements such as layout preferences (e.g., open vs. closed spaces), functional needs (e.g., home office, living area), style expectations (e.g., traditional, modern, minimalist), and special instructions (e.g., eco-friendly materials, child-friendly layout).
   - **Reading between the lines**

     Often, a brief may not state everything directly. A skilled planner needs to ask the right questions and clarify points to fully grasp what the client envisions. For example, if a client says they want a "bright and cozy" space, this could imply the use of warm lighting, soft fabrics, and natural tones.
   - **Setting the tone for design**

     Once the key elements of the brief are understood, the project planning can align around specific goals—be it maximizing utility in a small space, showcasing a luxurious feel, or designing for multi-generational living.

2. **Harmonizing Furniture with Colour Palettes, Lighting, and Layout**
   - **Furniture and colour coordination**

     Selecting furniture that complements the room's colour palette is essential. For instance, dark wooden furniture pairs well with neutral or light-coloured walls, while light furniture is ideal for brightening small or dim spaces.
   - **Lighting as a design tool**

     Lighting affects the way furniture appears. Natural daylight enhances wood grains and neutral tones, while artificial lighting can create mood and highlight features. Strategic placement of furniture with respect to windows, lamps, or overhead lights improves both aesthetics and functionality.
   - **Spatial layout and flow**

     Proper planning ensures that furniture fits well within the space without overcrowding it. Understanding the circulation path (how people move around the room) helps in arranging pieces to ensure comfort, convenience, and openness. Furniture must suit the room's dimensions and purpose.

3. **Assessing Project Requirements for Quality, Material Compatibility, and User Comfort**
   - **Material selection and durability**

     Choosing the right materials (plywood, MDF, solid wood, laminate, fabric, etc.) is essential based on usage, climate, and maintenance expectations. For example, moisture-resistant boards are preferred in kitchens or bathrooms, while soft fabrics are ideal for living rooms.

- **Quality standards and safety**

  The furniture and layout must meet safety and durability standards. Edges should be rounded in homes with children, finishes should be non-toxic, and fixtures must be secure. Good quality products reduce future repair costs and enhance user satisfaction.

- **User comfort and practicality**

  The final layout should be functional and easy to use. This includes ergonomic furniture, adequate storage, proper ventilation, and user-friendly placements (e.g., not placing a tall cabinet in a low-ceilinged room). Comfort should be considered for all users — adults, children, and elderly family members.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Designing a Room Based on a Client Brief

Group Size: 4–5 participants

Activity Duration: 60 minutes

Materials Needed:

- Sample client brief handouts (with layout, style, and preferences)
- A3 sheets or chart papers
- Colour pencils/markers
- Furniture and lighting cut-outs (optional)
- Scales and rulers

Instructions

1. Distribute a unique sample client brief to each group. These briefs should describe client expectations such as room purpose (e.g., home office, lounge, bedroom), preferred style (modern, rustic, minimal), colour preferences, and any specific needs (e.g., natural lighting, storage, etc.).
2. Planning: Each group will discuss the client brief and create a basic layout plan that includes:
   - Placement of furniture
   - Lighting points
   - Colour scheme
   - Material suggestions for major elements

3. Design Presentation

   Each group will present their room design plan and explain how their choices reflect the client's expectations from the brief.

4. Feedback & Discussion

   Encourage peer questions and feedback on how well each design harmonizes functionality and aesthetics.

Activity	Duration	Resources used
Designing a Room Based on a Client Brief	60 minutes	Sample client brief handouts (with layout, style, and preferences), A3 sheets or chart papers, Colour pencils/markers, Furniture and lighting cut-outs (optional), Scales and rulers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage use of design language such as "flow of space", "color harmony", and "user comfort".
- Ensure teams interpret client needs clearly before jumping into design.
- Use visuals or images to help participants understand different interior styles (e.g., minimalist, traditional, industrial).

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following sectors is NOT directly supported by the furniture and interiors industry?
   a. Urban housing
   b. Institutional infrastructure
   c. Heavy machinery production
   d. Commercial spaces

   Answer: c. Heavy machinery production

2. What is one major sustainability practice increasingly used in modern furniture production?
   a. Synthetic lacquer coating
   b. Use of low-VOC finishes
   c. Importing tropical hardwoods
   d. Single-use packaging

   Answer: b. Use of low-VOC finishes

3. Which digital technology is transforming customer experience in furniture design and planning?
   a. Typewriting
   b. CNC lathe operations
   c. Augmented Reality
   d. Paper-based sketching

   Answer: c. Augmented Reality

4. Which trend is currently shaping the Indian furniture industry?
   a. Decrease in modular furniture demand
   b. Avoidance of eco-friendly materials
   c. Focus on bulk, uncustomised production
   d. Growing demand for personalized and space-saving furniture

   Answer: d. Growing demand for personalized and space-saving furniture

Fill in the Blanks

1. _____ boards are used as an eco-friendly alternative in sustainable furniture design.

   Answer: Recycled

2. A _____ is a visual tool used to convey the overall mood, color palette, and texture choices for an interior project.

   Answer: Mood board

3. The combination of seating, storage, and partitioning functions makes furniture highly _____ in modern spaces.

   Answer: Functional

4. The use of _____ certified wood ensures responsible forestry practices in furniture manufacturing.

   Answer: FSC

Match the following

1. Match Column A with Column B:

Column A	Column B
1. CNC Machining	a) Interpreting client themes and expectations
2. Interior Design Firm	b) High-precision automated cutting
3. Modular Furniture	c) Ready-to-assemble and space-efficient
4. Carpenters and Polishers	d) On-site furniture fabrication roles

Answers: 1 - b, 2 - a, 3 - c, 4 - d

2. Match Column A with Column B:

Column A	Column B
1. FSC-Certified Wood	a) Visual and physical coordination in interiors
2. Ergonomic Design	b) Promotes responsible and sustainable forestry
3. Color Palette, Lighting, Flooring Coordination	c) Enhances user comfort and health
4. Vendor and Hardware Supplier	d) Provides essential fittings and installation support

Answers: 1 - b, 2 - c, 3 - a, 4 - d.

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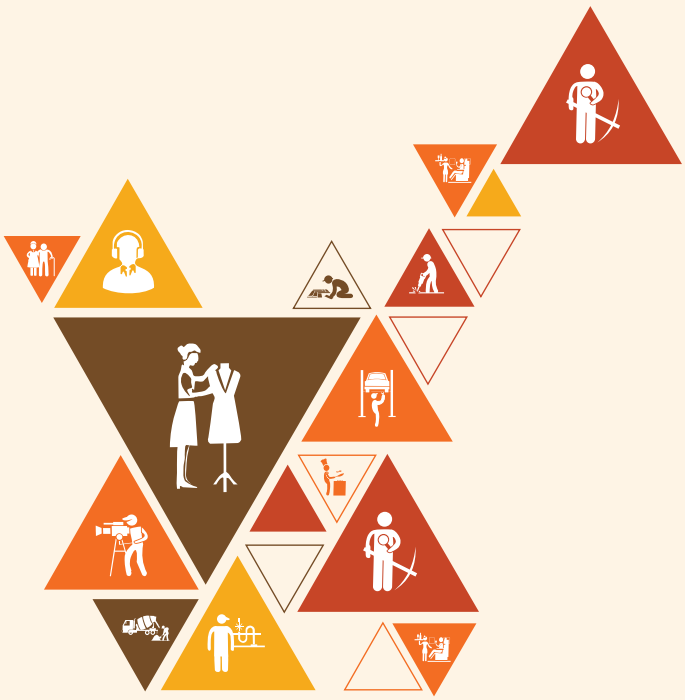
2. Application of Advanced Raw Materials and Architectural Hardware

Unit 2.1: Types, Properties, and Standards of Furniture Raw Materials
Unit 2.2: Introduction to Architectural Hardware and Fittings
Unit 2.3: Application, Trends, and Quality Practices in Materials and Hardware



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify different categories of engineered wood products used in furniture making, including MDF, HDF, particle board, plywood, and block board, and name their standard commercial grades.
2. Identify common types of solid wood used in carpentry such as teak, sal, pine, and rubberwood, and describe the basic characteristics that influence their suitability for different furniture applications.
3. Explain the differences between engineered boards and solid wood in terms of cost, workability, environmental resistance, and visual finish.
4. Describe the structural properties of furniture raw materials, including strength, load-bearing capacity, impact resistance, and flexibility.
5. Describe the aesthetic properties of furniture materials such as grain pattern, colour tone, surface texture, and how these influence the final appearance of finished products.
6. Explain how the moisture content and density of raw materials impact dimensional stability, susceptibility to warping, and long-term durability.
7. Interpret standard commercial sizes of furniture boards (e.g., 8'x4', 6'x3', 18mm thickness) and explain their role in efficient cutting, waste reduction, and layout planning.
8. Describe how the selection of board thickness and size influences hardware placement, joint strength, and product integrity.
9. Classify different types of furniture hardware fittings such as hinges, drawer channels, cam locks, handles, latches, catches, and connectors based on their function and mechanism.
10. Explain where and why each category of hardware is typically used such as hinges in shutters, runners in drawers, cam fittings in knockdown furniture, and locks in cabinets.
11. Identify modular fittings and concealed hardware elements and explain their contribution to aesthetics and space-saving in modern furniture designs.
12. Perform basic visual and manual inspections of raw materials and hardware to check for warping, cracking, delamination, rust, denting, or missing components.
13. Describe how to verify board quality by tapping for hollowness, inspecting layers for uniform bonding, and checking edge integrity.
14. Explain the process for checking hardware functionality such as smooth sliding, self-closing action, locking accuracy, and fixing alignment.
15. Describe current market trends such as the adoption of soft-close fittings, anti-scratch laminates, antibacterial surfaces, and digital locking systems in the furniture sector.
16. Explain how technological advancements like CNC-cutting compatibility and pre-laminated panels improve productivity and design consistency.
17. Describe safe handling practices for lifting and moving large boards, heavy hardware boxes, and sharp tools at the fabrication site or during transport.
18. List best practices for storing raw materials and hardware, such as vertical stacking of boards, organized labelling of fittings, and protection from moisture and direct sunlight.
19. Explain how to maintain a materials usage register and inventory checklist to track input, avoid wastage, and improve worksite accountability.
20. Identify potential issues caused by improper material handling or incorrect hardware selection and suggest preventive measures.

Unit 2.1: Types, Properties, and Standards of Furniture Raw Materials

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify commonly used raw materials in modern furniture making, such as MDF, HDF, plywood, particle board, and solid wood.
2. Explain the structural and aesthetic properties of different materials including density, grain, moisture resistance, and texture.
3. Describe the relevance of standard sizes and specifications when selecting raw materials for project execution.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the different types of organizational structures flat, functional, and hierarchical commonly found in carpentry workshops and installation businesses. Participants will also understand workplace protocols such as reporting chains, escalation procedures, and daily workflow rules. This knowledge helps workers navigate their responsibilities, follow instructions properly, and maintain professionalism and safety on site.

Ask

Ask the participants the following questions:

- Who do you usually report to in a carpentry workshop or installation site when you have a question or face a problem?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Types, Properties, and Standards of Furniture Raw Materials

In this session, we will study the different types of raw materials used in modern furniture making, such as MDF, plywood, particle board, and solid wood. Understanding their structural and aesthetic properties like strength, moisture resistance, and texture is essential for choosing the right material for each furniture component. We will also learn about standard sizes, grades, and industry certifications that guide proper material selection in professional projects.

1. **Commonly Used Raw Materials in Modern Furniture Making**

   - **MDF (Medium-Density Fibreboard)**

     MDF is an engineered wood product made by breaking down hardwood or softwood residuals into wood fibres and binding them with wax and resin. It is widely used for furniture panels, shutters, and decorative carvings due to its smooth surface and ease of machining. MDF is cost-effective and ideal for indoor use, especially for painted or laminated finishes.

   - **HDF (High-Density Fibreboard)**

     HDF is like MDF but is manufactured under higher pressure, resulting in a denser and stronger board. It is commonly used in applications where durability is crucial, such as wall panels, door skins, and laminated flooring bases. It offers better resistance to impact, and wear compared to MDF.

   - **Plywood**

     Plywood consists of multiple layers (veneers) of wood that are glued together with alternating grain directions, giving it superior strength and dimensional stability. It is used in structural applications such as cabinets, bed frames, partitions, and kitchen panels. Marine-grade or BWR (Boiling Water Resistant) plywood is preferred in areas exposed to moisture.

   - **Particle Board**

     Particle board is made by compressing wood chips, sawdust, and resin into sheets. It is lightweight and economical, commonly used in ready-to-assemble furniture, wardrobe carcasses, and drawer units. However, it is less durable and should not be used in areas with high moisture or heavy loads.

   - **Solid Wood**

     Solid wood is a natural material sourced from tree trunks. It includes hardwoods like teak, oak, and walnut, and softwoods like pine. It is prized for its durability, beauty, and natural grain patterns. Solid wood is used in premium furniture such as dining tables, chairs, and beds where longevity and aesthetics are essential.

2. **Structural and Aesthetic Properties of Raw Materials**

   - **Density and Strength**

     The density of a material affects its weight and strength. HDF and solid wood have higher density, making them suitable for load-bearing furniture like tables and shelving units. MDF and particle board are lighter and suitable for vertical panels or decorative elements but not recommended for structures that carry heavy weight.

- **Moisture Resistance**

  Moisture resistance is critical, especially for kitchen and bathroom furniture. Plywood, particularly BWP and marine grades, performs well in humid environments. MDF and particle board can swell or deteriorate when exposed to water unless specially treated (e.g., moisture-resistant MDF).

- **Texture and Finish Compatibility**

  MDF provides a uniform and smooth surface, making it excellent for painting and laminating. Plywood accepts veneers and laminates well while offering some natural grain. Solid wood has a unique texture and grain, often used for natural or stained finishes to highlight its aesthetic appeal.

3. **Relevance of Standards and Specifications**

- **Standard Sizes and Thicknesses**

  Most raw materials come in standard sheet sizes such as 8 feet x 4 feet (2440mm x 1220mm). Standard thicknesses include 6mm, 12mm, 18mm, and 25mm. These uniform sizes help streamline cutting, reduce material wastage, and ensure compatibility with modular construction.

- **Material Grades and Certifications**

  Regulatory bodies like the Bureau of Indian Standards (BIS) define quality grades. For example, IS:710 denotes marine plywood, IS:303 represents commercial-grade plywood, and IS:12823 is for MDF boards. These certifications ensure that materials meet safety, durability, and performance benchmarks.

- **Project Suitability and Usage Guidelines**

  Each furniture project demands careful material selection. Kitchens and bathrooms require water-resistant boards, while lightweight furniture may use particle board. Understanding standards helps match materials to functional needs, design intent, and environmental exposure, ensuring long-term reliability and user satisfaction.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Material Identification and Evaluation Challenge

Group Size: 4–6 participants per group

Materials Needed:

- Physical samples of common raw materials (MDF, HDF, plywood, particle board, solid wood)
- Labels/tags (for temporary marking)
- Basic hand lens or magnifying glass

- Reference chart listing material properties (can be printed or on whiteboard)
- Worksheets or evaluation sheets
- Pens/pencils

Activity Duration: 45–60 minutes

Instructions

1. **Material Display and Group Assignment**
   - Set up a table with unlabelled raw material samples.
   - Each group will be tasked with identifying each material based on physical observation.
2. **Evaluation Task**
   - Using texture, grain, density (weight), and surface characteristics, each group will identify the type of material.
   - They will record key properties: density, grain direction, moisture resistance (if known), and any visible finish.
   - Then, they will discuss the ideal application (e.g., cabinets, partitions, tabletops) and standard thicknesses/specifications commonly used.
3. **Presentation and Review**
   - Each group will present their material observations and choices to the rest of the class.
   - Trainer/facilitator will validate answers and discuss common mistakes and best practices.

Examples of Scenario Cards

Scenario Card 1

The Office Table Mix-Up

You are tasked with fabricating office tables for a new workspace. The client expects a sturdy surface that will last for years and can withstand occasional spillage from coffee cups or water bottles. However, your supplier mistakenly delivered a large batch of particle board instead of plywood.

Discussion Prompts

- Can particle board be used instead of plywood in this scenario?
- What are the structural and moisture-related implications?
- What action should your team take to meet quality expectations?

Scenario Card 2

Modular Wardrobe in a Humid Region

Your team has been assigned to build a modular wardrobe system for a coastal apartment. The area is known for high humidity and salt-laden air. You need to finalize the material list for this project.

Discussion Prompts

- Which raw materials would be best suited for high moisture resistance?
- How does HDF compare with MDF and solid wood in such environments?
- What material combinations can offer durability without exceeding budget?

Scenario Card 3

Cost vs. Quality Dilemma

You are working with a builder who wants affordable furniture units for a student hostel project. The design team prefers plywood for durability, but the cost estimator suggests switching to MDF or particle board to stay within budget.

Discussion Prompts

- What are the trade-offs between MDF, particle board, and plywood?
- How do you balance cost, durability, and usage frequency in shared spaces?
- What would you recommend, and how would you justify your material choice to the client?

Activity	Duration	Resources used
Material Identification and Evaluation Challenge	45-60 minutes	Physical samples of common raw materials (MDF, HDF, plywood, particle board, solid wood), Labels/tags (for temporary marking), Basic hand lens or magnifying glass, Reference chart listing material properties (can be printed or on whiteboard), Worksheets or evaluation sheets, Pens/pencils etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage tactile learning**

  Allow participants to touch and observe the materials closely—hands-on experience enhances memory retention.

- **Highlight visual and structural cues**

  Emphasize simple techniques like checking weight, grain consistency, and edge appearance to distinguish between materials.

- **Support with real-world examples**

  Share industry use-cases for each material to connect the activity with practical furniture-making scenarios.

Unit 2.2: Introduction to Architectural Hardware and Fittings

Unit Objectives

At the end of this unit, participants will be able to:

1. Classify types of architectural hardware such as hinges, channels, locks, brackets, and runners based on their application.
2. Describe the installation context and functional purpose of hardware fittings used in modular furniture and carpentry.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the different types of architectural hardware and fittings used in furniture making, such as hinges, locks, channels, brackets, and runners. We will explore their functions, installation contexts, and importance in modular furniture and carpentry work. Understanding how each hardware component contributes to furniture usability and durability is essential for creating efficient and aesthetically pleasing interior solutions.

Ask

Ask the participants the following questions:

- Can you name any type of hardware used in opening or closing a cabinet door?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points

Introduction to Architectural Hardware and Fittings

Architectural hardware and fittings play a foundational role in modern furniture design and functionality. They are the mechanical components that enable movement, locking, support, and structural reliability in furniture installations. From smooth drawer operations to the secure closing of cabinets, hardware elements enhance both the usability and aesthetic appeal of finished products. In this unit, learners will explore the major categories of furniture hardware and understand how each is used in real-world carpentry and modular projects.

1. **Classification of Architectural Hardware by Type and Use**

Hinges

- Hinges allow doors and panels to pivot open and closed.
- Butt hinges are commonly used in traditional carpentry for cupboard doors.
- Concealed (European) hinges are widely used in modular kitchen and wardrobe units for a cleaner, modern finish.
- Soft-close hinges reduce noise and prevent door slamming, improving longevity and user comfort.

Locks and Handles

- Locks offer secure access control for drawers, cabinets, and wardrobes.
- Common lock types include cam locks, deadbolt locks, and magnetic locks.
- Handles and knobs are available in various designs to suit furniture styles—from classic to modern.
- Hardware selection affects both aesthetics and ergonomic usability.

Channels and Runners

- Channels are mechanical tracks that enable smooth drawer movement.
- Side-mounted channels are easy to install and often used in office and home storage.
- Undermount runners are hidden from view and offer a sleeker, premium appearance.
- Soft-close and telescopic runners offer quiet, full-extension functionality.

Brackets and Supports

- Brackets support wall-mounted shelves, tabletops, or foldable furniture elements.
- Materials used include steel, aluminium, and sometimes heavy-duty plastic.
- Brackets must be chosen based on weight-bearing requirements and design compatibility.

2. **Installation Context and Functional Importance**

Functional Suitability

- Hardware should be chosen based on load, use case, and movement requirements.
- Heavy-duty runners are essential for filing drawers or kitchen utensil storage.
- Hinges and locks must support the size and weight of the doors they operate.

Design Integration

- Hardware should blend with the furniture's visual style.
- Hidden hardware (like concealed hinges or undermount runners) helps maintain minimalist aesthetics.
- In contrast, exposed industrial-style hardware can enhance certain design themes, like loft or workshop interiors.

Safety and Performance

- Accurate placement and secure fixing are critical to prevent functional issues.
- Improper hinge placement may cause doors to misalign or sag.
- Misaligned drawer channels can lead to jamming or uneven movement.

Maintenance and Durability

- Quality installation reduces the frequency of repairs and prolongs lifespan.
- Regular cleaning, lubrication, and inspection of moving parts ensure optimal performance.
- Selecting rust-resistant or corrosion-proof hardware is crucial in humid or outdoor settings.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Hardware Selection and Application Mapping

Group Size: 4–6 participants per group

Materials Needed:

- Sample images or actual pieces of hardware (hinges, drawer runners, brackets, locks, channels, etc.)
- Furniture application cards (e.g., wardrobe, modular kitchen cabinet, office drawer, TV unit)
- Chart paper or whiteboard
- Markers, sticky notes

Activity Duration: 45–60 minutes

Instructions

1. **Distribute Furniture Application Cards**

   Give each group a card describing a specific furniture item (e.g., wall-mounted cabinet, sliding wardrobe, modular kitchen drawer unit).

2. **Hardware Identification Task**

   Each group will identify and list all hardware and fittings required for their assigned furniture item. They should match appropriate hardware (from samples/images provided) to the function it will perform in the unit.

3. **Functionality Mapping**

   Groups will draw a simple layout on chart paper showing where each hardware piece will be installed and note its purpose (e.g., “soft-close hinge for cabinet doors”).

4. **Presentation & Feedback**

   Each group presents their layout and justifies the choice of each hardware piece. Allow peer questions and facilitator input.

Activity	Duration	Resources used
Hardware Selection and Application Mapping	45-60 minutes	Sample images or actual pieces of hardware (hinges, drawer runners, brackets, locks, channels, etc.), Furniture application cards (e.g., wardrobe, modular kitchen cabinet, office drawer, TV unit), Chart paper or whiteboard, Markers, sticky notes etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage Hands-On Handling (if physical samples are available)**

  Let learners physically examine hinges, brackets, or locks to better understand their function and suitability.

- **Prompt Discussions Around Alternatives**

  Ask guiding questions like “What if the cabinet was wall-mounted?” or “Would this hinge work on a glass door?”

- **Reinforce Installation Contexts**

  Emphasize the relevance of correct placement and compatibility with materials and load-bearing needs.

Unit 2.3: Application, Trends, and Quality Practices in Materials and Hardware

Unit Objectives

At the end of this unit, participants will be able to:

1. Demonstrate basic quality checks for evaluating strength, durability, and finish of raw materials and hardware.
2. Explain current trends and technological advancements in engineered boards and hardware used in the furniture industry.
3. Describe safe practices for storing, handling, and documenting material and hardware usage at a worksite.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to evaluate the quality of materials and hardware used in furniture making. We will also explore new trends and technological improvements in boards and fittings and understand safe handling and storage practices. This unit helps learners ensure better durability, functionality, and organization at worksites by using correct methods and following standard procedures.

Ask

Ask the participants the following questions:

- Can you name one material or tool you've seen used in making furniture?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points

Application, Trends, and Quality Practices in Materials and Hardware

The session discuss how quality practices, and evolving trends shape the modern furniture industry. Participants will understand how to evaluate raw materials and hardware for their durability and finish, stay updated on emerging materials and fittings, and implement safe handling and documentation processes at worksites. These concepts ensure both functional and aesthetic quality in furniture production and installation.

1. **Demonstrate basic quality checks for evaluating strength, durability, and finish of raw materials and hardware**
   - **Visual Inspection of Boards**

     Participants learn to check engineered boards (such as MDF, plywood, particle board) for surface uniformity, cracks, warping, or uneven edges, which may affect the quality of the final product.
   - **Strength and Stability Checks**

     Basic techniques are introduced to test material strength and internal bonding—such as edge tapping or pressure checks—especially important for load-bearing furniture parts.
   - **Hardware Functionality Testing**

     Participants are shown how to assess hinges, slides, and locks for smooth movement, resistance to wear, and structural firmness to ensure long-term reliability.
   - **Finish and Corrosion Resistance Evaluation**

     Participants explore how to inspect surface coatings, polish quality, or signs of rust in metallic hardware, ensuring components are durable and visually appealing.

2. **Explain current trends and technological advancements in engineered boards and hardware used in the furniture industry**
   - **Emerging Materials**

     Learners are introduced to modern engineered materials such as pre-laminated boards, waterproof plywood, and HDF, which are replacing traditional wood due to their affordability and workability.
   - **Advanced Hardware Innovations**

     Participants examine recent hardware features like soft-close hinges, push-to-open systems, and concealed drawer runners that enhance functionality and user comfort.
   - **Digital Integration in Manufacturing**

     The session introduces CNC machines, laser cutters, and 3D design tools that allow for mass customization, precise fabrication, and high-speed production.
   - **Eco-friendly and Space-saving Solutions**

     Trends such as modular furniture, recyclable boards, and foldable designs are discussed, highlighting how sustainability and urban living challenges influence furniture design.

3. **Describe safe practices for storing, handling, and documenting material and hardware usage at a worksite**

   - **Material Storage Guidelines**

     Participants understand the importance of horizontal stacking of boards, avoiding moisture-prone areas, and using pallets or racks to prevent warping and damage.

   - **Hardware Handling Techniques**

     Safe handling practices are demonstrated, such as wearing gloves when dealing with sharp-edged fittings and using sorting trays or bins to organize small parts.

   - **Documentation of Material Flow**

     Participants are introduced to basic inventory tools like checklists, stock ledgers, and usage logs to track material consumption and reduce losses at the worksite.

   - **Worksite Safety and Cleanliness**

     The importance of maintaining a clean and organized workspace is emphasized to prevent accidents, improve workflow, and ensure material longevity.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Material and Hardware Quality Check Station

Group Size: 4–5 participants

Materials Required:

- Samples of furniture boards (MDF, plywood, particle board)
- Hardware items (hinges, channels, screws, brackets)
- Checklist templates for quality parameters (strength, finish, defects, markings)
- Magnifying glasses, measuring tape, and a moisture meter (if available)
- Labels and markers

Activity Duration: 60 minutes

Instructions:

1. **Setup Stations**

   Arrange 2-3 inspection stations with material and hardware samples. Each station will represent different types of raw materials or hardware components.

2. **Group Rotation and Assessment**

   Each group rotates through all stations. At each station, they must:

   - Observe and identify key quality features (e.g., surface finish, defects, sturdiness)
   - Use the checklist to mark whether each item passes the quality check
   - Note any improvement suggestions for safe handling or better storage

3. **Discussion and Reflection**

   Groups share their findings with the class. Discuss which material or hardware passed all checks and which had issues. Talk about how these affect the final furniture product.

Activity	Duration	Resources used
Material and Hardware Quality Check Station	60 minutes	Samples of furniture boards (MDF, plywood, particle board), Hardware items (hinges, channels, screws, brackets), Checklist templates for quality parameters (strength, finish, defects, markings), Magnifying glasses, measuring tape, and a moisture meter (if available), Labels and markers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Explain clearly the basic criteria to look for (e.g., surface cracks, finish consistency, proper screw threading, etc).
- Guide the observation: Encourage participants to feel the texture, observe edges, test movement (for fittings like hinges).
- Link observations to real worksite impact: Emphasize how poor-quality affects durability, installation time, and customer satisfaction.

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following is a key difference between MDF and solid wood?
   a. MDF is more expensive than solid wood
   b. MDF has a natural grain pattern
   c. MDF is made by compressing wood fibers and resins
   d. Solid wood is made from recycled wood pieces

   Answer: c. MDF is made by compressing wood fibers and resins

2. What is the primary function of a cam lock fitting in furniture?
   a. Decorative finish
   b. To allow foldability
   c. Join modular components without visible fasteners
   d. Support heavy shelves

   Answer: c. Join modular components without visible fasteners

3. Which hardware component is most used in drawer systems?
   a. Hinges
   b. Drawer channels
   c. Handles
   d. Magnetic catch

   Answer: b. Drawer channels

4. Which engineered wood is known for high density and smooth surface, suitable for paint finishes?
   a. Plywood
   b. Block board
   c. MDF
   d. Particle board

   Answer: c. MDF

Fill in the Blanks

1. The moisture content of raw materials plays a critical role in preventing _____ and ensuring long-term stability.

   Answer: warping

2. In modern modular furniture, concealed hardware is used to enhance _____ and save space.

   Answer: aesthetics

3. The standard size for a full furniture board is usually _____ feet.

   Answer: 8x4

4. Soft-close hinges and drawer runners are examples of _____ trends in the hardware industry.

   Answer: current market or modern

Match the following

1. Match the furniture hardware with its primary application:

A. Hardware	B. Application
1. Hinges	a. Secure closure of drawers and doors
2. Drawer channels	b. Smooth sliding of storage compartments
3. Locks	c. Enable opening and closing of shutters
4. Cam fittings	d. Assembly of modular knockdown furniture

   Answers: 1 - c, 2 - b, 3 - a, 4 - d

2. Match the raw material with its property:

A. Raw Material	B. Key Property
1. MDF	a. High strength and natural finish
2. Teak wood	b. Smooth surface ideal for painting
3. Plywood	c. Multi-layered for strength and durability
4. Particle board	d. Lightweight but less moisture-resistant

   Answers: 1 - b, 2 - a, 3 - c, 4 - d

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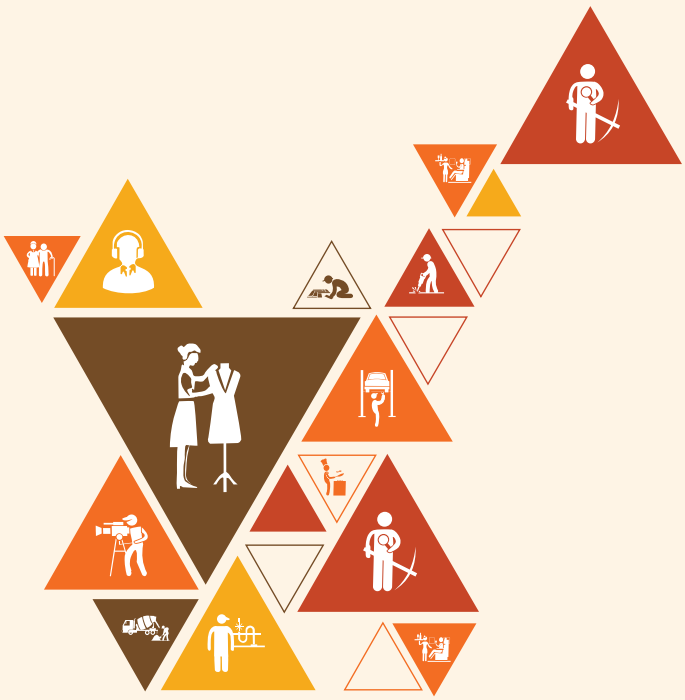
3. Proficient Use of Power Tools, Equipment, and Workshop Machinery

Unit 3.1: Identification and Application of Furniture Workshop Tools and Equipment
Unit 3.2: Safe Operation and Handling of Power Tools and Machines
Unit 3.3: Maintenance, Safety Checks, and Workshop Upkeep



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify different categories of advanced furniture-making tools such as cutting tools, shaping tools, sanding tools, and pneumatic devices used in workshop environments.
2. Name and describe the use of specific machines such as table saws, band saws, routers, jigsaws, orbital sanders, belt sanders, and pneumatic nail guns.
3. Explain the role of each machine at different stages of production — such as panel cutting, edge shaping, joinery preparation, surface finishing, or component assembly.
4. Differentiate between hand-held power tools and stationary workshop machines in terms of usage, accuracy, and control.
5. Identify the key parts and accessories of commonly used workshop machines and tools, such as router bits, saw blades, sanding discs, and guide fences.
6. Demonstrate standard procedures for starting, operating, and shutting down various power tools safely under normal working conditions.
7. Describe how to perform pre-operation checks for power tools to ensure switches, cables, blades, and guards are in proper working condition.
8. Explain the importance of using personal protective equipment (PPE) while operating tools that produce dust, noise, or vibration.
9. Identify essential safety guards, locking mechanisms, blade covers, and emergency stop features built into powered machines and explain their function.
10. Follow manufacturer's guidelines, tool manuals, and site-specific SOPs for safe and efficient operation of machinery.
11. List workplace do's and don'ts such as not leaving machines unattended, never bypassing safety features, and ensuring tools are turned off before adjustments.
12. Perform visual inspections and functional tests at regular intervals to verify the operational condition of power tools and mechanical equipment.
13. Create a checklist-based routine for scheduled maintenance activities such as tightening parts, replacing belts, clearing debris, and checking alignments.
14. Explain how regular cleaning and lubrication contribute to the efficiency and longevity of power tools and machines.
15. Describe the correct method for winding and storing electric cables, pneumatic hoses, and attachments after use to prevent accidents or damage.
16. Maintain a clean, dust-free, and organized workspace with proper tool placement, waste disposal, and ventilation standards.
17. Identify signs of potential tool failure such as abnormal vibrations, overheating, noise, and explain how to respond appropriately.
18. Document inspection results, maintenance records, and fault reports as per workshop protocol and inform supervisors of necessary repairs or hazards.

Unit 3.1: Identification and Application of Furniture Workshop Tools and Equipment

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify advanced tools and machines used in furniture fabrication such as table saws, routers, orbital sanders, and pneumatic tools.
2. Explain the functional use of each tool or machine based on the stage of production or assembly.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential tools and equipment used in modern furniture workshops. Learners will explore different machines such as table saws, routers, sanders, and pneumatic tools, and understand how each is used at various stages of furniture making—from cutting and shaping to finishing and assembly. The unit will also highlight safe handling practices and the importance of tool selection for quality and efficiency.

Ask

Ask the participants the following questions:

- Can you name any tool that is commonly used to cut large wooden boards in a furniture workshop?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

1. **Identification of Key Tools and Machines**

   - **Table Saw**

     The table saw is a fundamental machine in any furniture workshop. It consists of a circular blade mounted on an arbor and protruding through the surface of a table. The operator pushes wood against the blade to make long, straight cuts. This machine is essential for accurately cutting large panels like plywood or MDF to size during the early stages of fabrication. It ensures precise dimensions and clean edges, which are critical for joinery and assembly.

   - **Router**

     A router is a highly versatile power tool used for hollowing out an area in wood or creating complex edge profiles. It is especially useful in cabinetry and furniture detailing. Routers are used to create decorative edges, cut joints such as dado or rabbets, and hollow areas for fittings. They can be handheld or mounted on a router table for greater stability. The tool allows for customization and precision in shaping components.

   - **Orbital Sander**

     The orbital sander is a finishing tool used to smooth wooden surfaces. It moves in a random orbit pattern to avoid scratching or marking the surface. It is particularly useful before applying paint, laminate, or polish to furniture pieces. It helps remove uneven textures, glue residue, or minor surface defects, preparing the component for a clean, professional finish. Proper sanding ensures that the final product looks polished and feels smooth to the touch.

   - **Pneumatic Tools (e.g., Nail Gun, Stapler)**

     Pneumatic tools operate using compressed air and are widely used in furniture assembly for fastening components. Nail guns, for instance, can drive nails quickly and uniformly into frames, panels, or moldings. They significantly reduce manual labor and time during assembly. Pneumatic staplers are used for upholstery work or for fixing thinner boards. These tools ensure strong joints and consistent results while reducing worker fatigue.

2. **Application Based on Production Stages**

   - **Cutting Stage**

     This is the first phase of the furniture-making process, where raw boards or panels are cut into required dimensions. Tools like table saws, panel saws, or crosscut saws are used here. Accurate cutting is essential to minimize material wastage and ensure that all pieces fit together during assembly. It also sets the base for achieving uniformity in product components.

   - **Shaping and Routing Stage**

     After cutting, shaping tools like routers are used to add details to the components. This may involve carving out grooves, profiles, or joints that help in assembling the furniture. It also includes aesthetic enhancements like bevelled edges or chamfers. Proper use of the router ensures both function (through joints) and visual appeal (through decorative profiling).

   - **Surface Finishing Stage**

     Before applying surface treatments like lamination, paint, or polish, components must be sanded. Orbital sanders help achieve a smooth and clean surface. This stage improves the adhesion of finishes and eliminates sharp edges, splinters, or unevenness. It is a critical phase for enhancing the appearance and durability of the final product.

- **Assembly Stage**

  In the final stage, all prepared components are assembled into the complete furniture piece. Pneumatic tools are often used here to fix parts together efficiently and securely. Proper alignment, firm fastening, and safe handling are key. Using these tools ensures the structural strength of the product and reduces the time taken to complete assembly.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Practical Planning for Furniture Tool Application

Group Size: 4–6 participants

Materials Needed:

- Flipchart or whiteboard
- Markers
- Sticky notes (3–4 colours)
- Scenario cards (examples below)
- Sample images of furniture tools and equipment (e.g., table saw, router, orbital sander, pneumatic nail gun)

Activity Duration: 60 minutes

Instructions

1. Divide participants into small groups of 4–6.
2. Introduce the objective: In this activity, participants will apply their understanding of furniture workshop tools to real-world work situations. Each group will work on a scenario that involves selecting appropriate tools and planning a safe, efficient workflow.
3. Distribute one scenario card per group (see examples below). Each card describes a practical workshop situation related to production or assembly. Participants must:
   - o Identify the tools and machines required.
   - o Explain the role of each tool in the process.
   - o Suggest safety precautions and workflow planning tips.

Group Discussion and Planning

Groups will discuss using these prompts:

- What is the product being worked on?
- What tools or machines are needed at each stage (cutting, joining, sanding, finishing)?

- How can the selected tools be used safely?
- Can the process be improved by changing the order of steps or selecting alternate tools?

Group Presentations

Each group presents there:

- Assigned scenario
- Chosen tools for each stage
- Process explanation
- Safety and efficiency recommendations

Encourage other groups to ask questions or share alternative solutions.

Debriefing and Key Takeaways

Conclude with a discussion:

- How did different teams approach tool selection?
- What factors influenced decisions about workflow and safety?
- What are key lessons about choosing and using tools in furniture workshops?

Examples of Scenario Cards

Scenario 1

Your team is tasked with building 10 bedside tables. The legs require shaping, the tops need rounded edges, and a smooth finish is expected. Choose tools for shaping, edge work, and sanding. Discuss safety tips and order of operations.

Scenario 2

You are assembling modular office desks. Boards are pre-cut. You must drill holes, install drawer channels and hinges, and assemble the structure. Identify suitable tools and safety practices for repetitive drilling and mechanical fastening.

Scenario 3

Due to partial equipment malfunction, only a few machines are operational. You need to complete five small coffee tables that involve joinery and finishing. Decide which tools are essential, how to organize the work efficiently, and how to maintain safety standards under equipment limitations.

Activity	Duration	Resources used
Practical Planning for Furniture Tool Application	45-60 minutes	Flipchart or whiteboard, Markers, Sticky notes (3–4 colours), Scenario cards (examples below), Sample images of furniture tools and equipment (e.g., table saw, router, orbital sander, pneumatic nail gun) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Use tool visuals or samples to support learning, especially for new or advanced equipment.
- Encourage critical thinking ask questions like “Why this tool?” or “What if it’s unavailable?”
- Ensure inclusivity by involving quieter participants through role-based group work (e.g., tool selector, safety monitor, presenter).

Unit 3.2: Safe Operation and Handling of Power Tools and Machines

Unit Objectives

At the end of this unit, participants will be able to:

1. Demonstrate safe operating procedures for power tools and machines used in carpentry tasks.
2. Identify mandatory safety guards and emergency features on power-driven equipment.
3. Follow manufacturer guidelines and workplace SOPs for tool and machine use.
4. Explain the importance of choosing the right tool based on material, task, and accuracy requirement.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the correct and safe methods for operating power tools and machines used in carpentry and furniture making. Learners will understand the importance of using safety guards, personal protective equipment, and emergency features. The unit will also highlight the role of following manufacturer guidelines and workplace safety protocols to reduce risks and ensure efficient operations.

Ask

Ask the participants the following questions:

- What should you always wear to protect your eyes while using a cutting machine?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Safe Operation and Handling of Power Tools and Machines

In this session, we will discuss how to operate and handle power tools and machines safely in carpentry and furniture fabrication tasks. Understanding safety procedures, identifying built-in protective features, and following standard guidelines are essential to prevent accidents and ensure efficient, risk-free use of machines. This session focuses on practical safety awareness during daily tool usage.

1. **Understanding Safe Operating Procedures**
   - **Pre-use inspection is essential**

     Always check the power tool or machine for damaged wires, loose parts, or worn-out components before use. Any visible defect should be reported or repaired immediately.
   - **Ensure correct body posture and stability**

     Operators should stand with feet firmly planted and maintain a balanced posture. Tools must be held with both hands, and movements should be controlled.
   - **Wear appropriate PPE**

     Use safety gear such as safety goggles, gloves, earplugs, and dust masks to prevent injury from splinters, noise, or airborne particles.
   - **Avoid distractions during use**

     Operators must stay focused while handling machines, especially those involving rotating or sharp parts.
   - **Use tools only for their intended purpose**

     Do not force tools to perform tasks they are not designed for, such as using a drill in place of a router.

2. **Recognizing and Using Safety Guards and Emergency Features**
   - **Understand common safety guards**

     Tools like circular saws or routers include blade guards or shields that cover the sharp part when not in use. These must be in place during operation.
   - **Familiarize with emergency mechanisms**

     Learn the location and function of emergency stop (E-stop) buttons, which immediately cut power to the machine in case of malfunction or danger.
   - **Do not bypass safety features**

     Never remove or disable a safety mechanism to speed up work. Doing so greatly increases the risk of injury.
   - **Practice using safety systems**

     Operators should occasionally rehearse how to quickly shut down the machine or respond to tool failure as part of safety drills.

3. **Adhering to Manufacturer Guidelines and SOPs**
    - **Read and follow the user manual**

      Each tool has specific guidelines for usage, maintenance, and limitations (e.g., cutting thickness, operational speed). These must be understood and followed.
    - **Understand workplace SOPs**

      Standard Operating Procedures (SOPs) ensure that everyone in the workshop follows consistent and safe handling methods.
    - **Keep records of tool maintenance**

      Regular maintenance—such as cleaning filters, lubricating moving parts, or sharpening blades—must be documented and scheduled.
    - **Follow handling protocols**

      Some SOPs may require using two operators for certain heavy machines, using lockout systems during maintenance, or reporting faults immediately.
    - **Store tools safely after use**

      Ensure machines are switched off, unplugged if necessary, and stored in designated places after operation to prevent accidental starts or damage.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Tool Safety Walkthrough and Mock Drill

Group Size: 4–5 participants per group

Materials Required:

- Safety posters or printed SOPs
- Mock versions of basic power tools (or real tools in a supervised, non-operational state)
- Safety gear (helmets, gloves, goggles, etc.)
- Chart paper and markers

Activity Duration: 45–60 minutes

Instructions

1. **Safety Zone Setup**

   Each group is assigned a workstation representing a different power tool (e.g., table saw, router, sander). Set up the station with either the actual tool (unplugged/off) or a replica/drawing.

2. **Safety Assessment and Checklist**

   Groups inspect the station and list all required safety gear, safety features (guards, switches), and SOPs. They must answer:

   - What PPE should be worn?
   - What safety checks should be done before using the tool?
   - What steps would you follow in an emergency?

3. **Mock Drill Presentation**

   Each group presents their findings and demonstrates a short role-play showing the safe handling and shutdown process in a simulated emergency.

Activity	Duration	Resources used
Tool Safety Walkthrough and Mock Drill	45-60 minutes	Safety posters or printed SOPs, Mock versions of basic power tools (or real tools in a supervised, non-operational state), Safety gear (helmets, gloves, goggles, etc.), Chart paper and markers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Emphasize observation**

  Encourage participants to notice common safety lapses (e.g., no guard, wrong posture, loose cables).

- **Ensure supervision**

  If real tools are displayed, ensure they are switched off/unplugged and handled with care.

- **Use visual aids**

  Provide reference SOP charts or safety posters to support learning and recall.

Unit 3.3: Maintenance, Safety Checks, and Workshop Upkeep

Unit Objectives

At the end of this unit, participants will be able to:

1. Perform periodic inspections to ensure functional readiness of tools and machines.
2. Develop a routine for cleaning, lubricating, and safely storing workshop equipment.
3. Maintain a clean, organized, and hazard-free workspace in compliance with safety standards.
4. Record maintenance activities and report faults or incidents to supervisors.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential practices for maintaining furniture workshop tools and machines, including how to carry out regular safety checks, clean and store equipment properly, and ensure the workspace remains safe and organized. We will also learn how to document maintenance activities and report any issues to supervisors to ensure smooth and safe workshop operations.

Ask

Ask the participants the following questions:

- Why is it important to clean and check your tools regularly in a furniture workshop?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Maintenance, Safety Checks, and Workshop Upkeep

Proper maintenance and regular safety checks are essential practices in any furniture or carpentry workshop. These practices not only enhance the performance and life of tools and equipment but also create a safe and organized work environment. In this session, participants will understand how to conduct routine inspections, follow maintenance schedules, manage workspace cleanliness, and maintain accurate maintenance records, all while adhering to workplace safety standards.

1. **Perform periodic inspections to ensure functional readiness of tools and machines**
    - **Regular Visual and Functional Checks**

      Before starting any work, carpenters must visually examine tools and machines for signs of wear, damage, or loose components. Functional checks like running machines briefly can help detect abnormal noise or vibration.
    - **Preventive Maintenance Awareness**

      Periodic inspections help detect issues like dull blades, misaligned parts, or overheating motors early. This allows timely intervention, which prevents bigger breakdowns and ensures the machinery is always ready for use.
    - **Minimizing Downtime and Ensuring Safety**

      Well-maintained tools reduce the risk of sudden failure during operations. This not only prevents delays in work but also minimizes the risk of accidents due to malfunctioning tools.

2. **Develop a routine for cleaning, lubricating, and safely storing workshop equipment**
    - **Daily and Weekly Cleaning Practices**

      Dust, shavings, and adhesive residues must be cleaned from machines and tools regularly to prevent blockages and maintain precision. Specific areas such as blades, vents, and moving parts require special attention.
    - **Scheduled Lubrication**

      Applying the appropriate lubricant to rotating or sliding parts helps reduce friction and prevents rusting. This is especially important for tools like planers, saws, and drills which have multiple moving components.
    - **Safe Storage to Prevent Damage**

      Tools should be stored in designated areas such as wall-mounted racks, tool cabinets, or protective cases. Sharp or delicate items must be kept securely to avoid injury or deformation.

3. **Maintain a clean, organized, and hazard-free workspace in compliance with safety standards**
    - **Importance of Orderliness**

      A clutter-free workshop reduces chances of tripping, slipping, or mistakenly using the wrong tools. It also allows quick access to tools, improving overall productivity.
    - **Following Safety Protocols**

      Maintaining clear access to fire extinguishers, emergency exits, and ensuring electrical cords are safely routed prevents major hazards. Keeping first-aid kits visible and within reach is part of safety compliance.

- **Segregation and Disposal of Waste**

  Sawdust, offcuts, and packaging material must be disposed of regularly in designated bins. This keeps the area clean and minimizes fire risks.

4. **Record maintenance activities and report faults or incidents to supervisors**
   - **Use of Maintenance Logs and Checklists:** Keeping written records of cleaning, servicing, and inspections ensures that no routine task is missed. This helps in scheduling future maintenance effectively.
   - **Reporting Faults Promptly:** If a tool malfunctions or a safety feature is not working, the issue must be documented and immediately reported to a supervisor. This avoids potential hazards during operation.
   - **Encouraging Accountability:** Regular documentation promotes responsibility among team members and helps supervisors track recurring issues or improper tool usage that may require training or process changes.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Workshop Safety Audit Walkthrough

Group Size: 4–6 participants

Materials Needed:

- Safety audit checklist (provided by trainer)
- Clipboards and pens
- Labels or stickers (for marking identified issues)
- Sample workshop layout or access to training workshop
- Camera or mobile phone (optional, for documentation)

Activity Duration: 45–60 minutes

Instructions

1. **Form Teams:**

   Divide participants into small groups and provide each group with a safety audit checklist.

2. **Audit Walkthrough**

   Each team will walk through a designated workshop area or simulated setup to identify potential maintenance or safety issues. They must check for:

- Cleanliness of workspace
- Tool/machine condition (lubrication, storage, wear)
- Placement of hazardous items
- Emergency features and labelling

3. **Reporting and Discussion**

   After the walkthrough, each group will present their findings and suggestions for improving workshop upkeep, tool maintenance, and safety practices.

Activity	Duration	Resources used
Workshop Safety Audit Walkthrough	45-60 minutes	Safety audit checklist (provided by trainer), Clipboards and pens, Labels or stickers (for marking identified issues), Sample workshop layout or access to training workshop, Camera or mobile phone (optional, for documentation) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Brief participants on common workshop hazards (e.g., oily floors, unshielded blades, cluttered tool benches) before starting.
- Ensure the checklist is simple and visually guided (tick boxes, symbols) to encourage active participation from all members.
- Encourage group members to assign roles like observer, note-taker, and presenter to ensure teamwork and task distribution.

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following machines is best suited for edge shaping in furniture making?
   a. Belt sander
   b. Router
   c. Jigsaw
   d. Table saw

   Answer: b. Router

2. What should be checked during a pre-operation inspection of a power tool?
   a. Colour of the casing
   b. Safety guards, switches, and cable condition
   c. Weight of the tool
   d. Age of the operator

   Answer: b. Safety guards, switches, and cable condition

3. Which tool is typically used for surface finishing tasks in a furniture workshop?
   a. Table saw
   b. Orbital sander
   c. Pneumatic nail gun
   d. Band saw

   Answer: b. Orbital sander

4. What is the main function of the emergency stop feature on workshop machinery?
   a. Increases the tool speed
   b. Enhances cutting precision
   c. Instantly halts the machine to prevent accidents
   d. Changes the direction of the motor

   Answer: c. Instantly halts the machine to prevent accidents

Fill in the Blanks

1. The _____ saw is primarily used for making straight panel cuts in furniture boards.

   Answer: table

2. A router uses _____ to carve edges or grooves in wooden panels.

   Answer: bits

3. It is important to use _____ while working with noisy or vibrating power tools.

   Answer: personal protective equipment (PPE)

4. Regular _____ and maintenance help in increasing the lifespan of workshop machines.

   Answer: cleaning

Match the following

1. Match the machine/tool in Column A with its primary use in Column B:

Column A	Column B
1. Jigsaw	a. Surface finishing
2. Pneumatic nail gun	b. Intricate curved cuts
3. Orbital sander	c. High-speed edge shaping
4. Router	d. Fastener fixing

   Answers: 1 - b. , 2 - d. , 3 - a. , 4 - c.

2. Match the machine part in Column A with its function in Column B:

Column A	Column B
1. Guide fence	a. Prevents accidental hand contact
2. Blade guard	b. Ensures straight cuts on the saw
3. Emergency stop	c. Cuts off power during faults
4. Dust port	d. Connects vacuum for dust extraction

   Answers: 1 - b. , 2 - a. , 3 - c. , 4 - d.

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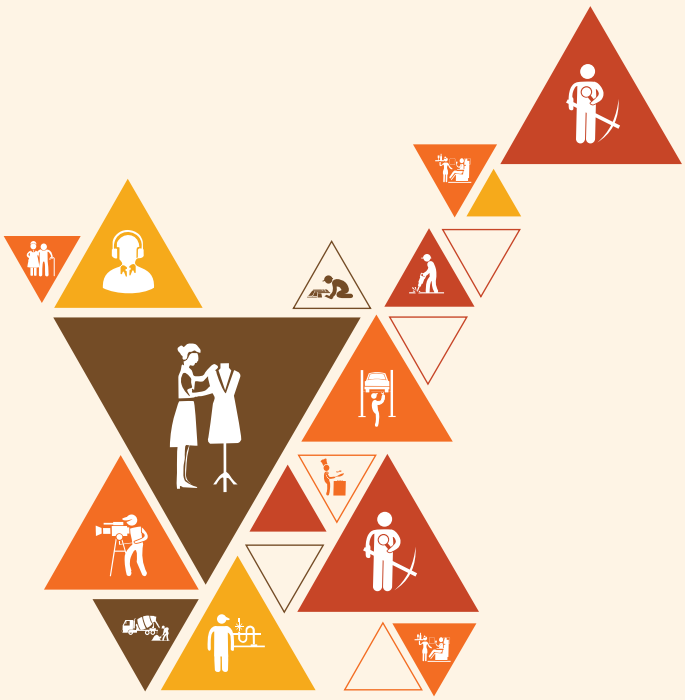
4. Supervisory Communication, Team Coordination, and Employability Tools

Unit 4.1: Organizational Structure, Task Reporting, and Documentation
Unit 4.2: Team Coordination, Professional Conduct, and Conflict Resolution
Unit 4.3: Digital and Employability Tools for Workplace Productivity



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Explain the structure of a typical carpentry or interior fit-out team, including the roles of supervisor, senior carpenter, junior carpenter, and helper, and describe how reporting responsibilities are distributed.
2. Describe how communication flows from the site team to the project manager, client, and external vendors in a real-world furniture installation scenario.
3. List the key types of documents used in carpentry and installation work such as job cards, checklists, site diaries, and inspection logs.
4. Explain how to interpret entries in a job card, including task breakdown, hours worked, material used, and remarks or issues.
5. Identify the importance of inspection sheets and how they are used to record project progress, quality verification, and compliance with design instructions.
6. Describe the escalation process used on a site when a task is delayed, quality is compromised, or required materials/tools are missing.
7. Explain who to inform first in the escalation chain — e.g., team lead, site supervisor, or client contact — and how to report issues clearly and constructively.
8. Demonstrate effective coordination techniques for working with other carpenters or tradespeople to ensure that interdependent activities like installation and polishing do not clash.
9. Describe how to delegate small tasks to junior team members while maintaining workflow and safety.
10. Identify practical barriers to smooth teamwork such as unclear task assignment, delay in materials, unequal workload, or miscommunication.
11. List strategies to reduce or manage interpersonal conflict such as clear communication, role clarification, and using a neutral third party (e.g., supervisor).
12. Demonstrate respectful and professional behaviour during client interactions, team meetings, and conflict resolution conversations.
13. Use messaging apps like WhatsApp or Telegram to send photos, instructions, or updates to supervisors or clients in real-time.
14. Scan QR codes or barcodes to access hardware specifications, installation guides, or project IDs.
15. Use mobile calculators and measurement apps to assist in material estimation, cost calculation, and layout adjustment.
16. Carry out basic digital transactions such as purchasing hardware, confirming delivery, or reimbursing petty cash via mobile apps or UPI platforms.
17. Access product catalogues, price lists, or installation tutorials from manufacturer websites or online videos when alternative suggestions are needed.
18. Use internet search and supplier directories to compare rates, check specifications, or find new vendors for materials or tools.

Unit 4.1: Organizational Structure, Task Reporting, and Documentation

Unit Objectives

At the end of this unit, participants will be able to:

1. Explain how typical carpentry project teams are structured, including roles and reporting lines.
2. Identify the use and components of basic documentation such as job cards, inspection sheets, and checklists.
3. Describe the escalation process when encountering work-related delays or quality concerns.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how carpentry project teams are structured and how tasks are reported and documented during work. Learners will explore different job roles, lines of reporting, and essential documents such as job cards, inspection sheets, and checklists. We will also understand how to report issues or delays through proper escalation processes to maintain smooth project execution and safety compliance.

Ask

Ask the participants the following questions:

- Can you name one document that helps track work progress in a carpentry project?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Organizational Structure, Task Reporting, and Documentation

In any furniture or carpentry project, efficient coordination among team members and accurate documentation are essential for smooth operations, quality assurance, and timely completion. This session helps participants understand how teams are organized, how responsibilities are reported, and how important documentation supports accountability and progress tracking.

1. **Organizational Structure in Carpentry Projects**
   - In a typical carpentry project, roles are clearly defined to ensure clarity and smooth functioning. At the top is the Project Manager or Site Supervisor, who oversees all activities, followed by Lead Carpenters, Assistant Carpenters, and Helpers.
   - Each team member has a specific set of duties and reports to a supervisor or team lead. This hierarchy helps avoid confusion, ensures proper supervision, and facilitates the delegation of work based on skills and experience.
   - Having a well-structured team promotes discipline, improves productivity, and allows faster response to any worksite issues.

2. **Importance of Task Reporting**
   - Task reporting involves updating supervisors about the status of assigned work, any obstacles faced, or deviations from the plan. This helps managers track progress in real-time and take corrective measures as needed.
   - Regular reporting allows the project manager to allocate resources efficiently, prioritize urgent tasks, and ensure timelines are met.
   - It also creates a sense of responsibility among workers, as they are expected to communicate regularly and accurately about their assigned duties.

3. **Key Project Documentation**
   - Carpentry and furniture projects require several types of documentation to track work quality and progress. For instance, a Job Card outlines the job description, materials required, duration, and responsible worker.
   - Inspection Sheets are used to check whether the work meets specific quality standards like alignment, finish, strength, and safety. These sheets are usually filled out during or after task completion.
   - Checklists help workers confirm that necessary tools, safety gear, and materials are in place before starting work and ensure tasks are properly closed out after completion.

4. **Escalation Process and Its Importance**
   - The escalation process is a formal way of handling worksite challenges that a worker cannot resolve independently. If a tool breaks, a safety concern arises, or materials are missing, the worker must report it to the immediate supervisor.
   - The supervisor then assesses the issue and either resolves it or forwards it to higher management if needed.
   - Escalating issues properly prevents delays, ensures team safety, and maintains work quality, while also reinforcing the value of structured communication on the site.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Managing a Carpentry Project Team and Reporting Structure

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (in 3 different colours for team roles, documents, and issues)
- Scenario cards (provided below)
- Sample templates of job cards, checklists, and inspection forms

Activity Duration: 60 minutes

Instructions

1. **Introduction & Briefing**
   - Brief participants on the key components of a carpentry project team: team hierarchy, documentation types, and escalation protocols.
   - Explain how roles interact and how delays or quality issues should be reported.
   - Distribute one scenario card per group.
2. **Scenario-Based Group Planning**

   Each group reads its scenario and discusses:
   - Which team members are involved in this scenario?
   - What documents are relevant to the task or issue?
   - What is the proper reporting line and escalation process?
   - How would the team communicate the issue and document it clearly?

Deliverables:

Groups should create a visual chart on the flipchart/whiteboard showing:

- The team hierarchy affected
- Flow of documents and reports
- Steps taken to address and report the issue

3. **Group Presentations**

   Each group presents:

   - A summary of the scenario
   - Team roles involved
   - Actions taken and documents used
   - Escalation or resolution approach

   Encourage peer questions and collaborative learning.

4. **Debriefing and Takeaways**

   Facilitate discussion around:

   - The role of clear documentation in resolving issues
   - How reporting structures help avoid confusion
   - Lessons about teamwork, accountability, and communication

Examples of Scenario Card

Scenario 1
A carpenter finds that a wall measurement on the job card doesn't match the site layout. Work needs to be paused. How should this be reported? Which documents and team members are involved?

Scenario 2
A helper gets injured while moving tools due to poor tool placement. What documentation is needed? How will the supervisor be informed, and how should the team respond?

Scenario 3
A client requests a sudden design change mid-project. How is this request recorded and communicated to the team? What documents need to be updated?

Activity	Duration	Resources used
Managing a Carpentry Project Team and Reporting Structure	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (in 3 different colours for team roles, documents, and issues), Scenario cards (provided below), Sample templates of job cards, checklists, and inspection forms etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Guide participation**

  Encourage every group member to take a role—team lead, document keeper, presenter, etc.

- **Visual clarity**

  Ask groups to clearly label each team role, document, and communication path in their visual chart.

- **Template samples**

  Provide simple printed samples of job cards, checklists, and inspection forms to support understanding.

Unit 4.2: Team Coordination, Professional Conduct, and Conflict Resolution

Unit Objectives

At the end of this unit, participants will be able to:

1. Demonstrate ways to coordinate with peers and junior workers for smooth execution of interdependent tasks.
2. Identify common causes of team conflict in carpentry settings and describe steps to resolve them effectively.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the importance of teamwork, professional behaviour, and managing conflicts effectively at the workplace. Learners will explore how to coordinate with fellow carpenters and junior workers to ensure tasks are completed smoothly. The unit also highlights common causes of conflict in carpentry settings and the steps that can be taken to resolve issues in a respectful and productive manner.

Ask

Ask the participants the following questions:

- Why is it important to work together as a team on a carpentry project?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Team Coordination, Professional Conduct, and Conflict Resolution

In carpentry projects, teamwork and professionalism are crucial for efficient task execution and a healthy work environment. This unit explores how workers can coordinate effectively, uphold respectful conduct on the job site, and manage conflicts when they arise. It emphasizes the importance of collaboration, clear communication, and ethical behaviour to maintain productivity and harmony among diverse team members.

1. **Demonstrate ways to coordinate with peers and junior workers for smooth execution of interdependent tasks**
   - **Shared Understanding of Roles**

     Workers must know not only their tasks but also how those tasks fit into the overall project. For example, assembling a frame depends on accurate cutting and measuring done beforehand. Coordinating these steps requires clear role definitions.
   - **Effective Communication**

     Workers should regularly update one another on task status and dependencies. Using brief check-ins or simple tools like job cards helps avoid overlaps or delays.
   - **Support and Supervision**

     Senior or more experienced workers should offer guidance and practical tips to juniors. Demonstrating tasks step-by-step builds trust and promotes skill-sharing across the team.
   - **Timing and Workflow**

     Coordination includes planning the sequence of tasks. For example, sanding cannot begin until cutting and shaping are done. Discussing the day's plan helps reduce idle time and confusion.

2. **Identify common causes of team conflict in carpentry settings and describe steps to resolve them effectively**
   - **Sources of Conflict**

     Common issues include unclear instructions, delays in task completion, or differences in work pace and attitude. Misunderstandings can also arise from cultural or personal communication styles.
   - **Early Identification**

     Recognizing signs of conflict early—such as arguments, tension, or avoidance—is key to preventing escalation. Supervisors and team leads should observe team dynamics regularly.
   - **Open and Respectful Dialogue**

     Addressing issues directly, respectfully, and without blame helps resolve most interpersonal problems. Workers should feel safe expressing concerns and offering suggestions.
   - **Involving Leadership**

     If the conflict continues, involving a supervisor or site manager can help mediate and clarify expectations. Leadership support ensures accountability and reinforces workplace standards.
   - **Promoting a Positive Culture**

     Encouraging respectful language, listening, and acknowledgment of team members' efforts reduces chances of future conflict and strengthens professional conduct on-site.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Resolving a Carpentry Team Conflict Scenario

Group Size: 4–6 participants

Materials:

- Printed role cards or scenario sheets
- Whiteboard or chart paper
- Markers

Activity Duration: 45–60 minutes

Instructions

1. Divide the class into small groups and assign each group a conflict scenario common in carpentry settings (e.g., disagreement over task responsibilities, safety oversight, miscommunication with junior workers, etc.).
2. Distribute Role Cards – each participant in a group will take on a specific role such as Team Leader, Carpenter, Junior Worker, or Supervisor.
3. Scenario Analysis and Role Play

   Groups will discuss their given scenario and act out a 3–5-minute role-play showing how they would resolve the conflict. They must focus on:

   - Coordinating task responsibilities
   - Demonstrating professional conduct
   - Applying basic conflict resolution steps (e.g., active listening, finding common ground, involving a supervisor if needed)
4. Presentation and Reflection

   Each group presents their role-play to the class. A short discussion follows, focusing on how the situation was handled and how it could be improved.

Activity	Duration	Resources used
Resolving a Carpentry Team Conflict Scenario	45-60 minutes	Printed role cards or scenario sheets, Whiteboard or chart paper, Markers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Ensure Clear Role Understanding**

  Brief participants on their roles beforehand so they understand perspectives and responsibilities.

- **Encourage Respectful Dialogue**

  Guide groups to use polite language and constructive communication during role-play.

- **Debrief with Key Learnings**

  Highlight the importance of empathy, clear communication, and following hierarchy in resolving real-life conflicts.

Unit 4.3: Digital and Employability Tools for Workplace Productivity

Unit Objectives

At the end of this unit, participants will be able to:

1. Use digital tools like messaging apps, QR scanners, and mobile calculators for site communication and documentation.
2. Perform basic digital transactions such as online material ordering or payment tracking via mobile platforms.
3. Demonstrate the use of internet-based research for identifying carpentry material alternatives or design references.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to use basic digital tools and mobile applications to improve communication, planning, and task execution at carpentry worksites. We will explore how messaging apps, calculators, QR scanners, and online payment platforms help streamline day-to-day operations. The unit also highlights how to perform simple online transactions and use internet-based research for materials, design ideas, and vendor information.

Ask

Ask the participants the following questions:

- Have you ever used a mobile app like a calculator, WhatsApp, or Google to help with your work or daily tasks?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Digital and Employability Tools for Workplace Productivity

In today's fast-paced and tech-driven work environments, carpentry professionals must be equipped with digital skills that enhance communication, accuracy, and overall efficiency. From using mobile apps for communication and payments to conducting online research for better material choices, these tools significantly contribute to workplace productivity and employability.

1. **Using Digital Tools for Communication and On-Site Efficiency**
   - **Mobile Messaging Apps for Communication**

     Carpenters often work across different areas of a site. Apps like WhatsApp or Telegram allow instant sharing of updates, images, and voice notes with team members or supervisors, reducing delays and misunderstandings.
   - **QR Code Scanners for Technical Access**

     QR scanners enable carpenters to quickly retrieve manuals, safety instructions, or product specifications by scanning barcodes on packaging or machinery. This is especially useful for handling branded materials or accessing supplier resources on-site.
   - **Mobile Calculators for Quick Measurements**

     Built-in calculator apps or specialized measurement apps help workers perform quick unit conversions, calculate angles, or estimate material usage without needing physical calculators, ensuring faster and more accurate work.

2. **Managing Transactions and Material Orders Digitally**
   - **Using UPI Apps for Payments**

     Tools like Google Pay or PhonePe help carpenters transfer payments to suppliers instantly. This avoids cash handling issues and creates a secure digital transaction record for accountability.
   - **Ordering Materials via E-Commerce or Vendor Apps**

     Carpenters can browse, select, and order construction materials directly through vendor platforms or apps like Amazon Business or local e-supplier portals, reducing the need for store visits and allowing better planning.
   - **Tracking and Recording Transactions**

     Using screenshots or digital receipts helps in maintaining expense records. This is essential for site supervisors to report procurement activities and reconcile accounts with project budgets.

3. **Internet-Based Research for Smart Work Decisions**
   - **Exploring Material Alternatives**

     When a specific type of wood or hardware is unavailable, online research helps identify alternative materials with similar properties, ensuring the work can continue without compromising quality.
   - **Learning and Upskilling through Online Resources**

     Platforms like YouTube or carpentry blogs offer tutorials and demonstrations on tool usage, new joint techniques, or furniture design trends, helping workers improve their skills on the go.
   - **Finding Local Vendors and Comparing Prices**

Workers can use Google Maps, Justdial, or vendor websites to locate nearby suppliers, compare pricing, and check availability, which leads to smarter purchasing decisions and timesaving.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Digital Task Planning and Communication Simulation

Group Size: 4–6 participants

Materials Required:

- Smartphones or tablets with basic apps (messaging app, QR scanner, calculator, browser)
- Sample task cards (e.g., "Order plywood online", "Send material request to supervisor", "Search for eco-friendly paints")
- Whiteboard or flipchart for presenting

Activity Duration: 45–60 minutes

Instructions

1. **Assign a Real-World Scenario**

   Each group is given a task scenario involving a carpentry project (e.g., "You are preparing for an urgent furniture installation and need to coordinate materials, labour, and safety communication digitally").

2. **Task Breakdown and Digital Tool Mapping**

   Participants will identify 3–4 key subtasks from their scenario and map appropriate digital tools to each (e.g., use WhatsApp to update the team, use calculator for cost estimation, search online for alternative hinges, scan a QR code for product details).

3. **Execution & Presentation**

   Groups simulate sending a message, performing a basic online search, or scanning a QR code, and then present how digital tools helped them complete the scenario efficiently.

4. **Reflection and Discussion**

   After the presentations, discuss how digital tools helped improve productivity, what challenges were faced, and how these tools could be better used on a real site.

Activity	Duration	Resources used
Digital Task Planning and Communication Simulation	45-60 minutes	Smartphones or tablets with basic apps (messaging app, QR scanner, calculator, browser), Sample task cards (e.g., "Order plywood online", "Send material request to supervisor", "Search for eco-friendly paints"), Whiteboard or flipchart for presenting etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure all participants are familiar with the basic functions of the digital tools before starting the activity.
- Encourage participants to demonstrate tool use in real-time using their phones (if available) or role-play the steps.
- Highlight the importance of using trusted platforms, especially while doing financial transactions or accessing material resources.

Exercise

Multiple Choice Questions (MCQs)

1. Who is usually the first point of contact when reporting a delay or issue on a carpentry site?
   a) Client
   b) Site helper
   c) Team lead or site supervisor
   d) Material supplier
   Answer: c) Team lead or site supervisor

2. What is the main purpose of a job card in carpentry work?
   a) Recording payment status
   b) Recording task details, materials used, and time spent
   c) Tracking furniture delivery routes
   d) Measuring wall dimensions
   Answer: b) Recording task details, materials used, and time spent

3. Which of the following digital tools is best used to send real-time site updates with photos?
   a) Barcode scanner
   b) Google Maps
   c) Messaging apps (e.g., WhatsApp)
   d) Mobile calculator
   Answer: c) Messaging apps (e.g., WhatsApp)

4. What is a common cause of conflict in a carpentry team?
   a) Too many workers
   b) Proper tool availability
   c) Unequal workload or unclear task assignment
   d) Clean site conditions
   Answer: c) Unequal workload or unclear task assignment

Fill in the blanks

1. A _____ is used to verify that carpentry work meets quality and design standards before handing over the project.
   Answer: inspection sheet

2. If a material is missing during installation, the issue should be _____ to the site supervisor immediately.
   Answer: escalated

3. Professional behaviour includes showing respect, being punctual, and _____ clearly during meetings or client interactions.

   Answer: communicating

4. QR codes and barcodes can be scanned to access _____ or product installation guides on-site.

   Answer: specifications

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Job Card	a. Used for recording daily task details
2. Messaging App	b. Tool for sending real-time updates
3. Material Delay	c. Requires escalation to supervisor
4. Mobile Calculator	d. Used for estimating costs and layout

Answers: 1 - a, 2 - b, 3 - c, 4 - d

2. Match Column A with Column B correctly.

Column A	Column B
1. Site Supervisor	a. Helps compare rates and find vendors
2. Team Coordination	b. Ensures smooth task scheduling and workflow
3. Internet Search	c. Initial contact for reporting site issues
4. Escalation Process	d. Follows reporting chain in case of problems

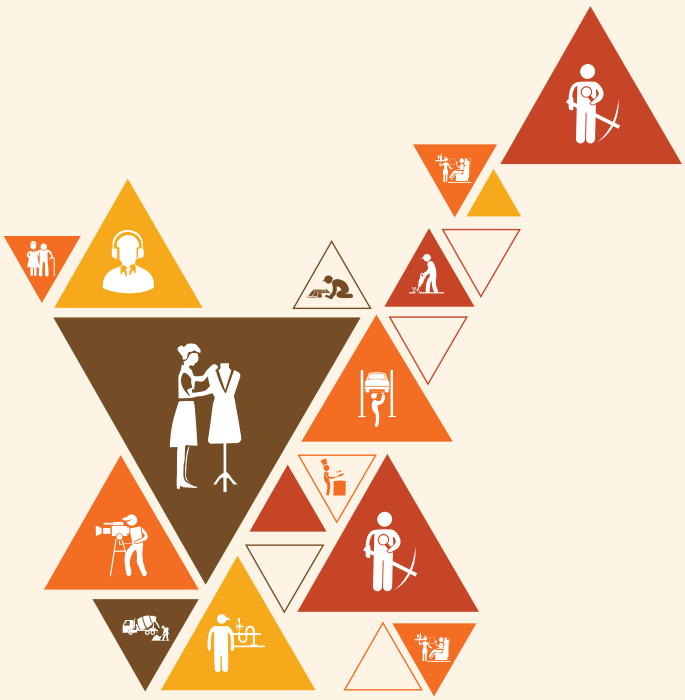
Answers: 1 - c, 2 - b, 3 - a, 4 - d

5. Project Planning, Cost Estimation, and Client Communication

Unit 5.1: Understanding Project Requirements and Documentation

Unit 5.2: Client Interaction and Workplace Communication Etiquette

Unit 5.3: Cost Estimation, Budgeting, and Execution Planning



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Read and understand furniture project drawings including floor layouts, elevation views, sectional diagrams, and detailed component sketches to extract measurable and actionable information.
2. Interpret technical symbols, annotations, and notations used in drawings to understand project expectations, alignment, materials, and hardware placement.
3. Describe the typical content and layout of work instructions and client briefs, and explain how they guide job scope, quality expectations, and output sequence.
4. Identify and list key project documents such as layout plans, GFC (Good for Construction) drawings, bill of quantities (BOQ), work schedules, and delivery timelines.
5. Explain the relevance of each document in guiding the preparation, procurement, and execution process of furniture installation and fit-out projects.
6. Demonstrate confident and professional body language and speech during client walkthroughs, supervisor briefings, or vendor discussions.
7. Respond clearly and respectfully to client queries, feedback, or concerns during meetings or on-site visits, maintaining a problem-solving attitude.
8. Coordinate effectively with external stakeholders like architects, electricians, and false ceiling contractors to prevent clashes and enable seamless execution.
9. Update progress verbally or via messages to clients, supervisors, or agencies using clear language, accurate figures, and issue-based references.
10. Record feedback or last-minute changes in communication logs or notebooks and integrate that input into revised work plans or drawings.
11. Prepare a basic cost estimate by itemizing material requirements, estimating hardware count, labour hours, transportation, and miscellaneous expenses based on a sample design or site need.
12. Use a calculator or spreadsheet to tally up quantities and rates and arrive at a total project cost including a margin or contingency where applicable.
13. Explain how budget planning ensures financial feasibility, timely procurement, and profit forecasting for small or mid-sized furniture works.
14. Describe the step-by-step process of execution planning including identifying tasks, assigning roles, sequencing work, and estimating time per activity.
15. List possible constraints or risks such as material delays, labor shortage, site readiness, weather impact, or client indecision and suggest simple mitigation measures.
16. Explain the importance of tracking cost overruns, documenting changes in scope, and updating the plan dynamically based on real-time execution inputs.

Unit 5.1: Understanding Project Requirements and Documentation

Unit Objectives

At the end of this unit, participants will be able to:

1. Read and interpret project drawings, work instructions, and client briefs for scope clarity.
2. Identify types of documents used in furniture projects such as layout plans, bill of quantities, and timelines.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to understand and work with project requirements and documentation used in furniture installation. Learners will explore how to read project drawings, interpret client briefs, and follow work instructions. The unit will also introduce key documents like layout plans, bill of quantities (BoQ), and project timelines, helping participants prepare effectively for site execution and material planning.

Ask

Ask the participants the following questions:

- Can you name one document that shows where furniture should be placed in a room?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Understanding Project Requirements and Documentation

In carpentry and furniture installation, understanding project requirements and documentation is crucial for executing tasks with precision and within deadlines. Proper interpretation of design plans, client briefs, and supporting documents ensures that all team members are aligned with the expectations and deliverables of the project.

- **Project Drawings**

  These include layout diagrams, elevations, and sectional views that visually communicate the size, shape, and positioning of furniture units. They help carpenters understand spatial relationships and ensure accurate placement of products such as cabinets, tables, or partitions.

- **Client Briefs**

  A client briefoutlines the customer's functional needs, aesthetic preferences, material specifications, and special instructions. It may also include mood boards, color preferences, or restrictions to be followed during execution.

- **Work Instructions**

  These are task-specific documents that guide the team step-by-step on how to fabricate or install a furniture component. They include details on tools to be used, surface finish requirements, hardware fitting instructions, and precautions for handling.

  Together, these documents ensure that the final product matches client expectations, maintains structural accuracy, and meets project quality standards.

2. Identifying and Understanding Key Project Documents

- **Layout Plans:** These are site-based furniture placement drawings that show exact positions for each furniture item in relation to walls, floors, electrical points, or plumbing. Carpenters use layout plans to mark positions accurately before installation.

- **Bill of Quantities (BoQ)**

  A detailed list that specifies the type and quantity of materials, fittings, or tools needed for the project. This includes plywood size and grade, laminates, screws, adhesives, brackets, and finishing materials. It ensures materials are procured in the right quantity and quality.

- **Project Timelines**

  A timeline or schedule breaks the project into phases such as measurement, cutting, assembly, installation, and polishing. It helps teams prioritize tasks and track progress, ensuring deadlines are met and avoiding overlaps or delays.

- **Supporting Documents**

  These may include design approvals, site readiness checklists, inspection logs, and vendor coordination notes. These documents assist in project planning, client communication, and compliance with quality standards.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Exploring a Furniture Installation Planning Scenario Using Project Documents

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (in different colors)
- Scenario cards (described below)
- Sample layout drawings, BoQs, and client briefs (mock documents)

Activity Duration: 60 minutes

Activity Instructions

1. **Group Formation and Objective Setting**
   - Divide participants into small groups.
   - Explain that the activity simulates a real-world planning situation for a furniture installation project.
   - Review key concepts from the unit: project documentation, team coordination, and client communication.
2. **Scenario Assignment and Planning**
   - Distribute one scenario card to each group. Each scenario describes a challenge involving interpretation of documents like layout plans, bill of quantities, or client briefs.
   - Provide sample documents to support analysis.
   - Each group will discuss:
     - What project documents are relevant to solving the problem?
     - How should the team coordinate roles and tasks?
     - What communication would be needed with the supervisor, client, or vendors?
3. **Group Presentations**
   - Each group presents their scenario, analysis, and proposed plan of action.
   - Encourage questions and constructive feedback from peers.
4. **Debrief and Key Learnings**
   - Facilitate a class-wide discussion.
   - Highlight different approaches taken, challenges identified, and effective strategies proposed.
   - Connect observations back to the unit learning outcomes.

Examples of Scenario Cards

Scenario 1

The layout plan indicates that electrical points for lighting fixtures were misaligned during furniture installation. How do you use the drawing and client brief to rectify this without disrupting progress?

Scenario 2

You receive a client complaint that one section of the modular furniture does not match the approved material list. How do you verify this using the BoQ and resolve the issue?

Scenario 3

Your team is confused about the sequence of installation across rooms. The project brief outlines the priority. How do you coordinate and communicate a revised plan effectively?

Activity	Duration	Resources used
Exploring a Furniture Installation Planning Scenario Using Project Documents	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (in different colors), Scenario cards (described below), Sample layout drawings, BoQs, and client briefs (mock documents) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure each group receives a different scenario and related mock documents.
- Guide teams to refer to drawings, BoQs, and briefs during the discussion.
- Encourage inclusive participation and clear role assignment during the activity.

Unit 5.2: Client Interaction and Workplace Communication Etiquette

Unit Objectives

At the end of this unit, participants will be able to:

1. Demonstrate appropriate verbal and non-verbal behaviour during site visits or client meetings.
2. Coordinate effectively with external agencies, designers, and clients to communicate progress and clarify specifications.
3. Record feedback from client or supervisor interactions and incorporate changes into execution planning.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the importance of professional communication and behavior during client meetings, site visits, and workplace interactions. Participants will learn how to use verbal and non-verbal cues effectively, coordinate with clients and external teams, and handle feedback properly. These skills help ensure smooth project communication, build trust with clients, and support better planning and execution on-site.

Ask

Ask the participants the following questions:

- What are some good ways to show respect when speaking to a client during a site visit?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Client Interaction and Workplace Communication Etiquette

In this session, participants will understand the importance of professional communication and behaviour during client interactions, site visits, and coordination with various stakeholders. They will learn how to represent themselves and their work effectively, respond to feedback, and maintain clarity in all workplace communication.

1. **Demonstrate appropriate verbal and non-verbal behaviour during site visits or client meetings**
    - **Professional Verbal Communication**

      Participants will learn to speak respectfully and clearly using polite language during client discussions or team briefings. They will understand the importance of avoiding slang or overly technical jargon unless appropriate for the audience.
    - **Active Listening Skills**

      Emphasis will be placed on listening attentively without interrupting, showing interest through nodding or verbal affirmations like "I understand" or "Yes, noted."
    - **Non-verbal Behaviour and Body Language**

      Participants will understand how posture, facial expressions, and eye contact can reflect professionalism. For example, maintaining steady eye contact, a calm expression, and open posture helps convey confidence and attentiveness.
    - **Personal Grooming and Appearance**

      The unit will highlight the importance of appropriate dress code, clean appearance, and punctuality during site visits or meetings, as these non-verbal factors also influence a client's impression.

2. **Coordinate effectively with external agencies, designers, and clients to communicate progress and clarify specifications**
    - **Sharing Regular Updates**

      Participants will learn how to provide structured updates on project status using verbal briefings, emails, or reports. Clear and timely communication helps avoid confusion and build trust.
    - **Clarifying Design and Technical Details**

      The session will teach how to ask specific questions related to design drawings, measurements, materials, or changes requested by clients or designers to ensure mutual understanding.
    - **Liaising Across Teams**

      Participants will practice acting as a communication bridge between clients, design teams, and technical staff—ensuring that each party receives consistent and accurate information.
    - **Maintaining a Cooperative Attitude**

      This point emphasizes the importance of being respectful, solution-focused, and responsive when working with different people, especially when addressing client concerns or design modifications.

3. **Record feedback from client or supervisor interactions and incorporate changes into execution planning**
    - **Listening and Capturing Feedback Accurately**

      Participants will develop the habit of carefully listening during meetings and noting down client or supervisor feedback in a structured format (such as in a notebook, checklist, or app).
    - **Translating Feedback into Actionable Steps**

      They will learn to break down feedback into clear tasks—for example, changing the type of fitting or adjusting placement of an item—and communicate these to the team.
    - **Updating Work Plans Accordingly**

      This section trains participants to modify their work sequence, timeline, or installation method based on the feedback, ensuring that adjustments are practical and in line with overall project goals.
    - **Confirming Implementation with Stakeholders**

      After changes are made, participants should follow up with the client or supervisor to confirm that their suggestions have been addressed and resolved satisfactorily.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Mock Client Meeting and Feedback Session

Group Size: 4–6 participants

Materials Needed:

- Role-play cards (Client, Supervisor, Installer, Designer)
- Sample project scenario or site layout
- Notebooks and pens
- Feedback form template

Activity Duration: 45–60 minutes

Activity Instructions

1. Divide participants into small groups. Assign roles to each member: one acts as the client, one as the installer, and others as designer, site supervisor, or observer.
2. Provide a sample scenario. For example, the client wants a modular cabinet installed but has specific preferences and concerns. The installer must lead the conversation, take feedback, and clarify specifications.

3. Role-play the interaction. The “installer” must demonstrate professional verbal and non-verbal communication, clarify doubts, and document the client’s feedback.
4. Rotate roles. Allow others to take turns being the installer to ensure everyone practices.
5. Debrief. Groups discuss what went well and what could be improved in terms of communication and feedback handling.

Activity	Duration	Resources used
Mock Client Meeting and Feedback Session	45-60 minutes	Role-play cards (Client, Supervisor, Installer, Designer), Sample project scenario or site layout, Notebooks and pens, Feedback form template etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Use simple, realistic scenarios related to site visits or client changes.
- Ask observers to focus on body language, tone, and clarity of responses.
- After the role-play, encourage a brief group reflection on what was done well and what could be improved.

Unit 5.3: Cost Estimation, Budgeting, and Execution Planning

Unit Objectives

At the end of this unit, participants will be able to:

1. Prepare a basic cost estimate for material, hardware, transport, and labor based on a given design.
2. Use simple techniques to plan budgets and calculate profitability for small-scale projects.
3. Define steps to create an execution plan aligned with timelines, dependencies, and available resources.
4. Identify resource gaps and possible risks that could impact cost or delivery in carpentry projects.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to estimate the cost of materials, labor, and transport for carpentry work, and how to prepare a simple project budget. Participants will also learn how to plan the steps of project execution, manage timelines, and identify risks or shortages that may affect delivery. These skills help ensure smooth, cost-effective, and timely completion of small-scale carpentry projects.

Ask

Ask the participants the following questions:

- Why is it important to know the cost of materials and labor before starting a carpentry project?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Cost Estimation, Budgeting, and Execution Planning

In this session, we focus on understanding how to estimate project costs, prepare practical budgets, and plan the sequence of work to ensure timely and cost-effective delivery in carpentry projects.

1. **Cost Estimation Based on Design Requirements**
    - **Understanding the Design**

      Before starting any estimation, it is important to carefully study the design drawings or client requirements. This helps identify what type of product is to be made (e.g., wardrobe, cabinet), the dimensions, materials specified, and finishing details. This forms the base for all further calculations.
    - **Identifying Components**

      Based on the design, a list of required items must be created. This includes raw materials like plywood or MDF, finishing materials like laminates and polish, hardware such as hinges and handles, tools, transport arrangements, and expected labor involvement.
    - **Calculating Quantities and Rates**

      Each item listed must be measured or counted. For example, how many sheets of plywood are required or how many hinges will be needed. Prices are then assigned by referring to market rates, vendor price lists, or past project invoices.
    - **Preparing a Cost Summary**

      All individual costs—materials, hardware, transport, labor—are added up to make a detailed cost sheet. This gives a clear picture of how much the entire project is expected to cost and can be used for planning and client approval.

2. **Budget Planning and Profitability Assessment**
    - **Creating a Simple Budget Format**

      The estimated cost must be organized neatly under categories like material cost, labor cost, transport charges, and other overheads. This helps ensure no element is missed and makes the budget easy to understand and present to others.
    - **Comparing with Project Value**

      Once the full cost estimate is ready, it should be compared to the amount being paid by the client. This helps verify if the job is feasible and whether the budget fits within the client's expectations or not.
    - **Calculating Profit Margins**

      Participants will learn to subtract the total estimated expenses from the expected payment. This remaining amount is the profit. For example, if a project pays ₹50,000 and the total cost is ₹40,000, the profit is ₹10,000. This check ensures the project is worth accepting.
    - **Adjusting for Savings**

      If costs are too high or profit is too low, the budget can be reviewed to identify areas where savings can be made. This may include sourcing materials at lower prices, reducing transport expenses, or using labour more efficiently without affecting quality.

3. **Execution Planning with Timelines and Resources**

   - **Breaking Down the Workflow**

     A project must be divided into logical steps such as material purchase, cutting and shaping, assembling, finishing, and delivery or installation. Breaking work into parts helps in organizing tasks better and assigning responsibilities.

   - **Setting Realistic Timelines**

     Each task is given a realistic time estimate. For example, 1 day for material purchase, 2 days for cutting and shaping, etc. Time planning must consider availability of workers, working hours, and possible delays.

   - **Planning for Resources**

     Resources like manpower, tools, and materials should be identified for each stage in advance. For instance, cutting requires a circular saw and 2 skilled workers. Proper planning avoids interruptions and keeps the work flowing.

   - **Ensuring Smooth Coordination**

     Tasks must be arranged in a logical sequence, so one stage flows smoothly into the next. This prevents work delays due to missing materials or idle labor. For example, assembly should not begin until all cutting is complete.

4. **Identifying Risks and Resource Gaps**

   - **Recognizing Potential Risks**

     Common risks in carpentry projects include material delivery delays, sudden worker unavailability, damaged tools, or last-minute design changes by the client. Awareness of such risks helps in being better prepared.

   - **Assessing Impact on Delivery**

     Participants will learn how to judge the seriousness of a risk. For instance, a one-day delay in material delivery may affect the entire timeline, while a damaged drill may slow down specific tasks. This understanding helps in prioritizing issues.

   - **Preparing Backup Plans**

     To reduce the impact of risks, simple solutions can be planned—such as keeping a few extra materials in stock, having a spare drill or contacting backup labourers in case of emergency. These precautions prevent long delays.

   - **Staying Proactive**

     Daily or weekly tracking of the work schedule helps identify problems early. Participants will learn the value of monitoring progress closely and making quick adjustments to the plan when something goes wrong, so that the overall project is not disrupted.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Estimating and Planning a Mini Carpentry Project

Group Size: 4–6 participants

Materials Needed:

- Sample carpentry design (e.g., a small wooden cabinet or table)
- Rate chart for materials and labour (printed or written)
- Paper, pens, calculators, and a planning template

Activity Duration: 60 minutes

Activity Instructions:

1. Divide participants into groups and provide each group with a simple carpentry design and a rate sheet for materials, hardware, labor, and transport.
2. Ask each group to prepare a basic cost estimate for the design, including material quantity, labor charges, and transport cost.
3. Instruct them to create a simple budget and execution plan, identifying the steps involved, the timeline for each step, and any potential risks or resource gaps.
4. Each group will present their estimate and plan, explaining how they arrived at the cost and how they would manage the execution.

Activity	Duration	Resources used
Estimating and Planning a Mini Carpentry Project	60 minutes	Sample carpentry design (e.g., a small wooden cabinet or table), Rate chart for materials and labour (printed or written), Paper, pens, calculators, and a planning template etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Provide realistic but simplified designs and rate sheets to keep the activity practical and engaging.
- Encourage teamwork and discussion while estimating costs and identifying steps.
- After presentations, provide constructive feedback and highlight good estimation and planning practices.

Exercise

Multiple Choice Questions (MCQs)

1. What does a BOQ (Bill of Quantities) primarily include?
   a. Labor schedules
   b. List of furniture items and fittings
   c. Cost of meals and refreshments
   d. Worker attendance logs

   Answer: b. List of furniture items and fittings

2. Which of the following ensures smooth coordination between site activities?
   a. Ignoring stakeholder input
   b. Individual working without updates
   c. Regular progress communication and coordination
   d. Verbal agreements without documentation

   Answer: c. Regular progress communication and coordination

3. What is the main purpose of including a margin or contingency in cost estimation?
   a. To increase taxes
   b. To avoid accurate costing
   c. To handle unexpected expenses or changes
   d. To reduce project scope

   Answer: c. To handle unexpected expenses or changes

4. Which drawing is considered 'ready for execution' at the site level?
   a. Concept sketch
   b. Client presentation layout
   c. GFC (Good for Construction) drawing
   d. Mood board

   Answer: c. GFC (Good for Construction) drawing

Fill in the Blanks

1. The process of _____ helps in organizing tasks, assigning roles, and estimating time for furniture project activities.

   Answer: execution planning

2. In communication, using _____ and respectful tone helps maintain professionalism during client walkthroughs or vendor meetings.

   Answer: clear language

3. A _____ is used to calculate total cost by adding up quantities and rates of materials, labor, and transport.

   Answer: spreadsheet

4. _____ symbols and notations in technical drawings indicate the placement of hardware, alignment, or material specifications.

   Answer: Annotation

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. GFC Drawing	a. Tracks site progress and cost
2. Contingency Budget	b. Approved for actual execution
3. Work Schedule	c. Buffer for unexpected costs
4. Project Tracker	d. Sequence and timing of tasks

Answers: 1 - b, 2 - c, 3 - d, 4 - a

2. Match Column A with Column B correctly.

Column A	Column B
1. Bill of Quantities (BOQ)	a. Notes client requirements and quality
2. Client Brief	b. Total of all project expenses
3. Cost Estimate	c. List of items with quantities and rates
4. Communication Log	d. Written record of site instructions

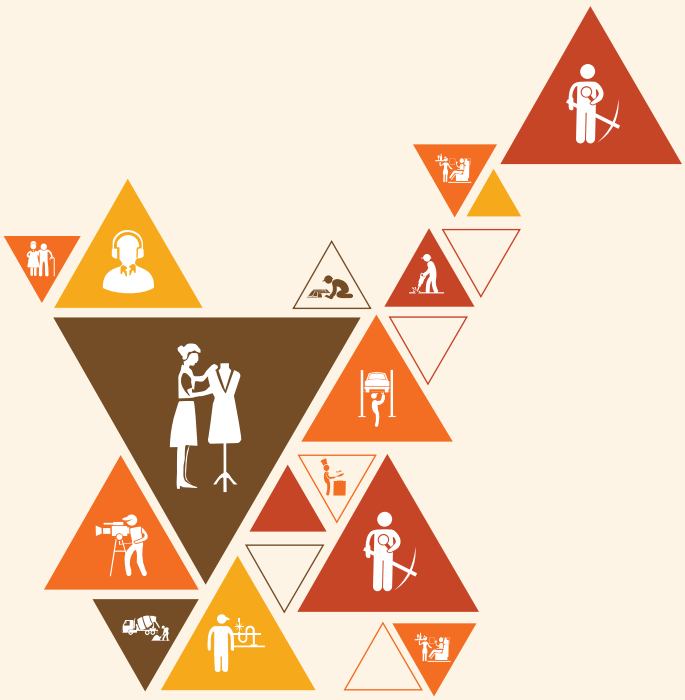
Answers: 1 - c, 2 - a, 3 - b, 4 - d

6. Site Survey and Pre-Execution Planning

Unit 6.1: Process of Site Survey and Recce as per Project Requirement

Unit 6.2: Technical Infrastructure, Logistics, and Material Planning

Unit 6.3: Measurement, Marking, and Survey Documentation



Key Learning Outcomes

At the end of this module, participants will be able to:

1. List the key preparatory steps to be taken before starting a site survey, such as tool readiness, checklist preparation, and access permissions.
2. Describe how to conduct a structured site recce by walking through all relevant areas, noting obstructions, floor levels, access points, and environmental conditions.
3. Differentiate between an initial site visit and a formal site survey in terms of depth of observation, data collected, and outcomes produced.
4. Explain why site surveys are critical for identifying feasibility, ensuring correct measurements, planning accurate layouts, and reducing rework.
5. List common site challenges like uneven floors, unfinished walls, electrical or plumbing overlaps, and explain how early identification during survey prevents delays.
6. Record site dimensions, notes, and observations clearly in site notebooks, pre-formatted survey sheets, or mobile devices with geotagging.
7. Take photographs or make basic sketches during site recce to visually communicate obstacles, special conditions, or design conflicts to the team.
8. List basic infrastructure requirements for furniture and interior works such as power sockets, material stacking zones, dry work areas, and access to sanitation.
9. Describe how to evaluate site ventilation, lighting, and dust conditions to plan safer and more efficient work routines.
10. Explain how material movement should be planned by considering elevator/lift access, entry size, staircase restrictions, and hoisting needs.
11. Create a simple flowchart showing how raw materials and ready components should be unloaded, moved, and stored at different stages.
12. Use measurement tools such as measuring tapes, steel rulers, laser distance meters, and water levels with proper technique and safety.
13. Convert physical site measurements into structured records such as site sheets, survey registers, or digital formats.
14. Interpret basic layout drawings to understand boundary lines, marked zones, dimensions, and fitment references.
15. Translate drawing markings to on-site references by using chalk lines, masking tapes, or markers to prepare for carpentry installations.
16. Develop and complete a survey measurement sheet that includes wall dimensions, floor levels, utility positions, and fit-out clearance zones.
17. Draw a rough site sketch showing measurements, obstacle locations, and partitioning areas to assist during material cutting and job execution.

Unit 6.1: Process of Site Survey and Recce as per Project Requirement

Unit Objectives

At the end of this unit, participants will be able to:

1. Describe the standard steps involved in conducting a professional site survey and recce.
2. Identify reasons why site surveys are conducted before fabrication and installation work begins.
3. Document site observations accurately to support planning, feasibility, and layout design.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the step-by-step process of conducting a site survey and recce as per project requirements. Participants will learn why surveys are essential before starting fabrication or installation work, how to record observations accurately, and how these inputs help in layout planning, feasibility checks, and smooth execution. The unit highlights both the technical and practical aspects of professional site surveys in carpentry and fit-out work.

Ask

Ask the participants the following questions:

- Why is it important to visit the site before starting furniture installation work?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Process of Site Survey and Recce as per Project Requirement

Conducting a site survey and recce is an essential first step in ensuring a furniture installation project is both practical and accurate. It allows the team to assess the actual conditions of the site, verify alignment with the design, and prepare for smooth execution. Below are the main components of this process explained in descriptive points:

1. **Describe the Standard Steps Involved in Conducting a Professional Site Survey and Recce**

- **Pre-visit Planning**

  Before visiting the site, the team carefully studies project-related documents such as furniture layouts, floor plans, elevation drawings, and client briefs. This helps them understand the scope, requirements, and any critical measurements that need verification.

- **On-Site Structural Assessment**

  During the site visit, the team inspects the structure for beams, columns, offsets, or alcoves that may influence the design or installation process. These are carefully noted, and exact measurements are taken.

- **Detailed Measurement and Verification**

  Room dimensions like width, height, and diagonal distances are measured precisely. Additional factors such as ceiling height variations, floor slopes, or wall irregularities are also assessed.

- **Evaluation of Access Points and Delivery Routes**

  The team checks whether furniture components can be transported through lifts, stairwells, doorways, or hallways. Any obstructions or size constraints are noted to avoid delivery delays or material damage.

- **Inspection of Service Points**

  Important utility connections such as electrical outlets, plumbing lines, HVAC vents, and false ceiling supports are located. Their positions are cross-checked against design plans to ensure there are no conflicts.

- **Finish Material Observation**

  The type of flooring, wall textures, ceiling finish, and lighting conditions are examined. This helps in matching the furniture material, edge finishes, or anchoring methods.

- **Site Documentation**

  All data is recorded through manual sketches, photographs, and digital apps. Markings are made directly on drawings or images, and the team prepares notes highlighting any issues or unusual conditions.

2. **Identify Reasons Why Site Surveys Are Conducted Before Fabrication and Installation Work Begins**

- **Ensure Measurement Accuracy**

  Surveys allow the team to take actual on-site measurements that help validate or adjust factory designs. This prevents misfits and reduces costly rework during installation.

- **Assess Feasibility of Design**

  The team confirms whether the intended design elements will actually fit within the physical space. For example, a planned wardrobe might not fit if the ceiling is lower than expected, or there's a beam in the way.

- **Identify Risks or Constraints**

  Potential issues like uneven floors, water seepage, damp walls, or obstructed ventilation points are detected early. These can be flagged for repair or adjustment in planning.

- **Plan Work Sequence and Logistics**

  Based on site conditions, the team can decide how and when different tasks will be carried out. This includes determining where to unload and store materials, how to bring them to the workspace, and what tools are needed.

- **Avoid Site Coordination Conflicts**

  When electricians, plumbers, or ceiling workers are active on-site, a survey helps ensure work is properly coordinated. It prevents overlaps that could lead to delays or damage.

3. **Document Site Observations Accurately to Support Planning, Feasibility, and Layout Design**

- **Use of Visual Tools and Technology**

  Digital tools like mobile survey apps, site capture software, or simple smartphone photos help in recording detailed conditions. These tools reduce manual errors and provide clear reference visuals.

- **Clear and Consistent Notes**

  Survey sheets should include room-by-room measurements, surface quality notes, obstacle markings, and electrical or plumbing point locations. Consistency in format ensures the data is understandable across teams.

- **Add Contextual Information**

  Each observation record should mention the date, time, site location, name of surveyors, and weather or lighting conditions if relevant. This helps trace decisions or issues later during execution.

- **Support for Team Coordination and Accuracy**

  Well-documented surveys are essential for carpenters, designers, and supervisors to base their work on reliable, real-world data. It minimizes mistakes like incorrect cutting, misalignment, or ordering the wrong materials.

- **Enhances Client Confidence and Approval**

  Proper documentation also allows the team to present findings and suggestions to the client. In case of layout changes or product redesigns, the data serves as justification for approvals or variation orders.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Conducting a Site Survey and Recce for a Furniture Installation Project

Group Size: 4–6 participants

Materials Needed:

- Whiteboard or flipchart
- Markers
- Clipboards, measuring tapes or rulers
- Sticky notes
- Scenario cards (examples provided below)

Activity Duration: 60 minutes

Instructions:

1. **Briefing**

   Start by reviewing:

   - The purpose and steps of a professional site survey
   - Key elements to observe (access points, finishes, utilities)
   - Importance of accurate documentation

2. **Scenario Distribution**

   Give each group a site survey scenario card with a realistic challenge related to a furniture installation project.

3. **Group Discussion & Planning**

   Groups should analyse the scenario and discuss:

   - What must be observed and measured at the site?
   - What challenges could arise due to site conditions?
   - What documentation (drawings, notes, photos) would be needed?

   Each group writes their findings and suggested planning steps on a chart or board.

4. **Group Presentations**

   Groups present their scenario, observations, and recommendations to the class. Other groups may ask questions or add suggestions.

5. **Debrief and Takeaways**

   Facilitator wraps up the activity by discussing:

   - How a good site survey improves planning accuracy
   - Common issues that can be prevented
   - Importance of team coordination and documentation

Examples of Scenario Card

Scenario 1

A staircase is too narrow and there is no elevator to carry large furniture to the 2nd floor. The layout includes big wall cabinets for that floor.

Scenario 2

The site has newly installed glass partitions which are not reflected in the layout drawing. Some units were planned along those walls.

Scenario 3

The site has an uneven floor and slight slope that could affect wardrobe alignment.

Activity	Duration	Resources used
Conducting a Site Survey and Recce for a Furniture Installation Project	60 minutes	Whiteboard or flipchart, Markers, Clipboards, measuring tapes or rulers, Sticky notes, Scenario cards (examples provided below) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Brief groups quickly about what a good survey should capture.
- Encourage them to prioritize clarity and site-specific risk identification.
- Remind participants that documentation is as important as observation.

Unit 6.2: Technical Infrastructure, Logistics, and Material Planning

Unit Objectives

At the end of this unit, participants will be able to:

1. List essential site infrastructure needs including power access, ventilation, work zones, and unloading paths.
2. Describe how to plan material movement and worker flow based on site access and layout.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential technical infrastructure and logistics required for smooth on-site furniture installation. This includes planning for power access, ventilation, work zones, and safe material unloading paths. Participants will also learn how to organize material movement and worker flow based on the site layout and access points, ensuring efficient and safe operations during project execution.

Ask

Ask the participants the following questions:

- Why is it important to check for power supply and clear pathways before starting furniture installation work on a site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Technical Infrastructure, Logistics, and Material Planning

Technical Infrastructure, Logistics, and Material Planning play a vital role in the successful execution of on-site carpentry and furniture installation projects. These elements ensure that the workspace is functional, materials are handled efficiently, and activities are carried out safely without delays or clashes.

1. **List essential site infrastructure needs including power access, ventilation, work zones, and unloading paths**
    - **Power Access**

      Ensure there are adequate power points or connections available for tools, equipment, and lighting. Temporary power supply setups may be needed if permanent lines are unavailable during early stages.
    - **Ventilation**

      Good air circulation is necessary, especially during activities like sanding, cutting, or finishing that release dust or fumes. Natural ventilation or exhaust systems should be assessed before work begins.
    - **Defined Work Zones**

      Clearly marked work areas help avoid overlaps between tasks like cutting, assembly, or polishing. This also ensures safety and smoother task coordination among teams.
    - **Unloading and Material Handling Paths**

      Safe, wide, and obstacle-free paths should be identified for unloading and shifting materials. These paths should minimize travel distance and avoid disturbing completed work or other trades on-site.

2. **Describe how to plan material movement and worker flow based on site access and layout**
    - **Entry and Exit Planning**

      Assess where workers and materials will enter and exit. Narrow entries or shared access points with other contractors should be considered to avoid congestion.
    - **Zoning of Activities**

      Plan the site layout so that movement of materials (e.g., plywood sheets, tools, hardware) does not interrupt ongoing work. Heavy or large items should be stored near their area of use.
    - **Staging and Storage Areas**

      Allocate temporary storage for raw materials and completed components in dry, accessible areas. This helps protect materials and ensures smoother workflow.
    - **Worker Flow Management**

      Organize tasks so that multiple teams (e.g., electricians, carpenters) can work in parallel without clashing. Routes for movement within the site should be pre-defined for efficiency and safety.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning Site Infrastructure and Logistics for a Furniture Installation Project

Group Size: 4–6 participants

Materials Required:

- Flipchart or A3 sheets
- Markers
- Sample site layout (printed or projected)
- Stickers or coloured post its to mark zones and paths

Activity Duration: 45–60 minutes

Activity Instructions

1. **Briefing**

   Introduce participants to a sample site layout (e.g., an apartment, office floor, or retail store layout). Provide a basic project brief — for example, "Install modular kitchen cabinets and wardrobes on-site."

2. **Planning in Groups**

   Each group must review the layout and plan the following:

   - Where will power access and temporary lighting be arranged?
   - Which areas will serve as work zones and storage/unloading points?
   - What route will be used to bring materials from the unloading point to the installation area?
   - How will worker movement be organized to avoid clashes or hazards?

   Groups must draw their plan on the sheet, marking zones, routes, and infrastructure clearly.

3. **Presentation & Discussion**

   Each group presents their site plan and explains their decisions. Discuss the differences between group approaches and how safety and efficiency were considered.

Activity	Duration	Resources used
Planning Site Infrastructure and Logistics for a Furniture Installation Project	45-60 minutes	Flipchart or A3 sheets, Markers, Sample site layout (printed or projected), Stickers or coloured post its to mark zones and paths etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage groups to consider real-world issues like staircase width, lift size, or limited ventilation.
- Ensure all teams think about minimizing material damage and worker fatigue through efficient layout planning.
- Use the sample layout to simulate practical problem-solving around actual site constraints.

Unit 6.3: Measurement, Marking, and Survey Documentation

Unit Objectives

At the end of this unit, participants will be able to:

1. Measure site dimensions using tapes, laser tools, and levels and record them in structured formats.
2. Interpret layout drawings and mark worksite areas accordingly for accurate installation preparation.
3. Prepare a complete measurement sheet and basic sketch layout to assist in execution planning.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to accurately measure site dimensions, mark installation zones, and prepare proper documentation to support execution planning. Participants will explore the use of tools like tape measures, laser meters, and levels, along with basic techniques for interpreting layout drawings and recording site information. This unit helps ensure that furniture installation is carried out with precision and coordination.

Ask

Ask the participants the following questions:

- Why is it important to measure and mark the site before installing any furniture?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Measurement, Marking, and Survey Documentation

In this session, we will study how to take precise site measurements, interpret layout drawings, and create accurate marking and documentation required for installation and execution planning. Understanding these skills ensures that every component fits correctly and aligns with the design intent. Accurate survey records also help avoid rework, improve communication, and guide both planning and fabrication teams efficiently.

1. **Measure site dimensions using tapes, laser tools, and levels and record them in structured formats**
   a. **Select appropriate measuring tools**
      - Use tape measures for small distances and tight spaces.
      - Employ laser distance meters for long spans or to quickly measure room dimensions.
      - Use spirit levels and plumb bobs to check verticality and level surfaces.

   b. **Identify measurement areas**
      - Measure wall-to-wall dimensions for each room.
      - Note ceiling heights, floor levels, and door/window placements.
      - Identify utility points like plug sockets, water lines, and ducts.

   c. **Record systematically**
      - Enter values in a measurement sheet with proper labels (e.g., Length of North Wall – 4050 mm).
      - Mention units, tools used, and any unusual observations (e.g., wall slope or bulge).
      - Use site photos and attach them with annotations for visual clarity.

2. **Interpret layout drawings and mark worksite areas accordingly for accurate installation preparation**
   a. **Understand layout drawings**
      - Read architectural or interior layout plans and understand symbols, legends, and dimensions.
      - Match site measurements with drawing references to confirm alignment.
      - Identify zones for furniture, fittings, and service points (e.g., sink, electrical sockets).

   b. **Plan marking sequence**
      - Decide where to begin marking—typically from a fixed datum line (e.g., a corner wall).
      - Use chalk lines, masking tape, or laser markers for precision.
      - Ensure markings are visible and do not damage finished surfaces.

   c. **Mark accurately on-site**
      - Mark the footprint of furniture items (e.g., base of a wardrobe or TV panel).
      - Indicate centrelines for alignment and vertical guidelines for tall units.
      - Highlight any interference zones or adjustment areas.

3. **Prepare a complete measurement sheet and basic sketch layout to assist in execution planning**
   a. **Compile a complete measurement sheet:**
      - Organize data room-wise or area-wise.
      - Include measurements, notes on obstructions, and material requirements if known.
      - Add observer's name, date, time, and tool calibration status (if applicable).
   b. **Create a basic sketch layout**
      - Draw a top-view plan of the space with scaled proportions.
      - Show doors, windows, fixed furniture, and noted measurements.
      - Add annotation arrows, dimensions, and symbols (e.g., sockets, plumbing lines).
   c. **Use the documentation for planning**
      - Share documents with designers, vendors, and execution teams.
      - Update drawings in case of site modifications or client changes.
      - Ensure drawings and measurements are used to finalize fabrication plans, cutting lists, and installation schedules.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Practicing Measurement and Layout Marking

Group Size: 4–6 participants per group

Materials Needed:

- Measuring tapes or laser distance meters
- Spirit levels
- Chart paper or printed layout drawings
- Markers, pencils, masking tape
- Blank measurement sheets on clipboards

Activity Duration: 60 minutes

Activity Instructions

1. **Create a Practice Are**

   Use an open space to mark boundaries on the floor (with masking tape or chalk) to represent walls and fixtures based on a sample layout.

2. **Team Task – Measurement and Marking**

   Each group will:

   - Take measurements of the marked area using tapes or laser tools.
   - Identify and mark key positions for items like cabinets, partitions, or fittings based on the drawing.
   - Use levels to ensure horizontal markings are aligned and straight.
   - Record all data on a measurement sheet and prepare a basic top-view sketch of the layout.

3. **Group Sharing**

   Each group presents their process and explains how their measurements and markings will help during actual installation.

Activity	Duration	Resources used
Practicing Measurement and Layout Marking	60 minutes	Measuring tapes or laser distance meters, Spirit levels, Chart paper or printed layout drawings, Markers, pencils, masking tape, Blank measurement sheets on clipboards etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Prepare a simple sample layout with basic furniture placement to guide marking.
- Ensure participants handle measurement tools properly and double-check values.
- Highlight how small errors in measurement can lead to major fitment issues on-site.

Exercise

Multiple Choice Questions (MCQs)

1. What is the main purpose of conducting a site survey before starting installation work?
   a. To train workers
   b. To take photographs for advertising
   c. To check feasibility, record accurate measurements, and reduce rework
   d. To test materials on site

   Answer: c. To check feasibility, record accurate measurements, and reduce rework

2. Which of the following is a key difference between an initial site visit and a formal site survey?
   a. Initial visit includes detailed measurements
   b. Survey involves deeper observation and documentation
   c. Initial visit requires marking tools
   d. Survey is done only after project is complete

   Answer: b. Survey involves deeper observation and documentation

3. What tool is used for checking floor level differences during a site recce?
   a. Measuring tape
   b. Screwdriver
   c. Spirit level or water level
   d. Hammer

   Answer: c. Spirit level or water level

4. What should be done if the team identifies damp walls or plumbing overlaps during a site survey?
   a. Ignore and proceed
   b. Stop the project permanently
   c. Record and report the issues to avoid delays
   d. Start painting the wall

   Answer: c. Record and report the issues to avoid delays

Fill in the Blanks

1. A _____ checklist helps ensure all important areas are reviewed during the site survey.

   Answer: pre-survey

2. Measurements must be recorded clearly using _____ sheets or mobile apps.

   Answer: survey

3. Power access, ventilation, and sanitation are part of the basic site _____ requirements.

   Answer: infrastructure

4. Marking layout lines on-site can be done using chalk, _____ tape, or colored markers.

   Answer: masking

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Floor Level Check	a. Planning movement based on stair/lift access
2. Material Logistics	b. Noting site issues like unfinished walls or overlaps
3. Site Constraints	c. Done using spirit levels or water levels
4. Layout Drawing	d. Used to understand zones and fitment placements

   Answers: 1 - c, 2 - a, 3 - b, 4 - d

2. Match Column A with Column B correctly.

Column A	Column B
1. Laser Distance Meter	a. Used to visually communicate obstacles or layout conflicts
2. Site Sketch	b. Helps identify boundary lines and installation zones
3. Photographic Documentation	c. Measures large distances quickly and accurately
4. Layout Drawing Interpretation	d. Rough drawing used to show measurements and special conditions

   Answers: 1 - c, 2 - d, 3 - a, 4 - b

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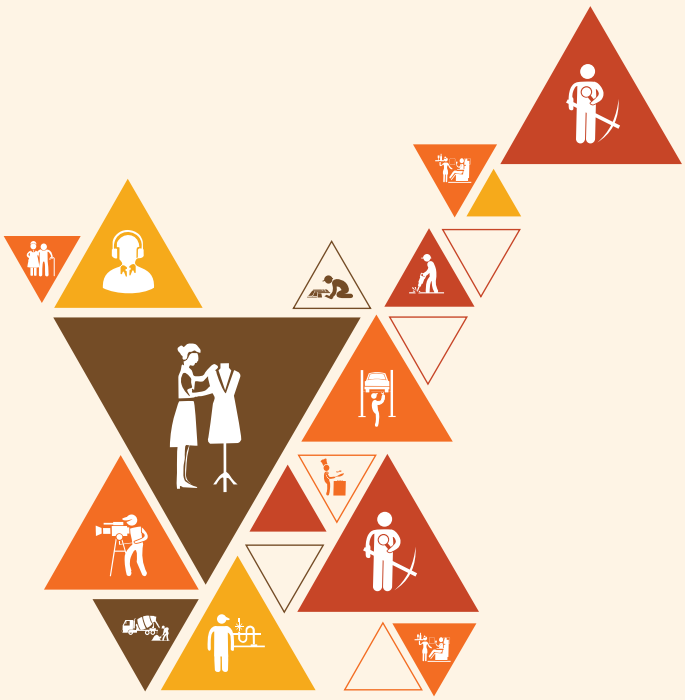
7. Quality Control, Ergonomics, and Team Supervision

Unit 7.1: Quality Control Procedures and Safety Practices
Unit 7.2: Ergonomic Standards and Furniture Specification Guidelines
Unit 7.3: Team Supervision, Task Allocation, and On-the-Job Training



Key Learning Outcomes

At the end of this module, participants will be able to:

1. List the key quality control parameters for furniture projects, including joint strength, surface evenness, symmetry, dimensional tolerance, and fit alignment.
2. Explain how finish quality is evaluated through tactile feel, surface smoothness, uniformity of polish or paint, and absence of glue marks or scratches.
3. Identify common signs of poor workmanship such as misaligned parts, open joints, rough edges, and loose hardware.
4. Perform physical quality checks during intermediate production stages using measurement tools like measuring tape, try square, and spirit level.
5. Carry out final inspections of fully assembled units using visual checks, opening and closing tests, weight checks, and stress assessments.
6. List the critical safety rules to follow when handling polished, sharp-edged, or heavy furniture parts to prevent injury or damage.
7. Demonstrate how to handle large or delicate components using gloves, corner protectors, and proper lifting techniques.
8. Use standardized reporting formats like inspection sheets or daily logs to record observations about quality defects or damage.
9. Describe the process of communicating quality issues to supervisors using verbal explanation, photographic evidence, and marked-up drawings.
10. Define ergonomic principles in furniture, including anthropometric data, posture alignment, access comfort, and motion efficiency.
11. Identify the impact of incorrect ergonomic proportions — such as seat height, backrest angle, or table width — on user comfort and safety.
12. Apply reference dimensions from standard ergonomic charts (e.g., seat height: 430–450 mm, table height: 740–760 mm) to evaluate existing or fabricated units.
13. Use basic measuring instruments like height gauges and angle finders to verify ergonomic compliance in finished furniture.
14. Divide project workloads based on team members' skill sets, physical capability, and familiarity with the task.
15. Create and communicate daily or weekly work plans that clearly outline task distribution, sequence, and deadlines.
16. Demonstrate methods for training junior staff on-site such as hands-on demonstration, supervised repetition, and guided tool handling.
17. Explain the importance of training continuity to improve team performance, reduce rework, and build skill consistency across workers.
18. Track the completion of tasks against job cards or project timelines using progress updates and work logs.
19. Identify signs of falling productivity (e.g., idle time, repeated mistakes, incomplete stages) and apply corrective measures.
20. Maintain daily records of task status and manpower productivity and escalate serious delays or performance issues.

Unit 7.1: Quality Control Procedures and Safety Practices

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify standard parameters to assess workmanship, finish quality, and structural fit in furniture projects.
2. Perform visual and physical quality checks during intermediate and final stages of product execution.
3. List mandatory site safety measures to be followed while inspecting or handling finished components.
4. Report any deviations or quality issues using appropriate formats and communication protocols.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential steps to ensure quality control and maintain safety on a furniture installation site. Participants will learn how to inspect workmanship, assess finishing, and verify structural fit. The unit also covers basic safety precautions to be followed during inspections and the correct way to report quality issues using structured formats and protocols.

Ask

Ask the participants the following questions:

- What is one thing you should check when inspecting a finished piece of furniture for quality?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Quality Control Procedures and Safety Practices

In furniture installation and execution, maintaining quality and safety standards is essential for ensuring client satisfaction and a safe work environment. Quality control helps ensure that workmanship, finishing, and fittings meet predefined standards, while safety practices prevent accidents and material damage during inspection and handling. This session explores how to identify, inspect, and report quality issues while following key safety protocols on-site.

1. **Identify standard parameters to assess workmanship, finish quality, and structural fit in furniture projects**
    - **Workmanship Accuracy**

      Assess the precision of how components are fabricated and assembled. This includes checking for clean, straight cuts, well-fitted joints, and consistent alignment across all pieces. Accurate workmanship ensures the furniture functions correctly and maintains visual symmetry.
    - **Finish Quality**

      Inspect the surface of furniture elements such as panels, edges, and visible joints. A high-quality finish is smooth to touch, evenly applied (whether it's paint, laminate, or polish), and free from common defects like streaks, patches, air bubbles, or blotchy areas.
    - **Structural Stability**

      Evaluate the sturdiness of the furniture once assembled. Check for any wobble or imbalance. Ensure that connectors like screws, dowels, and brackets are properly fixed and that the frame can withstand normal usage without stress or noise.
    - **Functional Fitment**

      Ensure that operational parts such as doors, drawers, and hinges open and close smoothly, without misalignment or friction. The fitment should reflect the design specifications and not require forceful handling or readjustment.
2. **Perform visual and physical quality checks during intermediate and final stages of product execution**
    - **Intermediate Stage Checks**

      While the product is under assembly or installation, carry out checks to identify errors early. This may include verifying screw placement, alignment of edges, and initial fit of carcasses or frames. Catching mistakes early prevents expensive rework later.
    - **Physical Testing**

      Gently apply pressure to joints and mounted components to assess their load-bearing capacity and stability. This helps in identifying weak connections or areas that need reinforcement before final fixings are completed.
    - **Final Stage Checks**

      At the end of the job, conduct a comprehensive visual inspection. This includes verifying surface cleanliness, uniformity of colour, and that no tool marks, glue spills, or scratches remain on visible parts. It also involves checking dimensions and position against the plan.

- **Client Specification Verification**

  Cross-check the final installation with client-approved designs or samples. Confirm that the dimensions, materials, colours, and hardware used match what was committed during the design approval stage.

3. **List mandatory site safety measures to be followed while inspecting or handling finished components**

   - **Use of Personal Protective Equipment (PPE)**

     Always wear appropriate safety gear such as gloves to avoid splinters or scratches, safety shoes to prevent injuries from dropped tools or panels, and dust masks if final finishing is still ongoing nearby.

   - **Safe Handling and Movement**

     When moving large or heavy furniture items, use correct body posture or seek help from team members to avoid strain or accidents. Dragging furniture should be avoided as it may damage both the product and flooring.

   - **Organized Inspection Area**

     Make sure the area where final checks are conducted is free of clutter, wet patches, or sharp tools. Good lighting and open space allow for better inspection and reduce the chance of injury or oversight.

   - **Tool Safety**

     If tools are being used during final adjustments, ensure they are handled carefully and stored securely after use. Sharp tools like cutters or drills should never be left on top of finished furniture or in walking paths.

4. **Report any deviations or quality issues using appropriate formats and communication protocols**

   - **Issue Identification and Documentation**

     When a defect is found—such as a dent, misalignment, or faulty hardware—clearly document it by noting the exact location, the type of problem, and what part it affects. Be precise and objective**.**

   - **Visual Evidence**

     Support your report with photographs showing the defect clearly. This helps in explaining the issue to supervisors or the quality assurance team and may be used for record-keeping or escalation.

   - **Standard Reporting Formats**

     Use predefined formats like quality checklists, defect logs, or digital inspection forms to submit your findings. These tools help ensure consistency in reporting and make it easier to track and resolve issues.

   - **Timely Communication**

     Share the deviation report with relevant stakeholders (site supervisor, project manager, or quality head) as soon as it is identified. Prompt reporting helps avoid delays and ensures corrective actions are taken before handover.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Managing Quality and Safety During a Furniture Installation Project

Group Size: 4–6 participants

Materials:

- Flipchart or whiteboard
- Markers
- Sticky notes (in two colours: one for quality, one for safety)
- Scenario cards (see examples below)
- Sample quality checklist (optional)

Activity Duration: 60 minutes

Instructions:

Step 1: Introduction

Begin by briefly discussing:

- Common quality control parameters (surface finish, alignment, screw placement, stability)
- Importance of following safety procedures (PPE, secure handling, clear pathways)
- Typical reporting methods for defects and incidents

Explain that each group will receive a scenario related to quality or safety challenges during an ongoing furniture installation project.

Step 2: Group Analysis & Planning

Each group receives one scenario card.

Discussion Prompts:

- What is the main quality or safety issue described?
- How should the issue be inspected or verified on site?
- What immediate and long-term steps are needed to fix or prevent the issue?
- How should the issue be reported — and to whom?
- What site safety measures are important in this case?

Groups write their key points on the sticky notes and prepare a brief solution plan.

Step 3: Group Presentations

Each group presents their scenario and solution strategy. Other groups may ask questions or suggest alternate approaches.

Step 4: Debriefing and Key Takeaways

Facilitator summarizes:

- Common issues identified and methods to resolve them
- Importance of timely reporting and communication
- Link between safety, quality, and project success

Examples of Scenario Cards

Scenario 1

While inspecting the modular cabinet units on site, you notice that the edge bands on some panels are slightly peeling. How would you document this defect? What is your response plan to maintain quality standards before the final handover?

Scenario 2

During unloading of heavy countertops, a worker trips on a cable that wasn't secured. The worker is unharmed, but the situation could have been serious. How do you address the safety lapse? What actions would you take immediately and going forward?

Scenario 3

A client flags that the laminate finish on some panels looks patchy under light. Your team insists it was checked during dispatch. How do you handle this quality issue on-site while keeping a professional communication approach?

Activity	Duration	Resources used
Managing Quality and Safety During a Furniture Installation Project	60 minutes	Common quality control parameters (surface finish, alignment, screw placement, stability)Importance of following safety procedures (PPE, secure handling, clear pathways) Typical reporting methods for defects and incidents etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Provide Support Materials**

  Share sample inspection formats, reporting templates, and quick safety guidelines to help teams think practically.

- **Encourage Realistic Reasoning**

  Emphasize balancing on-site challenges with practical and professional problem-solving.

- **Highlight Reporting Skills**

  Reinforce how documentation and escalation help maintain both quality and safety standards.

Unit 7.2: Ergonomic Standards and Furniture Specification Guidelines

Unit Objectives

At the end of this unit, participants will be able to:

1. Define ergonomic factors that influence furniture design for comfort, safety, and functionality.
2. Apply ergonomic measurements and reference standards to check compliance of seating, tables, and beds.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the importance of ergonomic standards in designing furniture that is comfortable, safe, and suitable for everyday use. The unit will explain how body posture, movement, and dimensions influence furniture design. Participants will also learn how to apply standard measurements and guidelines to assess chairs, tables, and beds for ergonomic compliance. This helps ensure better usability and health outcomes for end users.

Ask

Ask the participants the following questions:

- What does the term “ergonomics” mean in furniture design?

Write down the participants’ answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Ergonomic Standards and Furniture Specification Guidelines

Ergonomic standards help ensure that furniture is designed for user comfort, safety, and efficiency. By following these guidelines, furniture can support correct posture, reduce strain on the body, and improve overall user well-being. Understanding and applying ergonomic principles is essential for checking whether seating, tables, and beds meet the required specifications for different user needs and settings.

1. **Define ergonomic factors that influence furniture design for comfort, safety, and functionality**

   Comfort-Centric Design

   - Ergonomic furniture aligns with the body's natural posture and movements.
   - Chairs should support the lumbar spine and allow feet to rest flat on the ground.
   - Proper seat depth and height help maintain neutral body alignment.
   - Comfortable design reduces fatigue during prolonged sitting or working.

   Safety Considerations

   - Poor posture caused by non-ergonomic furniture can lead to long-term physical strain.
   - Safety in furniture means preventing pressure points and awkward movements.
   - Ergonomic design helps avoid repetitive stress injuries or musculoskeletal problems.
   - Balanced support ensures users don't lean or slump into unsafe positions.

   Functional Utility

   - Furniture must support task-based usage without causing discomfort or inefficiency.
   - A desk should allow easy reach to materials without unnecessary twisting or bending.
   - Well-designed furniture increases work productivity and minimizes effort.
   - Features like swivel bases or tilt mechanisms contribute to function.

   Adaptability to User Variability

   - Ergonomic furniture must accommodate users of varying sizes and physical needs.
   - Adjustable features like seat height, armrest angle, or backrest position are essential.
   - Versatile design ensures inclusive use in public or shared spaces.
   - Customizability enhances user satisfaction and long-term comfort.

2. **Apply ergonomic measurements and reference standards to check compliance of seating, tables, and beds**

   Understanding Measurement Standards

   - Ergonomic dimensions are defined by standards such as BIS and ISO.
   - For example, standard seat height is typically around 430–460 mm for adults.
   - These benchmarks ensure the furniture suits common postures and movements.
   - Reference standards are based on anthropometric (human body) data.

Tools for Ergonomic Measurement

- Measuring tapes and steel rulers are used for basic dimension checks.
- Inclinometers help measure angles in chairs or beds.
- Laser distance meters may be used for precise assessments in larger furniture.
- Gauges ensure components meet consistent specifications.

Furniture Categories and Key Parameters

- **Seating:** Assessed for backrest height, lumbar support, armrest angle, and tilt.
- **Tables:** Checked for working surface height, knee clearance, and edge design.
- **Beds:** Evaluated for base elevation, mattress firmness, and support distribution.
- Each type has different ergonomic focus areas, depending on usage.

Ensuring Ergonomic Compliance

- Site or factory inspections involve comparing product dimensions with standards.
- Any mismatch requires modification or redesign before approval.
- Documentation of compliance helps maintain quality benchmarks.
- Periodic audits ensure products remain user-safe and efficient.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Evaluating Furniture for Ergonomic Suitability

Group Size: 4–5 participants

Materials Required:

- Measuring tapes or scales
- Sample chairs, tables, or images/drawings of furniture
- Standard ergonomic reference chart (for seating height, backrest angle, table height, etc.)
- Worksheets for recording observations
- Pencils or pens

Activity Duration: 45–60 minutes

Activity Instructions

1. **Introduction**

   Briefly explain what ergonomics means and show participants a sample ergonomic chart with standard measurements for chairs, desks, and beds.

2. **Group Evaluation**

   Each group selects a piece of furniture (real or in image/drawing form). Using measuring tapes and the ergonomic chart, they will:

   - Measure seat height, depth, and backrest angle (for chairs) or height and width (for tables/beds).
   - Compare these with standard ergonomic values.
   - Discuss whether the furniture is comfortable, safe, and suitable for use over long periods.
   - Note any recommended improvements for better ergonomics.

3. **Presentation**

   Each group presents their findings to the class, explaining whether the furniture item meets ergonomic standards and how it can be improved.

Activity	Duration	Resources used
Evaluating Furniture for Ergonomic Suitability	5–60 minutes	Measuring tapes or scales Sample chairs, tables, or images/drawings of furniture Standard ergonomic reference chart (for seating height, backrest angle, table height, etc.) Worksheets for recording observations Pencils or pens etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage hands-on interaction**

  Allow participants to sit on or touch furniture (if available) to physically assess comfort and usability.

- **Support with visuals**

  Provide printed ergonomic measurement charts and sample sketches to make comparisons easier.

- **Promote discussion**

  Ask guiding questions like “How might poor ergonomics affect daily users?” or “What design changes would you suggest?”

Unit 7.3: Team Supervision, Task Allocation, and On-the-Job Training

Unit Objectives

At the end of this unit, participants will be able to:

1. Plan and assign daily or weekly tasks to team members as per skill levels and job requirements.
2. Demonstrate techniques to train junior workers while maintaining pace and safety on site.
3. Monitor productivity and ensure assigned work is completed as per job card timelines.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to effectively supervise a furniture installation team by planning daily tasks, assigning work based on skill levels, and ensuring timely execution. The unit also covers simple methods to train junior workers while maintaining site safety and productivity. Participants will learn how to monitor task completion using job cards and how to handle on-site coordination efficiently.

Ask

Ask the participants the following questions:

- What is the role of a supervisor in managing day-to-day work at a furniture installation site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Team Supervision, Task Allocation, and On-the-Job Training

This topic is essential for ensuring that furniture or interior project runs smoothly. Proper team supervision ensures that all workers know their roles, receive guidance, and complete their tasks safely and efficiently. It also involves training less-experienced workers while maintaining the pace of the project.

1. **Plan and assign daily or weekly tasks to team members as per skill levels and job requirements**
    - **Understanding team capabilities**

      A good supervisor observes and understands the specific strengths, weaknesses, and experience levels of each team member. For instance, an experienced carpenter may be assigned precision joinery tasks, while a fresher might be given simple sanding or component movement work. This ensures tasks are completed efficiently and with fewer errors.
    - **Breaking down job requirements**

      Every project involves multiple activities such as cutting panels, fixing hardware, polishing, and final fitting. These must be broken into manageable parts. Once divided, the supervisor matches each task with the person most suitable to perform it, balancing complexity and workload.
    - **Prioritizing work based on deadlines**

      Supervisors need to identify which tasks are time-sensitive or dependent on other work. For example, base unit installation must be done before countertop fitting. Planning must reflect these logical sequences to avoid bottlenecks or unnecessary downtime.
    - **Communicating assignments clearly**

      Team briefings should be held at the start of the day. Assignments should be explained in simple terms — either verbally, using sketches, or referencing site drawings. Clear communication avoids confusion, promotes ownership, and keeps everyone aligned with daily targets.
2. **Demonstrate techniques to train junior workers while maintaining pace and safety on site**
    - **Hands-on demonstration of tasks**

      Junior workers often learn best by observing. Supervisors or skilled workers should demonstrate the correct technique of using tools, assembling parts, or reading drawings. This live demonstration helps the junior worker understand what is expected and builds confidence.
    - **Allow supervised practice**

      Once a demonstration is given, the junior worker should repeat the task under guidance. For example, they may mark and cut a panel while the supervisor watches. Immediate feedback is given to correct technique, reduce material wastage, and improve safety.
    - **Promote safe working habits**

      Training is not just about speed or skill — safety is equally important. Supervisors must emphasize wearing gloves, safety glasses, proper lifting posture, and careful tool usage. Every lesson should include a reminder about safe practices.
    - **Balance learning with ongoing work**

      On-site training must not disrupt project timelines. A practical way is to assign juniors smaller, non-critical tasks that contribute to the main job. For example, helping in hardware counting or drilling under supervision allows them to learn without delaying work.

3. **Monitor productivity and ensure assigned work is completed as per job card timelines**

   - **Tracking task progress throughout the day**

     The supervisor must move around the site, check the status of each task, ask questions, and verify if the work is progressing according to plan. This helps detect any slowdowns early and take corrective actions, like reallocating workers or providing extra support.

   - **Using job cards or checklists**

     Job cards are formal tools that outline tasks, assigned workers, estimated time, and status. These help supervisors stay organized and give transparency to workers about their responsibilities.

   - **Identifying delays or errors early**

     Timely inspection helps catch problems such as incorrect fitting, missing measurements, or misaligned components before they escalate. Early corrections save time and avoid costly rework later.

   - **Maintaining records and coordination**

     The supervisor should keep notes of what was completed each day, what was pending, and whether the output met expected quality standards. This data is useful for progress meetings and for planning the next day's tasks effectively.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Task Planning and Supervision Drill

Group Size: 4–6 participants per group

Materials Required:

- Sample job card with furniture installation details (provided by facilitator)
- Skill profile sheets for mock team members
- Chart paper or whiteboard
- Markers or pens

Activity Duration: 45–60 minutes

Activity Instructions

1. **Introduction**

   Brief the participants about the roles of a site supervisor — task planning, worker allocation, on-the-job training, and progress monitoring.

2. **Group Planning**

   Each group is given:

   - A sample job card describing 2–3 days of work (e.g., cabinet installation, bed assembly, shelf filing).
   - Mock profiles of workers with different skill levels (e.g., experienced carpenter, junior helper, semi-skilled technician).

   Tasks for the group:

   - Break down the work into daily tasks.
   - Assign each task to appropriate workers based on skills.
   - Identify 1–2 training tasks where a senior can guide a junior.
   - Draw a simple chart showing supervision plan and daily progress checkpoints.

3. **Presentation & Feedback**

   Each group presents their task plan, team allocation, and how they will supervise and train juniors on-site.

Activity	Duration	Resources used
Task Planning and Supervision Drill	45–60 minutes	Sample job card with furniture installation details (provided by facilitator),Skill profile sheets for mock team members,Chart paper or whiteboard,Markers or pens etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Clarify Skill Matching**

  Explain how to assess which worker is suited for which task. Guide groups to avoid overloading one worker.

- **Promote Realism**

  Encourage participants to consider real site conditions—such as limited tools, shared workspace, or staggered material delivery.

- **Reinforce Safety & Training Balance**

  Remind participants that on-the-job training should not delay overall work or compromise site safety.

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following is NOT a common sign of poor workmanship in furniture?
   a. Misaligned parts
   b. Smooth surface finish
   c. Open joints
   d. Loose hardware

   Answer: b. Smooth surface finish

2. Which tool is commonly used to check right angles in furniture joints?
   a. Measuring tape
   b. Spirit level
   c. Try square
   d. Screwdriver

   Answer: c. Try square

3. What is the standard ergonomic seat height range for comfortable seating?
   a. 500–550 mm
   b. 430–450 mm
   c. 300–320 mm
   d. 700–720 mm

   Answer: b. 430–450 mm

4. Which of the following practices improves safety when handling heavy furniture?
   a. Wearing slippers
   b. Dragging items across the floor
   c. Lifting without bending knees
   d. Using gloves and proper lifting technique

   Answer: d. Using gloves and proper lifting technique

Fill in the Blanks

1. _____ protect furniture corners from damage during handling or transport.

   Answer: Corner protectors

2. Finish quality is evaluated by checking for surface smoothness, polish uniformity, and absence of _____ marks.

   Answer: Glue

3. Job cards are used to monitor progress and ensure work is completed within assigned _____.

   Answer: Timelines

4. Incorrect ergonomic design can negatively affect user _____ and safety.

   Answer: Comfort

Match the following

1. Match the Following – Set 1: Quality Checks

Column A	Column B
1. Surface evenness	a. Stress assessment
2. Joint strength	b. Spirit level
3. Symmetry check	c. Try square
4. Load bearing test	d. Visual alignment

   Answers: 1 - b, 2 - c, 3 - d, 4 - a

2. Match the Following – Set 2: Team Supervision

Column A	Column B
1. On-the-job training method	a. Progress tracking
2. Idle time and repeated errors	b. Signs of falling productivity
3. Daily work allocation	c. Task distribution plan
4. Work log	d. Supervised demonstration

   Answers: 1 -d, 2 - b, 3 - c, 4 - a.

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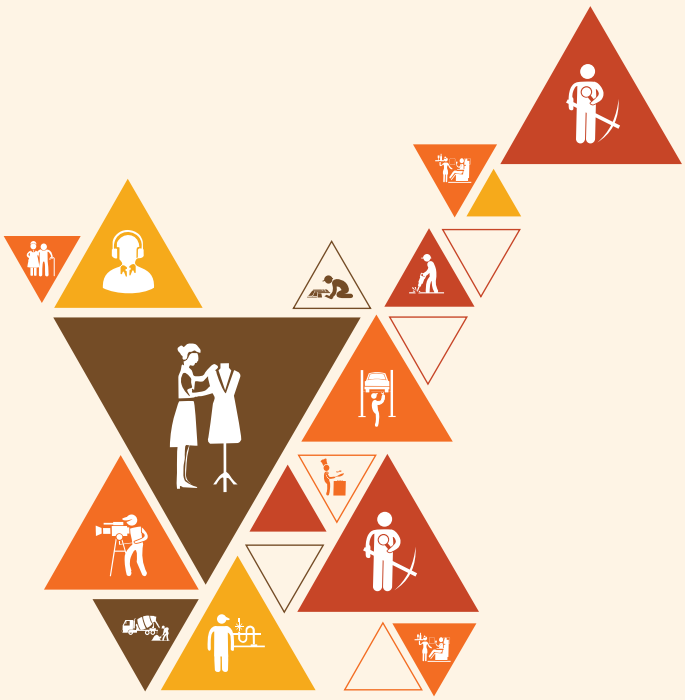
8. Project Execution and Resource Monitoring

Unit 8.1: Planning and Preparation for Project Execution
Unit 8.2: On-Site Execution and Documentation Practices
Unit 8.3: Resource Optimization, Reporting, and Productivity Monitoring



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Interpret various project execution documents such as job cards, timelines, site instructions, and dependency charts to understand scope and sequencing of tasks.
2. Describe the relationship between job card activities and resource deployment including manpower, equipment, and materials.
3. Explain how to read task dependencies and align activities such as carpentry, polishing, and hardware fitting without overlap or delays.
4. List different categories of tools and equipment required at various execution stages like framing, joining, surface finishing, and installation.
5. Identify specific material requirements for structural, surface, and hardware components of a carpentry project based on execution planning.
6. Carry out actual installation tasks as per project layout drawings, sectional views, and elevation markings to ensure accuracy and alignment.
7. Follow the design instructions and site references during positioning, fixing, and checking of furniture components.
8. Use standard procedures and safety practices during on-site operations including movement, lifting, fixing, and support staging.
9. Document work progress daily and weekly using site diary formats, job card updates, checklist tick-offs, or mobile-based documentation apps.
10. Track delivery of project components such as cabinets, shutters, hardware, or panels and confirm delivery notes against orders.
11. Perform physical checks for quantity, surface condition, and integrity of delivered components and report discrepancies immediately.
12. Record the usage of materials and tools using issue-return logs, consumption sheets, or tag-based systems.
13. Observe site practices to identify patterns of material wastage such as excessive off-cuts, repeated drilling errors, or misaligned hardware placement.
14. Identify inefficiencies in manpower usage such as idle time, repeated corrections, or unnecessary task duplication.
15. Explain how task-wise time monitoring and tool checklists help in controlling site execution efficiency.
16. Prepare progress updates including percentage completion, pending tasks, and daily achievements using structured formats or verbal briefings.
17. Fill out delay reports, fault registers, or issue logs in cases where progress is blocked due to materials, access, or coordination issues.
18. Suggest ways to improve output by resequencing tasks, simplifying flow of work, or using alternate tools where needed.
19. Identify opportunities to save time or improve accuracy by reorganizing workspace, reducing unnecessary movements, or preparing tool sets in advance.

Unit 8.1: Planning and Preparation for Project Execution

Unit Objectives

At the end of this unit, participants will be able to:

1. Interpret project execution plans including job cards, schedules, and dependencies.
2. List the types of tools, equipment, and materials required for executing different stages of a carpentry project.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to understand and use project execution plans such as job cards, schedules, and task dependencies in carpentry projects. We will also explore how to identify and prepare the right tools, equipment, and materials for different stages of work. This unit helps learners build the foundation for organized, efficient, and error-free project execution on-site.

Ask

Ask the participants the following questions:

- What is the purpose of a job card in a carpentry project?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Planning and Preparation for Project Execution

Proper planning and preparation are the backbone of any successful carpentry or furniture installation project. This session focuses on understanding how to interpret project documentation and prepare the right tools and materials for each phase of execution.

1. **Interpret project execution plans including job cards, schedules, and dependencies**

   Understanding how to interpret project execution documents is essential for organizing work efficiently and avoiding confusion on-site.

   - **Job Cards as a Planning Too**

     Job cards are detailed instruction sheets that outline the specific task to be done, by whom, and within what time frame. They also mention the materials and tools required for each task. Workers and supervisors use job cards to plan their daily or weekly tasks, which ensures alignment with the broader project goals.

   - **Project Schedules and Timelines**

     Schedules are visual timelines that represent when different tasks need to start and finish. These schedules help track progress and keep the entire team aware of upcoming activities. It also helps in allocating resources without overloading any phase of work.

   - **Understanding Dependencies Between Tasks**

     In carpentry, certain tasks can only begin after others are finished. For example, panel cutting must be completed before edge banding or joining. Recognizing such task dependencies avoids delays, duplication of work, and improper sequencing. It ensures that each step supports the next in a smooth workflow.

2. **List the types of tools, equipment, and materials required for executing different stages of a carpentry project**

   Thorough preparation of resources is critical for uninterrupted and safe project execution.

   - **Tools for Different Project Phases**

     Various tools are required at different stages of the project. For example:

     - Layout Stage: Measuring tape, try square, pencils, chalk line
     - Cutting Stage: Hand saws, jigsaws, or circular saws
     - Assembly Stage: Clamps, screwdrivers, electric drills
     - Finishing Stage: Sandpaper, polishers, paintbrushes

   - **Types of Equipment and Accessories**

     Larger or motor-operated tools such as portable routers, vacuum machines, or laser markers may be used depending on the complexity of the project. Safety equipment such as gloves, helmets, and goggles must also be ready and in working condition.

   - **Selection and Readiness of Materials**

     Proper identification and selection of materials are important. These may include plywood boards, laminates, adhesives, fasteners (screws, nails), and edge bands. Ensuring the right quantity and specification in advance helps maintain quality and avoid delays.

- **Pre-execution Inspection**

  Before starting work, check that tools are not damaged, blades are sharp, batteries are charged (for cordless tools), and materials meet the required dimensions and quality. This inspection minimizes the risk of error or injury.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning and Preparation Challenges in Carpentry Projects

Group Size: 4–6 participants

Materials:

- Scenario cards
- Chart paper or flipchart
- Markers
- Sticky notes

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Begin with a short discussion on the importance of proper planning before starting a carpentry project. Emphasize how clear job cards, correct scheduling, and readiness of tools and materials help in smooth execution and reduce delays or rework.

2. **Distribute Scenario Cards**

   Each group receives a card describing a real-life planning or preparation issue commonly faced in carpentry projects. These situations are designed to highlight gaps in coordination, resource availability, or understanding of job plans.

3. **Group Discussion & Solution Planning**

   Groups should discuss their scenario using the following guiding questions:

   - What is the main planning or preparation issue in this case?
   - How might it affect workflow, deadlines, or material usage?
   - What practical steps can be taken to fix the issue?
   - How could better planning have prevented this situation?

4. **Presentations**

   Each group presents:

   - A brief overview of the issue
   - The impact it could have on project execution
   - Their proposed corrective measures and planning tips

5. **Class Discussion**

   Conclude with a group reflection session:

   - What were some common planning mistakes discussed?
   - Which solutions were the most practical and preventive?
   - How can each team member contribute to better preparation practices in future projects?

Examples of Scenario Cards

Scenario 1

A team starts assembling modular furniture, but the job card lacks dimension details. The supervisor is unavailable, and work is delayed. How could this planning issue have been avoided?

Scenario 2

On the first day of work, essential tools like measuring tape and drill bits are missing from the toolkit. What went wrong in the preparation phase, and how should the team ensure tool readiness?

Scenario 3

The team begins floor cabinet installation before completing the wall surface finish. They are now told to pause and shift tasks. What was overlooked in the planning, and how can sequencing be improved?

Activity	Duration	Resources used
Planning and Preparation Challenges in Carpentry Projects	45-60 minutes	Scenario cards, Chart paper or flipchart, Markers, Sticky notes etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage teams to identify both technical and communication-related planning gaps.
- Prompt learners to think about how they would personally check readiness before beginning work.
- Reinforce habits like reviewing job cards thoroughly, using packing checklists, and discussing timelines with supervisors in advance.

Unit 8.2: On-Site Execution and Documentation Practices

Unit Objectives

At the end of this unit, participants will be able to:

1. Execute installation tasks following approved project layout and design documents.
2. Record daily and weekly progress using appropriate documentation formats.
3. Perform operational checks and maintain records for project components delivered and installed.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to carry out furniture installation tasks on-site by following approved layout and design documents. We will also learn how to maintain daily and weekly work records, check the quality and correctness of installed components, and document materials delivered. These practices help ensure that the project runs smoothly, professionally, and meets the required standards.

Ask

Ask the participants the following questions:

- What documents should you check before starting installation work at a site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

On-Site Execution and Documentation Practices

In this session, we explore how to carry out carpentry and installation work on-site in an organized and professional manner. Emphasis is placed on following project layouts accurately, maintaining proper documentation of work progress, and performing essential checks to ensure quality and accountability throughout the execution process.

1. **Execute installation tasks following approved project layout and design documents**
    - **Follow official layout drawings carefully**

      Before starting any installation, the team must carefully study the layout drawings, which show the position, dimensions, orientation, and sequence of furniture components. These documents guide the exact location where each item must be placed and how they align with walls, floors, or other structures.
    - **Use accurate measurement and marking tools**

      It is essential to use tools like a measuring tape, spirit level, plumb bob, and chalk lines to mark reference points. These tools ensure that furniture is installed straight, level, and in the correct location as per the design.
    - **Ensure correct positioning and alignment**

      Each furniture piece must be fixed in place according to the design plan. This includes ensuring accurate spacing, levelling, and alignment so that the final output looks professional and functions as intended.
    - **Handle discrepancies with care**

      If something on-site doesn't match the layout drawing—for example, a wall is not straight or dimensions are off—workers must not proceed without clarifying with the supervisor. Acting without confirmation may result in costly rework.
    - **Avoid assumptions or improvisation**

      Workers should strictly follow the design specifications. Avoid relying on guesswork or shortcuts, as these can lead to errors in alignment, gaps, or product damage.

2. **Record daily and weekly progress using appropriate documentation formats**
    - **Maintain daily work logs**

      Each day, workers or team leaders should document the specific activities completed—such as the number of cabinets fixed or panels installed. This helps track progress and accountability.
    - **Use proper documentation tools**

      Teams should use job cards, installation checklists, progress tracking sheets, or software apps that the project site uses. These formats are designed to maintain a standard method of recording work done.
    - **Monitor project timelines regularly**

      Compare actual daily and weekly work with the planned schedule to see if the project is on time or running late. This helps in adjusting manpower or workload if needed.

- **Note down any delays or issues**

  If there are interruptions like material shortages, bad weather, or team absences, these should be clearly noted in the log. This information is important for supervisors and client communication.

- **Submit reports to supervisors**

  The records should be shared at the end of each shift or week with the supervisor. This ensures transparency and allows project managers to plan the next steps based on actual progress.

3. **Perform operational checks and maintain records for project components delivered and installed**

- **Check components upon delivery**

  When furniture or fittings arrive at the site, verify that all items listed in the delivery challan are present. Check for any physical damage or missing parts before accepting the materials.

- **Ensure product specifications match the design**

  Before installation, ensure the delivered items match the approved design in terms of size, colour, finish, and material. Mismatches should be flagged immediately.

- **Conduct post-installation checks**

  After installation, perform functional checks—open and close drawers or doors, test the balance and alignment of installed pieces, and confirm fittings are tight and secure.

- **Identify and record quality issues**

  Any issues like scratches, loose fittings, misalignments, or missing parts should be clearly identified and documented with photos or notes. This helps in requesting repairs or replacements.

- **Fill checklists and defect logs**

  Use standard formats like furniture installation checklists or punch lists to document the status of each component. These documents ensure that all tasks are accounted for during handover or inspection.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Site Simulation: Plan, Install & Document

Group Size: 4–6 participants

Materials Needed:

- Sample layout/design drawings
- Sample job card or checklist
- Dummy progress report sheet
- Measuring tape, mock components (e.g., wooden blocks or labelled items)

- Pens, markers, chart paper

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Brief the participants on the importance of following layout drawings accurately and maintaining site documentation. Emphasize the role of quality checks and daily records in real-world installations.

2. **Scenario Assignment**

   Give each group a mock project scenario (e.g., installing a cabinet, table, or wall-mounted shelf) along with:

   - A layout plan
   - A list of components with labels
   - A blank job card and daily log sheet

3. **Task Simulation**

   Each group must:

   - Interpret the drawing and plan the mock installation on a table or wall space.
   - Record measurements or mock "installation progress" (simulated using labeled components).
   - Fill in a daily log or checklist for tasks completed, material received, and any deviations.

4. **Presentation**

   Each group presents:

   - How they read and followed the layout
   - Their documentation samples
   - Any issues they simulated and how they recorded or escalated them

5. **Debrief and Discussion**

   Discuss:

   - Why documentation is important in maintaining quality
   - What errors could occur without proper records
   - How this relates to real-life site responsibilities

Activity	Duration	Resources used
Group Activity: Site Simulation: Plan, Install & Document	45-60 minutes	Sample layout/design drawings, Sample job card or checklist, Dummy progress report sheet, Measuring tape, mock components (e.g., wooden blocks or labelled items), Pens, markers, chart paper etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Prepare simple but realistic layout samples with labelled dimensions and part placements to encourage practical thinking.
- Encourage accuracy and teamwork remind teams that correct interpretation and communication are critical on-site.
- Reinforce the use of proper documentation language and checking steps like measurement verification or material logging.

Unit 8.3: Resource Optimization, Reporting, and Productivity Monitoring

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify opportunities to reduce material wastage and optimize labor effort during on-site execution.
2. Explain how to monitor the usage of tools, consumables, and time for each major task.
3. Prepare and submit progress updates, delay reports, or issue logs to supervisors or clients.
4. Suggest minor adjustments in work sequence or material handling to improve overall productivity.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to use materials, tools, and labor more efficiently during furniture installation work. Learners will understand how to reduce waste, track the usage of resources like screws and adhesives, and keep simple reports on work progress. The unit also covers how to make small changes in daily work that can improve overall productivity and help avoid delays on site.

Ask

Ask the participants the following questions:

- Why is it important to keep track of materials and time while working on a furniture installation site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Resource Optimization, Reporting, and Productivity Monitoring

Resource Optimization, Reporting, and Productivity Monitoring are essential practices during furniture installation and carpentry projects. They ensure that time, materials, tools, and labor are used efficiently, while maintaining high work quality and meeting deadlines. In this unit, learners will understand how to reduce material wastage, track daily worksite operations, report progress accurately, and make small but impactful improvements to boost overall team performance.

1. **Material and Labor Optimization on Site**

   - **Plan for efficient material use**

     Before starting installation work, review the project drawings and job cards to ensure precise measurement and cutting. This avoids wastage due to rework or errors. Reuse offcuts or excess material for minor components wherever possible, such as support blocks or spacers.

   - **Assign tasks based on worker strengths**

     Distribute tasks by considering the specific skills and experience of team members. For example, assign complex fittings or machine operations to experienced carpenters, while newer workers can assist in sanding, holding parts, or moving materials. This leads to faster execution and better quality.

   - **Avoid duplication of efforts**

     Assign roles clearly to avoid situations where two or more people work on the same task unknowingly. Task overlap can lead to confusion, errors, and time loss. A brief morning meeting or task chart can help clarify responsibilities for the day.

   - **Maintain continuous communication on site**

     Encourage teams to communicate during tasks—especially if tasks are interdependent. For example, the person preparing the surface should coordinate with the one responsible for installation. Good coordination minimizes idle time and helps the workflow move smoothly.

2. **Tracking Tools, Consumables, and Work Time**

   - **Maintain a simple tool log or checklist**

     Keep a record of tools issued and returned at the start and end of each day. This can be maintained by the team lead or site supervisor. It helps in avoiding tool misplacement and ensures all workers have what they need without delay.

   - **Monitor consumables like screws, adhesives, and nails**

     Instead of giving full stock to workers, issue consumables in controlled quantities. Keep an estimate of how much is used daily. This prevents wastage, allows for planning restocking, and avoids work stoppage due to unexpected shortages.

   - **Track time taken for major work stages**

     Break down the project into major stages—e.g., framework assembly, hardware fitting, finishing. Track how much time each stage takes. This helps identify if a particular stage is consistently delayed and allows for investigation or rescheduling.

   - **Use visual or digital monitoring formats**

     Depending on the site setup, use wall charts, whiteboards, or mobile apps to track and display ongoing progress and resource use. This makes it easy for everyone, including visiting supervisors, to see status updates briefly.

3. **Progress and Issue Reporting**

   - **Maintain daily and weekly progress logs**

     Record what tasks were completed each day, including work status, workers involved, and time spent. Weekly summaries help track whether the project is on schedule or if adjustments are needed. Logs also assist in billing and verification.

   - **Report problems promptly and clearly**

     Any site-related problems—like unavailability of power tools, delayed deliveries, or structural issues—should be communicated to supervisors immediately. Early reporting enables timely solutions and prevents further delays or safety hazards.

   - **Use appropriate documentation formats**

     Whether using printed forms, checklists, or mobile tools, ensure that documentation is clear, complete, and easy to understand. All entries should include dates, brief descriptions, and responsible persons.

   - **Support planning through documentation**

     Well-maintained reports help project managers make informed decisions, such as rescheduling tasks, reallocating labor, or ordering extra materials. They also serve as a record in case of client queries or quality checks.

4. **Improving Productivity through Practical Adjustments**

   - **Review and modify task sequences if needed**

     Assess the work order to identify if any tasks can be rearranged to save time. For example, fitting handles before final polishing can lead to surface damage—so the order must be reconsidered. Efficient sequencing reduces delays and improves finish quality.

   - **Organize materials and tools for accessibility**

     Arrange commonly used items (like measuring tape, drills, or hinges) in easy-to-reach zones near the workbench. Clearly label toolboxes or storage bins to prevent searching and movement delays. This keeps the site organized and time efficient.

   - **Encourage suggestions from workers**

     Frontline workers often notice simple inefficiencies—such as a loose wire causing slow machine use or a poorly located material pile. Create a habit of gathering suggestions during end-of-day reviews or toolbox talks to address such issues collectively.

   - **Implement low-cost improvements quickly**

     Focus on simple changes that bring quick results, such as creating a color-coded marking system for materials, adding hooks for tool storage, or setting up designated walkways. Even small steps like these can improve speed, safety, and output quality.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning for Resource Optimization and Productivity Tracking

Group Size: 4–6 participants

Materials Needed:

- Sample project brief (with a list of tasks, materials, and timelines)
- Chart paper or whiteboard
- Markers
- Sticky notes (optional)
- Copies of sample reporting formats (daily log, material checklist, delay report)

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Briefly discuss the meaning of "resource optimization" and why tracking material usage, manpower time, and delays is important on an installation site.

2. **Distribute Scenario Briefs**

   Give each group a sample scenario (e.g., installation of modular kitchen or office partition), including a list of resources, manpower, and tasks involved.

3. **Group Planning and Analysis**

   Each group should

   - Review the project brief and identify which materials or tools are at risk of being wasted.
   - Suggest ways to optimize the sequence of work and manpower use.
   - Prepare a sample daily work log and delay report based on their assumptions.

4. **Group Presentation**

   Each group presents

   - 2–3 key suggestions for improving productivity
   - A short explanation of how they would report issues or delays
   - One example of how small changes can reduce material wastage

5. **Class Debrief**

   Discuss

   - What optimization ideas were most practical?
   - How did reporting help visualize project progress?
   - Why is tracking manpower and tools useful for site managers?

Activity	Duration	Resources used
Planning for Resource Optimization and Productivity Tracking	45-60 minutes	Sample project brief (with a list of tasks, materials, and timelines), Chart paper or whiteboard, Markers, Sticky notes (optional), Copies of sample reporting formats (daily log, material checklist, delay report) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage participants to focus on “small wins” — simple, realistic changes like reusing packaging material or rearranging tasks to reduce idle time.
- Provide visual aids or printed checklists to guide participants unfamiliar with reporting formats.
- Ensure each group links their optimization idea with actual reporting or monitoring practices (e.g., logging material wastage or noting idle time).

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following documents helps track the sequencing of carpentry tasks on-site?
   a. Delivery note
   b. Site diary
   c. Job card
   d. Consumption sheet
   Answer: c. Job card

2. What is the main purpose of a delay report in project execution?
   a. To request new tools
   b. To record faults in completed furniture
   c. To update drawings
   d. To highlight factors causing a halt in work progress
   Answer: d. To highlight factors causing a halt in work progress

3. Which of the following helps reduce material wastage during carpentry installation?
   a. Leaving off-cuts unmeasured
   b. Frequent re-drilling without jigs
   c. Accurate reading of layout and sectional drawings
   d. Ignoring surface damage
   Answer: c. Accurate reading of layout and sectional drawings

4. What is a tag-based system used for on-site?
   a. Employee attendance
   b. Identifying polishing materials
   c. Tracking material and tool usage
   d. Labelling furniture designs
   Answer: c. Tracking material and tool usage

Fill in the Blanks

1. _____ helps ensure that carpentry, polishing, and hardware fitting do not overlap unnecessarily.
   Answer: Task dependency chart

2. During component delivery, the _____ is used to verify items received against the order.
   Answer: Delivery note

3. A _____ is used to log daily activities, pending tasks, and achievements at the site.
   Answer: Site diary

4. Misaligned hardware or excessive off-cuts are signs of _____.

   Answer: Material wastage

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Site diary	a) Used to check surface finish and count of received materials
2. Task sequencing	b) Helps align different site activities efficiently
3. Delivery checklist	c) Tracks daily progress and updates
4. Time monitoring	d) Identifies inefficiencies in manpower use

   Answers: 1 - c, 2 - b, 3 - a, 4 - d

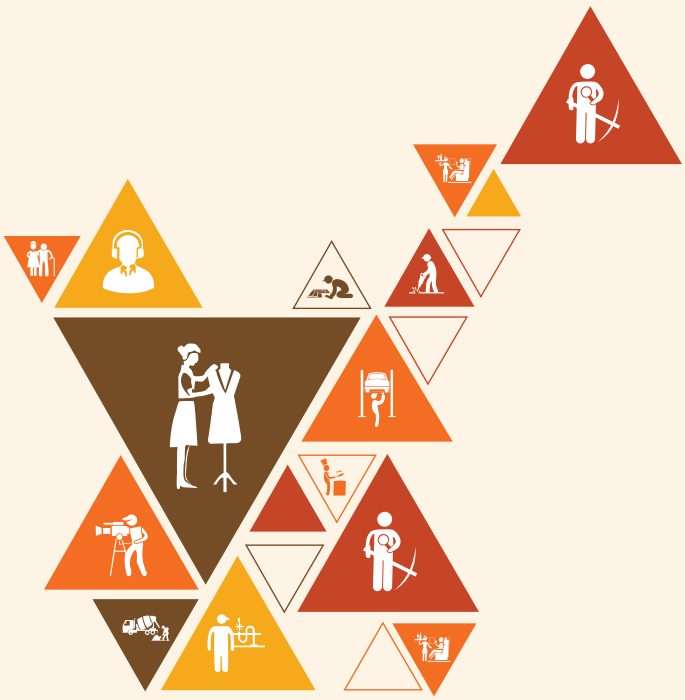
2. Match Column A with Column B correctly.

Column A	Column B
1. Material usage tracking	a) Job cards update or percentage tracker
2. Reporting delays	b) Issue-return log
3. Recording progress	c) Tool checklist and supervision
4. Preventing tool misuse	d) Fault register or delay report

   Answers: 1 - b, 2 - d, 3 - a, 4 - c

9. Worksite Operations and Storage Management

Unit 9.1: Coordination and Instruction Planning for Loading and Unloading
Unit 9.2: Safe Handling, Equipment Use, and Material Stacking
Unit 9.3: Storage Management, Inspection, and Quality Control



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Prepare a structured loading/unloading instruction sheet that includes item category, quantity, destination location, special handling instructions, and assigned personnel.
2. Organize the loading sequence based on installation priority, fragility, and unloading convenience to prevent site-level confusion and breakage.
3. Explain the importance of pre-briefing the logistics team or subcontractors with visual cues or hand-marked items to reduce errors during loading or dispatch.
4. Coordinate with internal departments such as fabrication, packing, and installation teams to finalize the readiness of items for dispatch.
5. Communicate effectively with warehouse, vehicle operators, and site receivers to ensure timely exchange of shipment information and accountability.
6. Demonstrate the safe operation of trolleys, platform trucks, pallet jacks, and forklifts for shifting heavy boards, cabinets, and hardware.
7. Show how to lift, move, and place materials manually using safe body posture and mechanical support to avoid damage or injury.
8. Perform basic safety inspections of handling equipment to check for loose wheels, broken brakes, oil leakage, bent frames, or control failure.
9. Describe how to isolate and report faulty equipment using safety lockout tags and inform the concerned maintenance team or supervisor.
10. Apply best practices in stacking materials such as placing heavy items at the bottom, keeping finished surfaces face-up, and ensuring airflow between stacked items.
11. Use corner guards, rubber sheets, or separators while stacking panels or finished parts to avoid scratches and impact marks.
12. Identify suitable containers, bins, or pallets for storing different types of furniture parts such as small hardware, long profiles, laminated panels, or glass inserts.
13. Explain how to group materials logically in storage — by project, by type, or by installation sequence — to speed up retrieval.
14. Inspect storage areas for lighting, ventilation, pest prevention, load-bearing capacity, and physical safety barriers.
15. List the potential consequences of poor storage such as warping, mold growth, rusting, and misplaced inventory.
16. Perform entry and exit quality checks on materials using visual inspection, size verification, and packaging condition review.
17. Detect mismatched, defective, or damaged items during inward/outward movement and report immediately to quality control or project manager.
18. Follow company guidelines for barcode or tag-based inventory, including scanning, labelling, and database updating.
19. Maintain registers or digital records for stock movements, discrepancies, and rejection notes for reporting and audit purposes.
20. Apply standard procedures for documenting damage reports, identifying responsible departments, and initiating corrective measures.

Unit 9.1: Coordination and Instruction Planning for Loading and Unloading

Unit Objectives

At the end of this unit, participants will be able to:

1. Prepare a clear loading/unloading instruction sheet that includes item details, handling sequence, and destination.
2. Coordinate across departments to minimize communication gaps during dispatch and receipt of furniture components.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the key steps involved in planning and coordinating the loading and unloading of furniture components at project sites. Participants will explore how to prepare detailed instruction sheets, manage item sequencing, and ensure smooth coordination between dispatch, transport, and installation teams. The unit also highlights the importance of clear communication to avoid delays, damage, and misplacement during material movement.

Ask

Ask the participants the following questions:

- Why is it important to label furniture items and share a proper loading plan before sending them to the site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Coordination and Instruction Planning for Loading and Unloading

In carpentry and furniture installation projects, loading and unloading of materials must be well-organized to avoid damage, confusion, or time loss. Proper planning and inter-departmental coordination ensure that components reach the site safely and are placed in the correct order for installation.

1. **Preparing a Clear Loading/Unloading Instruction Sheet**
    - **Purpose of the Instruction Sheet:**

      A loading/unloading instruction sheet is a vital planning document used to guide the safe and efficient movement of furniture components. It outlines the list of items to be transported, including item names, quantities, dimensions, and any handling precautions (e.g., "Fragile – Handle with Care" or "Heavy – Use Trolley"). This helps in preventing damage and confusion during the movement of materials from warehouse to site.
    - **Sequence and Destination Planning:**

      The order in which items are to be loaded or unloaded is crucial. The instruction sheet must indicate a handling sequence, ensuring that items needed first are unloaded last (reverse order of use). This saves time and effort during installation. In addition, the destination for each item (such as bedroom, kitchen, or 2nd-floor living area) must be specified clearly to help on-site teams position items directly at their installation points.
    - **Communication Tool:**

      The sheet acts as a communication bridge between the dispatch, transport, and receiving teams. When shared ahead of time, it allows all stakeholders to prepare accordingly, avoiding last-minute confusion.

2. **Coordinating Across Departments to Minimize Communication Gaps**
    - **Involvement of Multiple Teams:**

      The loading and unloading process involves coordination between the store team, dispatch team, transport personnel, and the site installation team. Miscommunication between these groups can lead to issues such as delays, wrong deliveries, or missing items.
    - **Advance Sharing of Details:**

      Coordination begins by sharing dispatch schedules, item checklists, and expected arrival times with all involved teams. For example, if the site is not yet ready to receive bulky items, the delivery can be rescheduled. Similarly, if the transport team is unaware of fragile goods, they may not load them correctly. By maintaining clear communication channels, these problems can be prevented.
    - **Use of Tools and Roles:**

      Assigning responsibilities—for instance, one person checking item quantity, another responsible for packaging, and a third overseeing loading—helps streamline the process. Mobile communication apps or checklists can be used to ensure real-time coordination. This prevents delays, duplication of tasks, and increases team efficiency.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Coordinating Loading and Unloading of Modular Furniture Components

Group Size: 4–6 participants

Materials:

- Flipchart or whiteboard
- Markers
- Sticky notes (various colors)
- Scenario cards (described below)
- Sample item tags or labels
- Instruction sheet templates

Activity Duration: 60 minutes

Instructions

Step 1: Setup and Objective Brief

Explain the purpose of the activity:

To plan and coordinate an efficient, damage-free loading and unloading operation for modular furniture components while maintaining clear communication across departments.

Step 2: Scenario Distribution

Provide each group with a scenario card outlining a unique dispatch or delivery challenge. Each card includes:

- Item mix (e.g., cabinets, glass shutters, hardware boxes)
- Site destination details
- Department coordination requirement (e.g., transport, warehouse, installation team)
- Specific challenge (e.g., time limit, limited manpower, fragile item handling)

Group Discussion and Planning

Each group should use the prompts below to develop a coordinated loading/unloading plan:

- What items are to be loaded, in what sequence, and why?
- What information must be included on the instruction sheet for handlers and receivers?
- What are the fragile or high-priority items that require special care?
- How will different departments (e.g., dispatch, transport, site team) stay informed during this process?

Deliverables:

- A completed instruction sheet with:
  - Item name, quantity, and description
  - Loading sequence and reasons
  - Destination zone at the site
  - Handling precautions
- Sticky-note item labels arranged in loading order

Group Presentations

Each group presents:

- Their scenario
- Key challenges in coordination
- Their full instruction plans and visual layout
- Communication steps taken to avoid mishandling or confusion

Debrief and Key Takeaways

Facilitate a closing discussion around:

- How did each group handle fragile or high-priority items?
- What methods did groups use to ensure communication across departments?
- How does planning ahead reduce errors during loading and unloading?
- What are the risks if such coordination is not done properly?

Activity	Duration	Resources used
Coordinating Loading and Unloading of Modular Furniture Components	60 minutes	Flipchart or whiteboard, Markers, Sticky notes (various colors), Scenario cards (described below), Sample item tags or labels, Instruction sheet templates etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage groups to prioritize communication clarity in their instruction sheets.
- Prompt participants to consider real-world challenges like manpower limits, weather, or access restrictions.
- Ask questions that make them think about sequence impact—what happens if installation-first items are loaded first?

Unit 9.2: Safe Handling, Equipment Use, and Material Stacking

Unit Objectives

At the end of this unit, participants will be able to:

1. Demonstrate the correct use of material handling equipment such as trolleys, forklifts, and lifters.
2. Perform safety checks on handling equipment to identify wear, malfunction, or hazards.
3. Apply techniques for smart stacking of boards, parts, and packaged products to ensure safety and space efficiency.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss safe methods of handling, transporting, and stacking carpentry materials using equipment such as trolleys, forklifts, and lifters. Participants will learn how to carry out safety checks on equipment, identify common handling hazards, and apply space-efficient stacking techniques. Emphasis will be placed on safety protocols, proper posture, and prevention of material damage or injury during on-site loading, unloading, and storage.

Ask

Ask the participants the following questions:

- What is one common tool used to move heavy materials safely at a worksite?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Safe Handling, Equipment Use, and Material Stacking

Safe handling of materials and equipment is a critical part of any on-site or workshop-based project execution. Improper handling can lead to accidents, material damage, or project delays. In this unit, we will discuss the correct methods for operating handling equipment like trolleys and forklifts, performing safety inspections, and stacking materials systematically to maintain both safety and operational efficiency.

1. **Demonstrate the correct use of material handling equipment such as trolleys, forklifts, and lifters**
    - **Select appropriate equipment based on material type and weight:**

      Different equipment serves different purposes. Use small trolleys for lightweight items such as small furniture parts. Use forklifts for heavy or bulk materials like packed boards or large cabinetry. Lifters are suitable for vertical stacking or lifting loads onto racks or higher surfaces.
    - **Operate equipment using safe methods and proper posture:**

      Always push trolleys forward rather than pulling them to reduce strain and improve control. When using forklifts, ensure proper seatbelt use, balanced load distribution, and follow designated movement paths. Avoid sudden stops or sharp turns to prevent toppling of materials.
    - **Secure loads properly before transport:**

      Items must be firmly positioned on the trolley or lifting base. Use straps or edges to prevent sliding. This ensures that during transport, the materials remain stable and do not cause accidents due to imbalance or falls.
    - **Use appropriate PPE (Personal Protective Equipment):**

      Always wear gloves for grip and protection, steel-toe boots for foot safety, and helmets in active loading/unloading zones. These measures minimize the risk of injury during handling activities.

2. **Perform safety checks on handling equipment to identify wear, malfunction, or hazards**
    - **Conduct pre-use visual inspection of all equipment:**

      Before starting any task, check for visible damage such as worn-out wheels, loose bolts, cracked forks, or rusted levers. A quick 2-minute check can prevent major mishaps.
    - **Observe equipment performance during use:**

      Pay attention to any abnormal noise (like squeaking or grinding) or irregular movements. For instance, if a forklift's lift function jerks or stalls, it could indicate hydraulic issues that require immediate repair.
    - **Report and tag damaged equipment:**

      Do not use malfunctioning equipment. Tag it with a "Do Not Use" label and report it to the site supervisor or maintenance team to avoid accidental use by others.
    - **Ensure post-use care and proper storage:**

      Clean equipment after use, especially if used in dusty or wet conditions. Store in dry, assigned zones to maintain their condition and avoid clutter that could cause tripping hazards.

3. **Apply techniques for smart stacking of boards, parts, and packaged products to ensure safety and space efficiency**

   - **Stack heavier items at the bottom and lighter items above:**

     A firm base is essential for stability. Place heavier boards or packages at the bottom of the stack to prevent collapse and to support the materials above them.

   - **Ensure uniform alignment and vertical stacking:**

     Poorly aligned items cause stacks to tilt and become unstable. Align all edges and corners neatly and maintain a vertical column-like shape to avoid accidental tipping.

   - **Follow height and load limit guidelines:**

     Over stacking beyond safe height or weight capacity increases risk of collapse and injury. Refer to site-specific stacking guidelines or equipment labels for safe limits.

   - **Use separators or spacers like pallets and foam padding:**

     Wooden pallets, cardboard sheets, or soft foam layers between materials protect surfaces and help distribute weight. This also reduces scratching, warping, or bending of sensitive components.

   - **Maintain clear movement space around stacks:**

     Leave at least 1 meter of clearance on all sides of stacks for safe movement of workers and equipment. This ensures emergency access and efficient material retrieval.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Material Handling and Stacking Simulation

Group Size: 4–6 participants per group

Materials Required:

- Cut-outs or models of boards, cartons, furniture components (can be paper-based or foam blocks for simulation)
- Labels for “Fragile,” “Heavy,” “Top Load Only,” etc.
- Chart paper and markers
- Sample checklist for equipment safety and stacking instructions
- Mock material handling equipment (toy forklift/trolley or printed visuals)

Activity Duration: 60 minutes

Instructions

1. **Scenario Briefing**

   Provide each group with a mock scenario — e.g., "You need to unload, transport, and safely stack furniture components in a tight site storeroom." Each group must interpret the task considering safety, space efficiency, and labelling.

2. **Planning & Simulation**

   - Groups must decide on equipment to use (from provided options)
   - Assign roles (e.g., equipment operator, safety checker, stack planner)
   - Create a visual layout for stacking, indicating weight order, access paths, and hazard prevention
   - Complete a sample checklist to ensure handling equipment is safe

3. **Presentation**

   - Each group presents their plan and layout
   - They explain how their approach ensures safe handling and efficient stacking

4. **Reflection & Discussion**

   - Facilitator encourages discussion on what worked, what could go wrong in real scenarios, and the importance of teamwork and safety checks

Activity	Duration	Resources used
Material Handling and Stacking Simulation	60 minutes	Cut-outs or models of boards, cartons, furniture components (can be paper-based or foam blocks for simulation), Labels for "Fragile," "Heavy," "Top Load Only," etc., Chart paper and markers, Sample checklist for equipment safety and stacking instructions, Mock material handling equipment (toy forklift/trolley or printed visuals) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Emphasize safety roles**

  Guide learners to assign responsibilities (e.g., one member only verifies equipment safety; another supervises stacking).

- **Encourage creative problem-solving**

  Let participants think about tight space challenges or simulate unstable load warnings.

- **Highlight real-world relevance**

  Compare group layouts with actual on-site practices and ask them to suggest improvements.

Unit 9.3: Storage Management, Inspection, and Quality Control

Unit Objectives

At the end of this unit, participants will be able to:

1. Select appropriate containers, pallets, or racks based on the type of material to be stored.
2. Inspect material storage areas for organization, ventilation, and safety compliance.
3. Perform quality checks on incoming and outgoing items to detect damages or mismatch.
4. Follow company protocols for inventory tagging, damage reporting, and record maintenance.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential practices of storage management, inspection, and quality control at furniture worksites. Participants will learn how to select proper storage systems for different materials, inspect storage conditions for safety and organization, and carry out quality checks for both incoming and outgoing materials. The unit also covers proper tagging methods and record-keeping for efficient inventory tracking and damage reporting.

Ask

Ask the participants the following questions:

- Why is it important to check materials before storing or sending them to the site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Storage Management, Inspection, and Quality Control

In this session, we explore how materials and components used in carpentry and furniture installation should be stored, inspected, and quality-checked to ensure smooth operations and consistent output quality.

1. **Selecting Suitable Storage Systems Based on Material Type**
   - **Assess the characteristics of the material**

     The first step in storage management is understanding the properties of the materials—are they fragile, heavy, irregularly shaped, or moisture-sensitive? For example, wooden panels need horizontal support, while hardware needs organized bins.
   - **Choose the right storage method**
     - Large panels or sheets should be placed on horizontal pallets or upright sheet racks to prevent warping or cracking.
     - Small fittings and hardware items like screws or clips should be stored in labeled bins or drawer units for easy sorting and access.
     - Polished or painted items require foam-lined shelves or soft padding to avoid surface scratches during storage.
   - **Ensure space optimization and safety**

     Good storage practices avoid clutter and make materials easily retrievable, which helps in faster job completion and reduces damage risks.
   - **Label materials properly**

     Every stored item should have a clear label indicating its type, quantity, and usage area—this avoids confusion and speeds up retrieval.

2. **Inspecting Storage Areas for Safety and Organization**
   - **Maintain environmental safety**

     Storage spaces must be free from water leaks, excessive heat, or humidity. Ventilation is important to prevent mold or material degradation—especially for wooden and MDF components.
   - **Follow structured stacking rules**

     Materials should be stacked in a stable, uniform way with heavier items at the bottom and lighter ones at the top. This minimizes the risk of toppling and injury.
   - **Regularly inspect storage equipment**

     Racks, pallets, and containers must be checked for bending, cracks, or loose parts that can cause accidents or damage stored goods.
   - **Ensure clear movement pathways**

     There should be designated walkways and unobstructed paths to allow workers and handling equipment (like trolleys) to move safely and efficiently.
   - **Look out for biological threats**

     Periodically check for rodents, termites, or insects that might damage materials. Using pest control measures can help preserve inventory quality.

3. **Performing Quality Checks on Incoming and Outgoing Materials**
   - **Incoming material inspection**

     Upon receiving materials, workers must perform a visual and physical check to identify visible cracks, breaks, rust, or packaging damage.
   - **Cross-verification with orders**

     The materials should be matched against purchase orders, delivery challans, or dispatch lists to confirm correct quantity, specifications, and supplier.
   - **Evaluate condition and packaging**

     Ensure that materials are well-packaged and protected against transport damage. Packaging integrity is crucial for maintaining quality.
   - **Outgoing material checks**

     Before sending materials to the job site, final checks must confirm that they are damage-free, fully counted, and ready for use.
   - **Avoid errors and rework**

     Detecting and correcting issues at this stage helps prevent expensive rework, return delays, or project interruptions.

4. **Using Proper Tagging and Reporting Systems**
   - **Tag all stored items clearly**

     Use barcode systems, color-coded labels, or printed tags to identify item types, sizes, and quantity at a glance.
   - **Use inventory management tools**

     Maintain detailed stock records using manual logs, Excel sheets, or digital inventory apps to track stock levels and movement.
   - **Document damage or discrepancies**

     Any damage or shortfall should be recorded in a standard damage report format and escalated for corrective action.
   - **Maintain traceability**

     A well-tagged and recorded system enables teams to track inventory usage, identify where material was used, and manage reorder timelines.
   - **Improve accountability**

     Documentation practices help avoid confusion, support audits, and encourage responsible usage and storage of materials and tools.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning for Resource Optimization and Productivity Tracking

Group Size: 4–6 participants

Materials Needed:

- Sample project brief (with a list of tasks, materials, and timelines)
- Chart paper or whiteboard
- Markers
- Sticky notes (optional)
- Copies of sample reporting formats (daily log, material checklist, delay report)

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Briefly discuss the meaning of "resource optimization" and why tracking material usage, manpower time, and delays is important on an installation site.

2. **Distribute Scenario Briefs**

   Give each group a sample scenario (e.g., installation of modular kitchen or office partition), including a list of resources, manpower, and tasks involved.

3. **Group Planning and Analysis**

   Each group should

   - Review the project brief and identify which materials or tools are at risk of being wasted.
   - Suggest ways to optimize the sequence of work and manpower use.
   - Prepare a sample daily work log and delay report based on their assumptions.

4. **Group Presentation**

   Each group presents

   - 2–3 key suggestions for improving productivity
   - A short explanation of how they would report issues or delays
   - One example of how small changes can reduce material wastage

5. **Class Debrief**

   Discuss

   - What optimization ideas were most practical?
   - How did reporting help visualize project progress?
   - Why is tracking manpower and tools useful for site managers?

Activity	Duration	Resources used
Planning for Resource Optimization and Productivity Tracking	45-60 minutes	Sample project brief (with a list of tasks, materials, and timelines), Chart paper or whiteboard, Markers, Sticky notes (optional), Copies of sample reporting formats (daily log, material checklist, delay report) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage participants to focus on “small wins” — simple, realistic changes like reusing packaging material or rearranging tasks to reduce idle time.
- Provide visual aids or printed checklists to guide participants unfamiliar with reporting formats.
- Ensure each group links their optimization idea with actual reporting or monitoring practices (e.g., logging material wastage or noting idle time).

Exercise

Multiple Choice Questions (MCQs)

1. What is the main purpose of a loading/unloading instruction sheet?
   a. To record workers' attendance
   b. To track expenses
   c. To provide clear handling and movement guidelines
   d. To assign rest breaks

   Answer: c. To provide clear handling and movement guidelines

2. Which of the following should be placed at the bottom during stacking?
   a. Fragile glass panels
   b. Light cardboard boxes
   c. Heavy wooden boards
   d. Cushion sheets

   Answer: c. Heavy wooden boards

3. What should be done before using a forklift?
   a. Charge mobile phones
   b. Perform a safety inspection
   c. Call the supervisor
   d. Stack materials first

   Answer: b. Perform a safety inspection

4. Why is it important to group materials logically in storage?
   a. To reduce energy bills
   b. To minimize employee presence
   c. To speed up material retrieval and avoid errors
   d. To increase stacking height

   Answer: c. To speed up material retrieval and avoid errors

Fill in the Blanks

1. Materials with finished surfaces should be stacked with the finished side facing _____.

   Answer: up

2. A faulty trolley with a broken brake must be isolated using a _____.

   Answer: safety lockout tag

3. The document used to track incoming and outgoing items is called a _____ or inventory log.

   Answer: stock register

4. Storing heavy boards at the top of a stack may lead to _____ or injury.

   Answer: breakage

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Barcode tagging	a. Lifting heavy flat boards
2. Corner guards	b. Quick digital inventory tracking
3. Visual inspection	c. Prevent scratches and edge damage
4. Pallet jack	d. Detect defects and mismatch

Answers: 1 - b, 2 - c, 3 - d, 4 - a

2. Match Column A with Column B correctly.

Column A	Column B
1. Coordinating with site receivers	a. Avoid malfunction or breakdown
2. Pre-dispatch safety checks	b. Smooth unloading and accountability
3. Logical stacking	c. Triggers corrective action process
4. Documentation of damage	d. Saves space and prevents collapse

Answers: 1 - b, 2 - a, 3 - d, 4 - c

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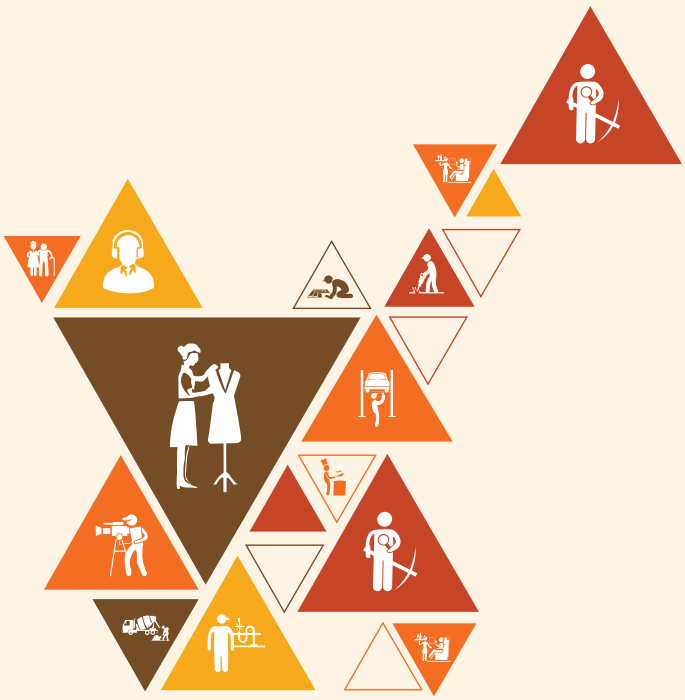
10. Worksite Preparation, Safety Checks, and Maintenance

Unit 10.1: Worksite Setup and Tool Organization
Unit 10.2: Safety Equipment, Signs, and Risk Awareness
Unit 10.3: Site Maintenance, Inspection, and Hazard Reporting



Key Learning Outcomes

At the end of this module, participants will be able to:

1. List different categories of tools required for carpentry tasks, such as measuring tools, cutting tools, joining tools, and finishing tools, and describe their typical use.
2. List essential equipment and materials used during various phases of furniture installation including drills, screwdrivers, adhesives, hardware, sealants, and packaging materials.
3. Prepare a tool checklist based on the day's task plan and ensure that all required items are available and functional.
4. Organize tools and consumables on a workbench in a way that supports efficient access, reduced hand travel, and proper sequencing.
5. Set up a temporary site storage system by assigning specific zones or containers for incoming material, installed parts, and unused inventory.
6. Identify mandatory safety signs used at furniture worksites such as "No Entry," "Use PPE," "Caution: Floor Wet," and explain their purpose and location.
7. Demonstrate standard hand signals used to guide equipment operation, lifting, or unloading when verbal communication is difficult.
8. Verify that machine guards, belt covers, blade shields, and flooring edge guards are in place and operational before use.
9. Check emergency exits, fire extinguishers, and electrical panel access for obstructions or unauthorized tampering.
10. Spot potential hazards such as loose wires, scattered hardware, oil spills, poor lighting, or unstable scaffolding at the worksite.
11. Explain the difference between physical hazards, mechanical hazards, and behavioral risks (e.g., rushing, skipping safety steps).
12. Create a basic routine to clean the work area at the beginning and end of the shift, including wiping surfaces, clearing walkways, and disposing of waste.
13. Inspect the site for misplaced tools, exposed fasteners, or improperly stored boards that may cause tripping or injury.
14. Use workplace reporting formats such as hazard registers, near-miss logs, or digital safety reporting apps to report unsafe incidents.
15. Inform the appropriate supervisor or safety officer when a serious hazard, tool fault, or procedural gap is identified.
16. Explain how regular site maintenance and tool care prevents injury, reduces downtime, and improves overall work efficiency.
17. Identify the long-term benefits of preventive maintenance, such as improved tool lifespan, cleaner workspaces, and better team morale.

Unit 10.1: Worksite Setup and Tool Organization

Unit Objectives

At the end of this unit, participants will be able to:

1. List the tools, materials, and equipment required for different carpentry tasks.
2. Organize a workbench and site storage layout to support smooth operations and reduce search time.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to set up a carpentry worksite effectively and organize tools and materials for smooth and safe operations. Learners will explore the list of essential tools for different tasks and understand how to arrange them to minimize delays and errors. The unit emphasizes proper planning of workspace zones and storage to improve productivity and reduce the time spent searching for tools.

Ask

Ask the participants the following questions:

- What is a workbench used for in a carpentry site?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Worksite Setup and Tool Organization

In carpentry and interior work, a well-planned worksite layout and proper tool organization play a crucial role in maintaining efficiency, safety, and productivity. This unit focuses on identifying essential tools and creating a systematic arrangement at the site to support smooth workflow.

1. **List the tools, materials, and equipment required for different carpentry** tasks

Measuring and Marking Tools

- **Tape Measures and Steel Rulers**

  Used to take precise linear measurements for cutting and assembly.

- **Spirit Levels**

  Ensure horizontal and vertical alignment of surfaces and structures.

- **Carpenter's Square and Bevel**

  Help in creating accurate right angles and transferring angles onto materials.

- **Marking Gauge and Chalk Line**

  Used to mark straight lines or reference points during layout planning.

Cutting Tools

- **Hand Saw and Back Saw**

  Useful for small, straight cuts in wood.

- **Circular Saw and Table Saw**

  Power tools for larger or repeated cuts, ideal for sheet goods like plywood.

- **Jigsaw and Hole Saw**

  Allow for curved cuts or circular openings in panels or boards.

Joining and Assembly Tools

- **Claw Hammer and Wooden Mallet**

  Used to insert or remove nails and tap joints together.

- **Screwdriver (Manual/Electric)**

  Fasten screws of various types; electric types save time and effort.

- **Drill Machine with Bits**

  Used for creating pilot holes, screw driving, and drilling into different materials.

- **Clamps (G-clamp, Bar Clamp)**

  Hold components firmly while glue sets or during screwing tasks.

Finishing Tools

- **Sandpaper and Orbital Sander**

  Smooth out wooden surfaces to prepare for polish or paint.

- **Files and Rasps**

  Shape or refine edges and joints in wood or hardware.

- **Paint Brushes and Rollers**

  Apply polish, primer, or paint evenly over surfaces.

Support Equipment

- **Workbench/Table**

  Serves as a stable surface for cutting, joining, or assembling.

- **Extension Boards and Lighting**

  Ensure access to power and visibility in dim or large work areas.

- **Safety Gear (Gloves, Goggles, Helmet)**

  Protects the worker from physical and environmental hazards.

2. **Organize a workbench and site storage layout to support smooth operations and reduce search time**

Define Functional Work Zones

- **Cutting Zone**

  Near power outlets, with safety clearance and dust extraction support.

- **Assembly Zone**

  Flat and clutter-free space for laying out parts and assembling furniture units.

- **Finishing Zone**

  Well-ventilated area for polishing, sanding, or painting, with minimal dust.

Arrange Tools Based on Frequency of Use

- **Frequently Used Tools**

  Keep screwdrivers, drills, and measuring tapes on wall-mounted boards or magnetic strips within easy reach.

- Occasionally Used Tools

  Store in labeled toolboxes or drawers under the workbench.

- **Heavy Equipment**

  Place on low shelves or rolling carts for easy mobility and to prevent lifting injuries.

Label and Categorize All Storage

- Use stickers or name tags to label bins for nails, screws, bolts, glue, and fittings.
- Store consumables by type and size, using transparent boxes or containers for easy visibility.
- Color-coding different categories (e.g., red for cutting tools, blue for assembly tools) helps new workers find items quickly.

Maintain Clean and Functional Workbench

- Daily Cleanup

  Allocate 5–10 minutes after every shift to remove sawdust, wood chips, and unused materials.

- Repair and Maintenance

  Check for splinters, loose screws, or unstable legs on the bench and fix them promptly.

Material Storage and Movement Plan

- Vertical Stacking for Panels

  Store large boards upright and supported against a wall to save floor space.
- **Weight Distribution**

  Heavier materials should be stored lower to avoid toppling and reduce strain when lifting.
- **Pathway Clearance**

  Ensure clear paths for moving materials and components to prevent accidents and delays.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning a Worksite Setup for a Carpentry Installation Task

Group Size: 4–6 participants

Materials

- Whiteboard or flipchart
- Markers
- Sticky notes (different colors)
- Scenario cards (described below)

Activity Duration: 60 minutes

Instructions

1. **Introduction**

   Begin with a brief discussion on the importance of worksite setup and tool organization in carpentry. Highlight how a well-planned layout improves productivity, reduces tool search time, and ensures safer movement at the site.
2. **Distribute Scenario Cards**

   Each group receives a scenario card describing a typical carpentry task and the site conditions. Each scenario includes a challenge that requires groups to plan an organized and efficient worksite setup.
3. **Group Discussion and Planning**

   Each group should discuss the scenario using the following prompts:

   - What kind of carpentry task is being executed at the site?
   - What tools and materials are needed?

- What layout of work zones would best support this activity?
- How can tool placement, access paths, and safety be ensured?
- What adjustments must be made for site-specific challenges?

As a team, create a layout sketch and write down strategies for organizing the workbench, storage, and material movement paths.

4. **Group Presentations**

   Each group will present their scenario, worksite layout plan, tool/material arrangements, and proposed solutions to the class. Encourage questions and suggestions from other groups.

5. **Debriefing and Key Takeaways**

   Facilitate a class-wide reflection with these questions:

- What worksite planning ideas were most practical?
- How did groups manage space and safety issues?
- What did this activity teach about tool organization and efficiency?

Examples of Scenario Cards

Scenario 1

You are installing a modular wardrobe in a compact bedroom with limited access. How will you set up your tools, store materials, and keep the walkway clear while ensuring smooth workflow?

Scenario 2

Your team must assemble and install five wooden tables at a school site. There is no proper workbench, and you must organize the tools and hardware on-site. How would you arrange the setup?

Scenario 3

The client site has uneven flooring and limited power sockets. You need to carry out measurements, cutting, and joining. How will you plan your work zones and power access points?

Activity	Duration	Resources used
Planning a Worksite Setup for a Carpentry Installation Task	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (different colors), Scenario cards (described below) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage realistic layouts by referencing classroom/lab settings.
- Ensure groups balance practicality with safety in their solutions.
- Emphasize that efficient setup improves speed, quality, and reduces fatigue.

Unit 10.2: Safety Equipment, Signs, and Risk Awareness

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify safety signs and hand signals used on furniture installation sites and explain their meaning.
2. Verify installation and functionality of safety guards on machines and floor areas.
3. Spot common worksite hazards and describe control measures to minimize risks.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss important safety practices at furniture installation sites, including how to recognize safety signs, use hand signals, and ensure safety guards are properly installed on machines. We will also learn how to spot common workplace hazards and apply control measures to reduce risk. These practices help create a safe, organized, and injury-free work environment for all team members.

Ask

Ask the participants the following questions:

- What does a red safety sign with a slash across it usually mean on a worksite?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Safety Equipment, Signs, and Risk Awareness

Understanding and applying safety practices is crucial in preventing injuries and ensuring smooth operations at furniture installation and carpentry sites. This session equips learners with the knowledge to identify essential safety signs, use equipment responsibly, and assess worksite risks with practical control measures.

1. **Identify safety signs and hand signals used on furniture installation sites and explain their meaning**

   a. **Types of Safety Signs (with Examples)**

   - Warning Signs (Yellow Triangles)

     These signs alert workers to potential hazards. For example, a triangle with a lightning bolt indicates a risk of electric shock, and one with a falling object warns of overhead work.

   - Mandatory Signs (Blue Circles)

     These signs instruct workers to take specific precautions. For example, a sign showing a helmet indicates that head protection must be worn.

   - Prohibition Signs (Red Circles with a Slash)

     These indicate forbidden actions. A common one is the "No Smoking" sign near storage areas with flammable materials.

   - Emergency Information Signs (Green Squares or Rectangles)

     These signs guide workers to safety-related resources, such as emergency exits, first-aid kits, or fire extinguishers.

   b. **Importance of Safety Signs**

   They serve as visual tools to prevent accidents, communicate rules quickly in multi-lingual or noisy environments, and help ensure that everyone follows standardized safety practices.

   c. **Hand Signals for On-Site Communication**

   Used when operating lifts or working around noise, these signals are critical. For example:

   - A raised palm clearly means "Stop."
   - A waving motion toward the body tells someone to "Move closer."
   - A downward pointing motion in a circular pattern indicates "Lower the load."

   d. **Why Hand Signals Matter**

   In construction and carpentry settings where machinery is noisy, these signals help ensure operations continue smoothly without misunderstanding, thus preventing injury and miscommunication.

2. **Verify installation and functionality of safety guards on machines and floor areas**

   a. **Why Machine Safety Guards Are Crucial**

   Guards on power tools and equipment like circular saws, routers, and grinders protect the operator from accidental contact with rotating blades or flying debris. They also ensure safer handling during maintenance or setup.

b. Steps to Verify Guard Installation

- Visually inspect for missing or broken guards before use.
- Check that guards are not loosely fitted or improperly secured.
- Confirm that the guard moves, slides, or locks properly based on its design.
- Test machine start-up to ensure the guard doesn't interfere with tool operation but still offers full protection.

c. Floor-Level Safety Installations

- Ensure non-slip mats are placed in dusty or damp areas to avoid slips and falls.
- Use caution tapes or cones around areas with active electrical wiring or material stacking.
- Confirm that fire extinguishers, exit paths, and electrical panels are not blocked.

d. Benefits of Proper Guarding and Floor Safety

Maintains accident-free zones, enables quicker emergency responses, and ensures workers can focus on tasks without risk distractions.

3. Spot common worksite hazards and describe control measures to minimize risks

a. Recognizing Common Hazards

- Falling objects from improperly stacked boards or overhead storage.
- Electrical hazards from exposed wires or temporary connections.
- Trip hazards such as tools, cables, or open boxes lying on the floor.
- Inhalation risks from dust generated by cutting or sanding.

b. Risk Identification Techniques

- Regular site audits or safety inspections using checklists.
- Peer reporting, where team members are encouraged to report what they see.
- Supervisors conduct end-of-day walkthroughs to identify leftover risks.

c. Risk Control Measures

- Use of PPE (gloves, goggles, earplugs, safety shoes, etc.) to protect workers directly.
- Training sessions on material stacking, proper lifting, and hazardous material handling.
- Housekeeping routines to clear debris, unused tools, and waste from work areas.
- Warning labels and barricades to mark dangerous areas.

d. Effective Reporting Practices

- Maintain safety logs to track hazards, actions taken, and persons responsible.
- Encourage use of photo documentation to show damage or issues.
- Include a chain of escalation, ensuring reported issues reach the concerned supervisor or safety officer quickly.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Identifying and Responding to Safety Hazards on Site

Group Size: 4–6 participants

Materials:

- Printed scenario cards
- Safety sign flashcards (real or printed)
- Flipchart or chart paper
- Markers
- Sticky notes

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Begin with a short discussion on why safety signs, equipment guards, and risk awareness are critical in installation and carpentry environments.

2. **Distribute Scenario Cards**

   Each group receives a card describing a workplace safety situation (e.g., a missing guard, unclear signage, cluttered floor, exposed wires, incorrect lifting).

3. **Group Discussion & Analysis**

   Groups discuss their scenario using these guiding questions:

   - What is the safety issue in this situation?
   - Which safety signs or control measures are missing or ignored?
   - What actions should be taken immediately to reduce the risk?
   - How can awareness be improved to prevent recurrence?

4. **Presentation**

   Each group presents:

   - A summary of the hazard
   - Recommended response measures
   - Relevant safety signs and their meanings
   - A safety message or reminder for workers

5. **Class Discussion**

   Conclude with a debriefing session:

   - What were the most common safety concerns?
   - Which responses were quick, practical, and effective?
   - How can everyone build a habit of early hazard detection and safe behaviour?

Activity	Duration	Resources used
Identifying and Responding to Safety Hazards on Site	45-60 minutes	Printed scenario cards, Safety sign flashcards (real or printed), Flipchart or chart paper, Markers, Sticky notes etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage participants to relate the scenarios to real-life experiences they've had or seen.
- Emphasize the importance of recognizing signs before starting work in any zone.
- Use actual safety sign visuals or posters to reinforce memory and interpretation.

Unit 10.3: Site Maintenance, Inspection, and Hazard Reporting

Unit Objectives

At the end of this unit, participants will be able to:

1. Establish a routine for cleaning and inspecting the worksite before and after daily operations.
2. Check the site for misplaced tools, unsecured materials, and unsafe conditions.
3. Report hazards, unsafe incidents, or non-compliance to supervisors using workplace reporting formats.
4. Explain how proactive maintenance contributes to safety, efficiency, and tool longevity.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the importance of maintaining a clean, safe, and organized worksite throughout the carpentry project. Participants will learn how to perform daily inspections, identify and report potential hazards, and follow proper routines for cleaning and tool storage. The unit will also cover how proactive maintenance practices help prevent accidents, improve work efficiency, and extend the life of equipment and tools.

Ask

Ask the participants the following questions:

- Why is it important to clean the worksite before and after daily work?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Site Maintenance, Inspection, and Hazard Reporting

In any carpentry or furniture installation project, maintaining a clean and hazard-free worksite is crucial for safety, efficiency, and quality. This session focuses on the practices involved in maintaining the site, identifying risks, and reporting hazards correctly.

1. **Establish a routine for cleaning and inspecting the worksite before and after daily operations**
    - **Morning readiness checks**

      Before beginning work, teams should carry out a visual inspection of the site to ensure that the workspace is clean, materials are stacked properly, and walkways are unobstructed. This helps avoid slips, falls, or delays caused by disorganized areas.
    - **Daily cleaning practices**

      Cleaning should include sweeping dust or wood shavings, remove packaging waste, and wiping surfaces if spills or residues are present. It should also involve checking for oil leaks or other fluid spills around machines or tools.
    - **Tool and material reset**

      After each shift, tools must be returned to their assigned storage areas, electrical cables must be coiled and secured, and all materials should be stacked systematically to ensure safety and efficiency for the next day.
    - **Routine discipline**

      Establishing and following a fixed cleaning-inspection routine creates discipline among workers, improves accountability, and reduces the likelihood of accidents due to untidiness or misplaced tools.

2. **Check the site for misplaced tools, unsecured materials, and unsafe conditions**
    - **Identify misplaced tools**

      Frequently used tools such as drills, hammers, or measuring tapes may be left in unsafe locations like ledges, walkways, or benches. These pose a risk of falling or tripping and must be relocated to designated tool zones.
    - **Ensure safe material stacking**

      Boards, panels, pipes, and fittings should be stacked on flat surfaces, with proper support and alignment to avoid tipping. Unsecured or leaning materials can be hazardous, especially in busy or narrow work areas.
    - **Look out for hazards**

      Common unsafe conditions include wet floors, hanging wires, exposed nails or screws, and poorly lit zones. These need to be addressed immediately or flagged with warning signs to prevent accidents.
    - **Ongoing vigilance**

      Safety isn't a one-time task. Teams should perform brief checks during break times and at shift transitions to ensure conditions haven't changed or deteriorated unexpectedly.

3. **Report hazards, unsafe incidents, or non-compliance to supervisors using workplace reporting formats**

   - **Observation and noting**

     Workers should be trained to spot and describe unsafe conditions or incidents. This may include frayed electrical cords, broken handles, cracked boards, or workers not wearing protective gear.

   - **Use of standard formats**

     Sites often provide hazard report books, daily checklists, or mobile-based safety apps. Workers must know how to fill out these forms accurately, mentioning the date, location, issue, and any immediate actions taken.

   - **Communication protocol**

     It is essential to inform a site supervisor, safety officer, or team leader about the concern right away — both verbally and through written formats. Quick communication helps in prompt resolution.

   - **Follow-up and tracking**

     After a report is submitted, the responsible person must follow up to confirm that the issue has been resolved. Maintaining a record of corrective actions helps improve long-term site safety performance.

4. **Explain how proactive maintenance contributes to safety, efficiency, and tool longevity**

   - **Preventing failure**

     Regular inspections and preventive maintenance (e.g., tightening loose parts, oiling joints, sharpening blades) ensure that tools and equipment function properly without sudden failure, reducing accident risk.

   - **Efficiency in task execution**

     Tools that are clean, sharp, and in good condition help workers complete tasks more efficiently. For example, a well-maintained drill will operate faster and cleaner than one with a worn-out bit.

   - **Prolonging tool life**

     Proactive care reduces wear and tear. Cleaning tools after use, storing them in dry areas, and avoiding rough handling prevent rust, breakage, and deterioration.

   - **Worker confidence and safety**

     Knowing that tools and machines are inspected and safe to use builds worker confidence, encourages careful usage, and reduces hesitation or misuse on the job.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Worksite Safety Walk and Maintenance Drill

Group Size: 4–6 participants

Materials:

- Clipboards or checklists
- Pens or markers
- Sample hazard cards or photos (optional)
- Safety cones or labels
- Cleaning tools (broom, cloth, dummy tools for misplacement practice)

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Brief the groups on the importance of maintaining cleanliness, conducting site inspections, and reporting hazards regularly. Emphasize how this contributes to overall safety and productivity.

2. **Safety Walk and Observation**

   Assign each group a mock worksite area (or set up a simulated zone in the classroom or workshop). Each group must inspect the area for:

   - Misplaced tools
   - Unsecured or scattered materials
   - Spillage, dust, or other unsafe floor conditions
   - Blocked exits or pathways
   - Worn-out or broken equipment

   Groups should record their findings on a pre-structured checklist or form.

3. **Hazard Identification & Reporting**

   Each group will now prepare a short verbal or written report, identifying:

   - The hazards observed
   - The actions taken (e.g., cleaned the area, moved tools, reported an issue)
   - A preventive suggestion (e.g., labelling zones, daily logbook update)

4. **Presentation and Discussion**

   Each group presents their findings and preventive recommendations. Encourage peer questions and facilitator feedback.

Activity	Duration	Resources used
Worksite Safety Walk and Maintenance Drill	45-60 minutes	Clipboards or checklists, Pens or markers, Sample hazard cards or photos (optional), Safety cones or labels, Cleaning tools (broom, cloth, dummy tools for misplacement practice) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure a safe, realistic setup for the “worksite”—no real hazards, only staged materials.
- Provide clearly structured checklists or sample observation sheets to guide documentation.
- Encourage participants to practice respectful communication when reporting observations, as they would in a real workplace.

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following tools is used to measure precise lengths and ensure straight alignment in carpentry?
   a. Chisel
   b. Measuring tape
   c. Hammer
   d. Sandpaper
   Answer: b. Measuring tape

2. What is the purpose of blade guards on cutting equipment?
   a. To increase cutting speed
   b. To protect materials from scratches
   c. To ensure operator safety
   d. To sharpen blades automatically
   Answer: c. To ensure operator safety

3. What should you check before starting a day's carpentry work?
   a. Internet connection
   b. Personal phone battery
   c. Tool availability and functionality
   d. Client feedback forms
   Answer: c. Tool availability and functionality

4. The safety sign "Use PPE" at a worksite reminds workers to:
   a. Take a lunch break
   b. Wear personal protective equipment
   c. Keep mobile phones away
   d. Stack materials
   Answer: b. Wear personal protective equipment

Fill in the Blanks

1. A _____ is used to apply screws during furniture installation.
   Answer: screwdriver

2. _____ signs such as "Caution: Floor Wet" help prevent workplace accidents.
   Answer: Safety

3. _____ maintenance helps reduce downtime and extends the life of tools.
   Answer: Preventive

4. A _____ checklist helps ensure all required items are ready and functional before work begins.

   Answer: tool

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Joinery tools	a. Organizing tool zones
2. Near-miss log	b. Recording safety issues
3. Workbench setup	c. Fixing furniture parts
4. PPE sign	d. Indicates safety gear

Answers: 1 - b. , 2 - c. , 3 - d. , 4 - a.

2. Match Column A with Column B correctly.

Column A	Column B
1. Tool checklist	a. Marking and ensuring safety order
2. Belt guard	b. Preventing blade exposure
3. Hazard reporting format	c. Tracking tools needed for a task
4. Temporary material storage zone	d. Reducing site clutter

Answers: 1 - c. , 2 - b. , 3 - a. , 4 - d. ,

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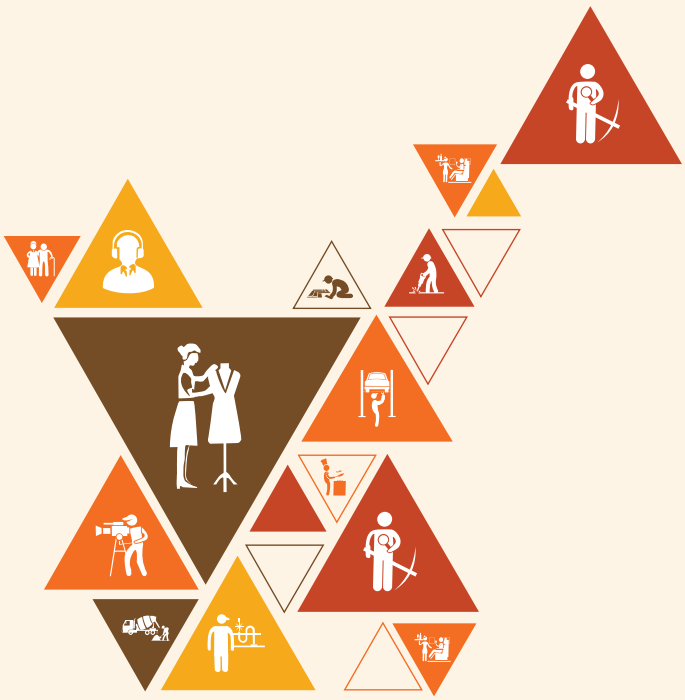
11. Preparing Components and Fabricating Product Parts

Unit 11.1: Interpretation of Drawings for Component Fabrication
Unit 11.2: Understanding Materials, Tools, and Pre-Work Planning
Unit 11.3: Measurement Techniques, Cutting Lists, and Documentation
Unit 11.4: Tool Operation and Component Fabrication
Unit 11.5: Quality Checks, Surface Treatment, and Finishing



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify different types of views commonly used in furniture drawings such as plan, elevation, and sectional views and explain their purpose in component visualization.
2. Recognize technical drawing symbols used for grain direction, edge finishes, and joinery details relevant to fabrication.
3. Interpret scales and measurement units in 2D and 3D drawings to convert drawing dimensions into real measurements for furniture parts.
4. Extract dimensional specifications, board thickness, and material details from technical drawings required for component planning.
5. Correlate different sections of an exploded or assembly view to understand the correct order of joining and orientation.
6. Locate and describe key annotations such as tolerances, clearances, fitting instructions, and grain alignment from fabrication drawings.
7. Classify various types of solid wood (like teak, sal, pine) and engineered boards (MDF, HDF, plywood, particle board) based on usage suitability and working properties.
8. Select appropriate hand tools including chisels, mallets, clamps, and scribers based on material hardness and joinery operations.
9. Choose relevant power tools such as routers, panel saws, and edge banders based on component complexity and cutting requirements.
10. Explain the importance of pre-use checks for tool sharpness, calibration, and stability before starting fabrication tasks.
11. Prepare accurate cutting lists by analysing drawings and matching them with board dimensions to minimize offcuts and wastage.
12. Create structured measurement sheets that include part codes, dimensions, materials, and remarks for tracking fabrication.
13. Use manual measuring instruments like steel rules, measuring tapes, set squares, and marking gauges to lay out cutting lines precisely.
14. Apply efficient board layout planning to reduce wastage and maximize usable board surface during cutting operations.
15. Record material consumption and leftover stock in tracking sheets to assist in inventory planning and cost control.
16. Operate standard woodworking machinery such as table saws, jointers, and thickness planers for precise shaping and sizing of furniture components.
17. Perform specific fabrication operations like notching, dado cutting, grooving, chamfering, and edge profiling based on drawing specifications.
18. Ensure that each fabricated part conforms to its specified dimensions, angle tolerances, and finish quality.
19. Align the grain direction and surface texture of each component as per design intent to maintain visual consistency.
20. Stack completed parts in a labelled and protected manner to avoid scratches, warping, or confusion during later stages.

21. Conduct visual inspections and cross-check dimensions to identify errors like overcuts, misaligned holes, or size mismatches.
22. Sand surfaces using manual blocks or powered sanders to achieve smooth, even finishes suitable for painting, polishing, or lamination.
23. Apply laminates or veneers using adhesives or pressing equipment, ensuring proper orientation, bubble-free bonding, and clean edges.
24. Identify and mark any fabrication defects including surface cracks, poor adhesion, improper drilling, or chipped corners for corrective action.
25. Maintain and update a checklist of completed parts, indicating readiness for assembly, rework needs, or packing status.

Unit 11.1: Interpretation of Drawings for Component Fabrication

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify symbols, scales, and views commonly used in technical drawings for furniture components.
2. Extract dimensional and material data from 2D and 3D drawings for accurate production planning.
3. Explain how to correlate different drawing sections to understand assembly order and joinery placement.
4. Highlight critical details such as tolerances, fit, and grain direction from a given fabrication drawing.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to read and interpret technical drawings used in the fabrication of furniture components. Participants will learn to identify common drawing symbols, scales, and different views. The unit also focuses on extracting key information such as dimensions, materials, joinery details, and grain direction. These skills help ensure accuracy during cutting, assembling, and finishing tasks on the shop floor.

Ask

Ask the participants the following questions:

- What is the purpose of a technical drawing in furniture making?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Interpretation of Drawings for Component Fabrication

Understanding how to read and interpret technical drawings is essential for anyone involved in the fabrication and assembly of furniture components. These drawings act as visual instructions, providing details on dimensions, joinery, material types, and assembly sequences. By accurately reading these plans, carpenters can ensure that each part is fabricated precisely, fits correctly, and meets design specifications.

1. **Identify symbols, scales, and views commonly used in technical drawings for furniture components**
   - **Understanding Symbols**

     Symbols in fabrication drawings represent specific details like screw holes, edge bands, dowel points, and hinge positions. Recognizing these symbols helps interpret the function and position of each component part quickly.
   - **Recognizing Drawing Scales**

     Scales reduce real-size measurements to fit on paper. For example, a 1:10 scale means every 1 cm on paper equals 10 cm. Understanding this helps interpret actual sizes accurately during cutting and assembling.
   - **Reading Drawing Views**

     Different views provide complete visual information:
     - Plan view (top view) shows layout and width/depth.
     - The elevation view (front view) shows height and face detail.
     - Side view and isometric view offer additional perspectives, especially for depth, angles, or thickness.

2. **Extract dimensional and material data from 2D and 3D drawings for accurate production planning**
   - **Extracting Dimensional Data**

     Drawings include labelled measurements for length, breadth, height, and hole distances. These are critical for ensuring parts are cut and drilled accurately, without guesswork.
   - **Interpreting Material Specifications**

     Material types are mentioned on drawings (e.g., 18mm MDF, 12mm ply with veneer). This helps the carpenter pick correct boards, surface finishes, and edge treatments for each part.
   - **Using 2D and 3D Together**

     2D drawings show exact measurements and cutting shapes, while 3D views help visualize how parts come together. Both types are used to plan fabrication logically.

3. **Explain how to correlate different drawing sections to understand assembly order and joinery placement**
   - **Matching Drawing Sections**

     Cross-sections, exploded views, and part diagrams must be compared to understand how one part connects with another—like which panel fits where or how a joint is aligned.
   - **Determining Joinery Positions**

     Joinery details like grooves, dowels, or screw placements are usually shown in sectional views. These helps avoid errors in hole drilling or joint cutting.

- **Identifying Assembly Sequence**

  Understanding the sequence of assembly (e.g., attaching side panels before the top) ensures efficient construction and prevents rework or part damage during assembly.

4. **Highlight critical details such as tolerances, fit, and grain direction from a given fabrication drawing**
   - **Reading Tolerances**

     Tolerance values (e.g., ±0.5mm) are mentioned for precision. This margin of error helps workers avoid over-correction or waste while ensuring tight fits.
   - **Understanding Fit Types**

     Fit instructions—like push fit, loose fit, or friction fit—indicate how tightly components should connect. These are crucial when installing shelves, drawers, or doors.
   - **Grain Direction Indicators**

     Arrows or lines in drawings show grain direction. Aligning grain correctly improves strength and maintains a consistent finish, especially for visible surfaces.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Drawing-Based Problem Solving in Component Fabrication

Group Size: 4–6 participants

Materials Required:

- Flipchart or whiteboard
- Markers
- Sticky notes (different colours)
- Scenario cards (furniture drawing-based situations)
- Printed samples of 2D/3D technical drawings

Activity Duration: 60 minutes

Instructions

1. **Introduction**

   Begin with a short discussion on the importance of interpreting fabrication drawings correctly in carpentry work. Explain how symbols, dimensions, scales, and section views directly affect accuracy, fit, and efficiency.
2. **Distribute Scenario Cards**

   Each group receives one scenario card describing a challenge related to interpreting a furniture fabrication drawing (examples provided below). These are based on real-site issues.

Group Discussion and Analysis

Each group should discuss their assigned scenario using the following prompts:

- What is the specific drawing interpretation challenge presented in the scenario?
- Which part of the drawing (scale, view, dimension, section, symbol) is causing confusion?
- What risks or mistakes could occur if this challenge is not resolved?
- What steps should be taken to clarify and proceed accurately?

Group Presentations

Each group presents:

- A summary of their scenario
- The identified interpretation issue
- Their proposed resolution strategy
- Tips for preventing similar errors on actual job sites

Debriefing and Key Takeaways

Facilitate a class discussion focusing on:

- How accurate drawing interpretation prevents material wastage and delays
- Importance of communication between site workers and design teams
- The value of using drawing tools (scale rulers, layout references)

Examples of Scenario Cards

Scenario 1

A team receives a fabrication drawing for a storage unit. The top view clearly shows dimensions, but the front elevation is missing scale references. Team members are unsure if the leg height matches the clearance requirements. How can they proceed without risking incorrect cutting?

Scenario 2

A junior carpenter misreads the sectional view of a bed frame and cuts all slats in equal lengths, while the drawing indicated tapering at the edges. How could this mistake be avoided, and how can drawings be explained better to less experienced staff?

Scenario 3

The materials list on a 3D drawing shows “6 mm plywood back panels”, but a team member notices that in the exploded view, two panels seem thicker. How should the team confirm the correct specification before proceeding?

Activity	Duration	Resources used
Drawing-Based Problem Solving in Component Fabrication	60 minutes	Flipchart or whiteboard, Markers, Sticky notes (different colours), Scenario cards (furniture drawing-based situations), Printed samples of 2D/3D technical drawings etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure that drawing samples include clear variations: top, front, side views, section views, and common symbols.
- Guide groups if they struggle with interpreting dimensions or identifying drawing parts.
- Reinforce the link between proper drawing interpretation and improved site productivity, safety, and precision.

Unit 11.2: Understanding Materials, Tools, and Pre-Work Planning

Unit Objectives

At the end of this unit, participants will be able to:

1. Classify various timber types and engineered boards used for fabrication, citing their advantages.
2. Select appropriate hand and power tools based on the material type and job requirement.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the different types of materials used in furniture fabrication, including solid timber and engineered boards like plywood and MDF. We will also explore how to choose suitable hand and power tools based on the type of material and job requirement. Understanding this helps in planning work efficiently, reducing damage, and achieving better results during fabrication.

Ask

Ask the participants the following questions:

- What is the difference between solid wood and engineered board in furniture making?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Understanding Materials, Tools, and Pre-Work Planning

In furniture fabrication, understanding the types of materials and tools—along with how to plan work in advance—is critical for achieving quality output and operational efficiency. This session focuses on helping learners identify suitable timber and board materials, select appropriate tools for specific tasks, and plan to avoid delays, errors, or waste.

1. **Classify Various Timber Types and Engineered Boards Used for Fabrication**

   a. **Solid Timber:**

   - Solid timbers are natural wood varieties like teak, sal, pine, and sheesham.
   - They offer high strength, long life, and a visually appealing natural grain pattern.
   - Teak and sheesham are used for premium, durable furniture; pine is preferred for light, easy-to-handle work.

   b. **Engineered Boards**

   - Plywood

     Made by gluing layers of wood veneer. It is strong, dimensionally stable, and ideal for structural applications.

   - MDF (Medium Density Fibreboard)

     Made from fine wood fibres; has a smooth finish and is suitable for painting or laminated surfaces.

   - Particle Board

     Made from compressed wood chips and resin. Economical but suitable only for light-load furniture.

   c. **Suitability for Use**

   - Selection depends on purpose pockets of high strength (e.g., bed frames) require plywood.
   - MDF is ideal for decorative or painted furniture.
   - Particle board is best for temporary or low-cost indoor furniture.

2. **Select Appropriate Hand and Power Tools Based on the Material Type and Job Requirement**

   a. **Hand Tools**

   - Used for precision work and finishing tasks like trimming or smoothing.
   - Includes chisels, screwdrivers, hand saws, rasps, and hand planes.
   - Offers greater control and is preferred for small-scale adjustments or assembly.

   b. **Power Tools**

   - Used for cutting, drilling, shaping, and sanding large volumes quickly.
   - Includes tools like circular saws, electric drills, routers, and jigsaws.
   - Ideal for repetitive or heavy-duty tasks during production.

   c. **Material-Tool Compatibility**

   - MDF requires sharp carbide-tipped blades to avoid chipping.

- Hardwoods like teak require high-torque tools to ensure smooth cutting.
- Choosing the correct tool reduces wear, improves safety, and increases accuracy.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Material and Tool Selection for a Furniture Task

Group Size: 4–6 participants

Materials Needed:

- Sample images or small swatches of various board types (plywood, MDF, particle board, solid wood)
- Tool cards or actual tools (e.g., hand saw, circular saw, drill, chisel, planer)
- Task cards describing common carpentry/furniture jobs (e.g., making a drawer, building a bookshelf, fitting a cabinet door)
- Flipchart or A3 sheets and markers

Activity Duration: 45–60 minutes

Activity Instructions

1. **Introduction**

   Begin with a brief recap of different material types and common tools used for cutting, joining, and finishing. Highlight that choosing the right combination improves efficiency and product quality.

2. **Distribute Task Cards and Material Samples**

   Each group receives a task card and a set of material samples/tool references. Task cards should describe basic furniture-making jobs like:

   - Fabricating a wardrobe shelf
   - Making a drawer front
   - Cutting a back panel for a cabinet

3. **Group Discussion & Planning**

   Participants discuss:

   - Which material is best suited for their task, and why
   - Which tools should be used for cutting, shaping, or assembling that material
   - What precautions or pre-planning steps are needed before starting the work

4. **Presentation**

   Each group presents:

   - Their task and chosen material
   - Selected tools and reasoning
   - Any challenges or safety considerations they identified

5. **Wrap-Up Discussion**

   Facilitator asks:

   - What did you learn about matching tools to material type?
   - What would happen if the wrong material or tool is chosen?

Activity	Duration	Resources used
Material and Tool Selection for a Furniture Task	45-60 minutes	Sample images or small swatches of various board types (plywood, MDF, particle board, solid wood), Tool cards or actual tools (e.g., hand saw, circular saw, drill, chisel, planer), Task cards describing common carpentry/ furniture jobs (e.g., making a drawer, building a bookshelf, fitting a cabinet door), Flipchart or A3 sheets and markers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage groups to refer to real tools or images while deciding—this helps build familiarity.
- Prompt learners to think of both strength and finish when choosing materials.
- Emphasize safety and planning—ask groups to mention any PPE or checks they would need before using tools.

Unit 11.3: Measurement Techniques, Cutting Lists, and Documentation

Unit Objectives

At the end of this unit, participants will be able to:

1. Prepare cutting lists and measurement sheets based on design inputs and material availability.
2. Perform accurate measuring and marking using standard carpentry tools.
3. Record material consumption data and optimize layout to reduce wastage.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to prepare accurate cutting lists and measurement sheets for carpentry projects. Participants will explore how to take correct measurements, mark materials clearly, and document material usage to reduce wastage. Emphasis will be given to using the right tools, following proper layout planning, and maintaining logs for improved project tracking and efficiency.

Ask

Ask the participants the following questions:

- Why is it important to double-check measurements before cutting wood for a furniture piece?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Measurement Techniques, Cutting Lists, and Documentation

In carpentry and furniture fabrication, precise measurement and organized documentation are the foundation of quality workmanship. In this session, we will study how to convert design inputs into actionable cutting lists, mark materials accurately using standard tools, and maintain records that help in reducing errors and material wastage.

1. **Preparing Cutting Lists and Measurement Sheets**
   - **Review design drawings carefully**

     Before making any list, it's important to go through the technical drawings and fabrication plans. This ensures that all required parts, dimensions, and joinery needs are clearly understood.
   - **List all required parts with details**

     Each item to be fabricated must be listed with specific measurements (length × width × thickness), quantity required, and any material preferences (e.g., plywood, MDF, or teak wood).
   - **Create a structured cutting list format**

     A cutting list should be organized as a table. It helps in visualizing which parts are needed, allows the team to plan cuts better, and ensures that no part is missed.
   - **Check available stock sizes**

     The standard size of boards or timber available in stock should be considered. This helps avoid errors in cutting and reduces the need to purchase additional material.
   - **Optimize the list to reduce waste**

     If some board pieces are larger than needed, the list can be re-arranged to utilize those sizes effectively. This helps save money and avoids excess waste.

2. **Accurate Measuring and Marking Techniques**
   - **Use correct measuring tools**

     Tools such as a steel tape measure, try square, marking gauge, or straight edge must be chosen depending on the type of job for example, large panels vs. small joints.
   - **Mark clearly and accurately**

     Using sharp pencils, scribers, or chalk ensures that marking lines are visible but not damaging. Accuracy is key to getting tight fits and proper alignment in furniture.
   - **Double-check dimensions**

     Every measurement should be verified at least twice to avoid errors. This step is especially important when cutting expensive material or precision parts.
   - **Follow a consistent marking method**

     Mark from a reference edge (usually the longest, straightest edge). Always mark cuts, joints, and drill points clearly so that other team members understand the markings.
   - **Include symbols and joinery notes**

     Some projects require specific joinery like dovetail, dado, or dowel. These should be indicated in the markings to avoid confusion during assembly.

3. **Documentation and Material Optimization**
    - **Maintain proper usage logs**

      Each time a piece of material is taken for use, the details should be noted including quantity, dimensions, and where it will be used. This helps with accountability and tracking.
    - **Compare actual usage with planned list**

      Check how much material was planned vs. how much was used. If there is a big difference, the team can investigate why maybe due to breakage, error, or poor layout.
    - **Monitor leftover and waste materials**

      Small off-cuts or leftovers from large sheets should be reviewed to determine if they can be reused. This helps reduce purchase costs and supports sustainability.
    - **Lay out parts on sheet materials efficiently**

      When planning cuts, all pieces should be arranged tightly on the board to use up maximum space. Tools like layout templates or software can assist in visualizing this.
    - **Document waste patterns or recurring issues**

      If certain types of waste keep happening for example, incorrect hole placement or repeated trimming this should be recorded so that training or process correction can happen.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Creating a Cutting List and Measurement Plan for a Bookshelf

Group Size: 4–6 participants

Materials Needed:

- Sample design drawing of a bookshelf (with dimensions)
- Chart paper or printed cutting list formats
- Measuring tapes, rulers, and scales
- Pencils, erasers, calculators
- Cardboard pieces or paper strips (as mock wood panels)

Activity Duration: 45–60 minutes

Activity Instructions

1. **Introduction**

   Briefly explain the purpose of a cutting list and measurement sheet. Highlight how this prevents material wastage and improves planning accuracy.

2. **Design Interpretation**

   Distribute a simple bookshelf drawing with labelled dimensions. Each group must identify all individual components (e.g., shelves, sides, back panel) and their sizes.

3. **Cutting List Preparation**

   Groups will:

   - List each part of the bookshelf by name (e.g., Shelf A, Side Panel B)
   - Note required quantity and dimensions
   - Draft a final cutting list on chart paper or provided sheet

4. **Mock Layout and Documentation**

   Using the cardboard or paper strips as mock wood panels, simulate cutting/marking by placing labels and verifying if layout is space optimized.

5. **Group Presentation & Discussion**

   Each group shares:

   - Their cutting list
   - Observations about material usage
   - Any changes made to improve layout/wastage control

Activity	Duration	Resources used
Creating a Cutting List and Measurement Plan for a Bookshelf	45-60 minutes	Sample design drawing of a bookshelf (with dimensions), Chart paper or printed cutting list formats, Measuring tapes, rulers, and scales, Pencils, erasers, calculators, Cardboard pieces or paper strips (as mock wood panels) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage teams to cross-check dimensions for accuracy before preparing the list.
- Provide guidance if students misinterpret design views or mix up measurements.
- Emphasize logical sequencing (longest cuts first, shared parts grouped) for material optimization.

Unit 11.4: Tool Operation and Component Fabrication

Unit Objectives

At the end of this unit, participants will be able to:

1. Operate machines and tools such as panel saws, jointers, and edge banders for precise part making.
2. Fabricate different product components according to specified dimensions and joinery design.
3. Ensure material grain, surface finish, and edges meet the required specifications.
4. Stack and label fabricated components for easy tracking during assembly.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the proper use of fabrication tools and machines such as panel saws, edge banders, and jointers. Participants will understand how to fabricate furniture components as per design specifications, ensuring precise dimensions, correct joinery, smooth surface finishes, and correct grain direction. The unit will also cover proper labelling and stacking of components to support efficient assembly and material tracking on-site.

Ask

Ask the participants the following questions:

- What is the main purpose of using a panel saw in furniture fabrication?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Tool Operation and Component Fabrication

In carpentry and furniture making, accurate fabrication is essential for achieving good fitment, aesthetics, and durability. This unit focuses on operating key machines and tools required for producing furniture components, while also ensuring quality standards are maintained. Learners will also develop habits for proper handling, stacking, and identification of fabricated parts for efficient assembly workflows.

1. **Operating Tools and Machines with Precision**
    - **Understand the use of key machines**

      Learn the purpose of each major machine used in fabrication. For example:
        - Panel saws are used to make long, straight cuts in large boards, especially for creating side panels and shelves.
        - Jointers help straighten and square the edges of timber pieces to ensure proper fit during joining.
        - Edge banders apply edge tapes to cover exposed surfaces and give a finished look while preventing chipping.
    - **Adjust machine settings for the material and task**

      Machine settings such as cutting depth, fence alignment, and feed rate must be adjusted depending on the material thickness, hardness, and design requirement. Proper settings ensure both safety and dimensional accuracy.
    - **Follow all machine safety guidelines**

      Before starting any machine, the operator must inspect the safety guards, use push sticks where needed, and wear PPE such as gloves, safety goggles, and hearing protection. Machines must never be used with wet hands or without proper training.
    - **Perform test runs or sample cuts before production**

      A trial cut is essential to confirm dimensions and edge quality. This prevents large-scale errors and ensures the machine is properly set up for repetitive work.

2. **Fabricating Components as per Design Specifications**
    - **Read and understand fabrication drawings**

      Carefully study the technical drawings provided, identifying all views (top, side, section) to extract dimensions, thicknesses, joinery requirements, and the direction of grain or finish. This is crucial for correct part production.
    - **Measure and mark accurately using carpentry tools**

      Use high-accuracy tools such as steel rules, measuring tapes, try squares, and marking gauges. Mark clearly using pencils or scribers and always double-check dimensions before cutting.
    - **Cut as per layout using the correct tools**

      Use the panel saw for large boards and a circular saw or jig saw for shaped cuts. Ensure that cuts are straight, with minimal tear-out, and aligned to the grain when necessary.

- **Create joinery features with proper tools**

  For example:

  - Use a dowel jig and drill for dowel joinery.
  - Use routers for dados or grooves.
  - Use chisels and hand saws for mortise and tenon work.

  Accuracy in joinery layout ensures that all components fit together during assembly without gaps or misalignment.

3. **Ensuring Material Quality and Finishing Standards**

- **Check and follow grain direction for strength and appearance**

  When cutting and assembling parts, always consider the direction of the wood grain. This ensures that the component not only looks good but also resists warping and maintains structural strength.

- **Inspect the surface after machining**

  Check for rough patches, tear-outs, and tool marks. Surfaces should be smooth to the touch. Use sandpaper, block planes, or finishing pads to remove imperfections.

- **Finish and clean all edges carefully**

  Ensure all edges are square, smooth, and free from splinters. Proper edge finishing is especially important for parts that will receive edge banding or form visible joins.

- **Reject or rework components with defects**

  Do not use pieces that have cracks, knots in critical zones, or warped profiles. Any defect that can affect fit, strength, or finish should be corrected or replaced.

4. **Stacking and Labelling for Easy Tracking During Assembly**

- **Use a systematic labelling system**

  Clearly mark each component with its part name or number (e.g., TP1 for Top Panel 1, LSP2 for Left Side Panel 2). Labels should be easy to read but not damage the surface.

- **Stack components in a categorized way**

  Organize parts by size, type, and purpose — for instance, keep all vertical panels together and place smaller parts like drawer fronts in a separate tray or shelf.

- **Use protective layers to prevent surface damage**

  When stacking finished parts, use foam sheets, cardboard, or plastic edge guards to prevent scratches, dents, or rubbing between surfaces.

- **Place components near the assembly zone for easy access**

  Store parts close to the location where assembly will take place, in the order of assembly stages, to reduce unnecessary movement and speed up workflow.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Tool Identification and Fabrication Planning

Group Size: 4–6 participants

Materials

- Printouts or photos of different carpentry tools (panel saw, jointer, edge bander, drill, etc.)
- Sample component drawings or basic part specifications
- Chart paper or flipchart
- Markers
- Sticky notes

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Begin with a brief discussion on the importance of choosing the right tools and techniques for precise fabrication of wooden components. Review common fabrication tools and their functions.

2. **Group Task Assignment**

   Each group receives a sample drawing or description of a furniture component (e.g., cabinet side panel, table leg, shelf). They must:

   - Identify which tools would be required to fabricate it.
   - Outline the steps involved in cutting, joining, finishing, and labelling.
   - List the key checkpoints for quality such as edge smoothness, grain direction, joinery precision, etc.

3. **Group Presentation**

   Each group presents:

   - Their tool selection with justification.
   - Their planned fabrication steps.
   - Any risks or safety precautions to observe during the operation.

4. **Class Discussion**

   Facilitate a reflection on:

   - The reasoning behind tool choices.
   - How planning impacts material accuracy and surface finish.
   - Importance of stacking and labelling after fabrication.

Activity	Duration	Resources used
Tool Identification and Fabrication Planning	45-60 minutes	Printouts or photos of different carpentry tools (panel saw, jointer, edge bander, drill, etc.), Sample component drawings or basic part specifications, Chart paper or flipchart, Markers, Sticky notes etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage participants to discuss why specific tools suit fabrication tasks.
- Clarify differences between cutting tools, surface finish tools, and edge tools.
- Emphasize the need for grain direction matching and dimensional accuracy for fitment during assembly.

Unit 11.5: Quality Checks, Surface Treatment, and Finishing

Unit Objectives

At the end of this unit, participants will be able to:

1. Conduct visual and dimensional checks to verify cut part accuracy and symmetry.
2. Sand surfaces and edges as per project finish level using manual and mechanical tools.
3. Apply laminates or veneers neatly and check for adhesion quality.
4. Report fabrication defects such as cracks, chipping, or incorrect joinery for corrective action.
5. Maintain a checklist of finished parts ready for assembly or dispatch.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential practices involved in checking the quality of fabricated components, performing surface treatment, and applying finishing materials. Participants will learn how to inspect cut parts for accuracy, smooth surfaces using sanding techniques, apply laminates or veneers properly, and report any fabrication defects. The unit also covers the importance of maintaining a checklist to ensure all parts are ready for final assembly or dispatch.

Ask

Ask the participants the following questions:

- Why is it important to check the dimensions and surface quality of furniture parts before sending them for assembly?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Quality Checks, Surface Treatment, and Finishing

This session focuses on ensuring the quality, appearance, and readiness of fabricated furniture components before assembly or dispatch. It involves careful inspection of part dimensions and surface quality, application of surface finishes, and maintaining documentation to support defect-free production. These practices help maintain product standards, customer satisfaction, and efficiency in the overall workflow.

1. **Conduct Visual and Dimensional Checks to Verify Cut Part Accuracy and Symmetry**
    - Participants will learn how to carefully inspect fabricated components for consistency in dimensions and shape. This includes checking length, width, depth, and angles using tools like measuring tapes, rulers, and try squares.
    - They will be trained to look for visible irregularities such as asymmetrical cuts, uneven thickness, or misaligned corners that may cause issues in fitting or joining.
    - Ensuring accurate dimensions and symmetry helps reduce rework, supports seamless assembly, and maintains overall product quality.

2. **Sand Surfaces and Edges as per Project Finish Level Using Manual and Mechanical Tools**
    - Participants will practice sanding techniques to prepare surfaces for painting, polishing, or laminate application. This includes edge rounding and removing splinters or sharp protrusions.
    - Both manual (sandpaper blocks) and mechanical tools (orbital or belt sanders) will be used, depending on the type of material and desired smoothness.
    - They will understand how to choose suitable grit levels—for example, starting with coarse grit to remove roughness and finishing with fine grit for smoothness.

3. **Apply Laminates or Veneers Neatly and Check for Adhesion Quality**
    - This step involves selecting the appropriate laminate or veneer material based on design and durability requirements.
    - Participants will learn the application process: surface cleaning, adhesive spreading, alignment, pressing, and edge trimming.
    - They will be taught to check for proper adhesion by inspecting for air bubbles, wrinkles, loose corners, and glue seepage—ensuring the surface finish is professional and long-lasting.

4. **Report Fabrication Defects Such as Cracks, Chipping, or Incorrect Joinery for Corrective Action**
    - Participants will be trained to visually identify signs of fabrication errors like small cracks in wood, chipped corners, open joints, or incorrect hole placement.
    - They will learn how to log these issues in defect reporting sheets or digital checklists and communicate them to the supervisor.
    - Early detection and reporting help prevent damaged or weak parts from being assembled or dispatched, improving overall product integrity.

5. **Maintain a Checklist of Finished Parts Ready for Assembly or Dispatch**
    - To ensure proper tracking of all completed components, participants will maintain a checklist that includes the part name, quantity, inspection status, and any finishing notes.

- This helps avoid mix-ups, missing parts, or delays during assembly or shipment.
- The checklist also acts as a verification tool for quality control supervisors and contributes to smoother handovers in the production chain.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Inspecting and Reporting on Finished Furniture Parts

Group Size: 4–6 participants

Materials:

- Sample wooden panels or printed images of finished parts (with visible quality issues or imperfections)
- Printed quality checklists (including parameters like cut accuracy, finish level, edge smoothness, adhesion, and defects)
- Chart paper or flipchart
- Markers and pens
- Sticky notes

Activity Duration: 45–60 minutes

Instructions

1. **Introduction**

   Start with a short discussion on why final quality checks and surface treatments are essential before assembly or dispatch. Emphasize the role of part accuracy, finish uniformity, and documentation in maintaining product standards.

2. **Inspection Task**

   Each group receives 2–3 sample parts or images of components with varying quality. Using the checklist:

   - Examine each item for any visible issues such as rough edges, chipped corners, glue stains, incorrect symmetry, or poor finish.
   - Discuss and record all observations.
   - Decide whether the part is acceptable, needs touch-up, or should be rejected.

3. **Report Preparation**

   Each group prepares a short report on chart paper that includes:

   - Observed issues and quality concerns

- Suggested rework or correction methods
- Final recommendation (Accept / Rework / Reject)

Presentations and Group Feedback

Groups present their findings and recommendations. Invite questions from other groups to encourage peer learning and discussion on quality standards and finishing processes.

Activity	Duration	Resources used
Inspecting and Reporting on Finished Furniture Parts	45-60 minutes	Sample wooden panels or printed images of finished parts (with visible quality issues or imperfections), Printed quality checklists (including parameters like cut accuracy, finish level, edge smoothness, adhesion, and defects), Chart paper or flipchart, Markers and pens, Sticky notes etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage all participants to refer to standard quality parameters during inspections.
- Help clarify the difference between acceptable imperfections and defects that need rework.
- Emphasize good reporting practices—using clear notes, labels, and highlighting observations neatly.

Exercise

Multiple Choice Questions (MCQs)

1. Which tool is most suitable for precise edge trimming in furniture component fabrication?
   a. Chisel
   b. Router
   c. Hammer
   d. Wrench
   Answer: b. Router

2. What does a sectional view in a drawing help visualize?
   a. External shape only
   b. Weight of the component
   c. Internal structure and joinery
   d. Grain direction only
   Answer: c. Internal structure and joinery

3. What type of engineered board is best suited for moisture-prone areas?
   a. MDF
   b. Particle Board
   c. Plywood
   d. Softwood
   Answer: c. Plywood

4. What is the primary purpose of a cutting list in fabrication?
   a. To record finished products
   b. To list workers assigned to the job
   c. To plan part sizes and reduce material wastage
   d. To check prices of materials
   Answer: c. To plan part sizes and reduce material wastage

Fill in the Blanks

1. The tool used to measure and mark right angles in carpentry is the _____.
   Answer: set square

2. Visual inspection helps identify issues like _____, poor adhesion, or chipped corners.
   Answer: surface cracks

3. Laminates must be applied in a way that avoids _____ and ensures clean edges.
   Answer: bubbles

4. A _____is commonly used to cut large board sheets into specified dimensions.

Answer: panel saw

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Jointer	a. Makes decorative profiles
2. Edge bander	b. Creates smooth and straight edges
3. Measuring tape	c. Applies edge finishing tape
4. Router	d. Measures dimensions

Answers: 1 - b, 2 - c, 3 - d, 4 - a

2. Match Column A with Column B correctly.

Column A	Column B
1. Grain direction arrow	a. Shows acceptable size variation
2. Tolerance mark (±)	b. Indicates wood fiber alignment
3. Sectional line	c. Specifies joint clearance
4. Fit note	d. Represents internal cut surface

Answers: 1 - b, 2 - a, 3 - d, 4 - c

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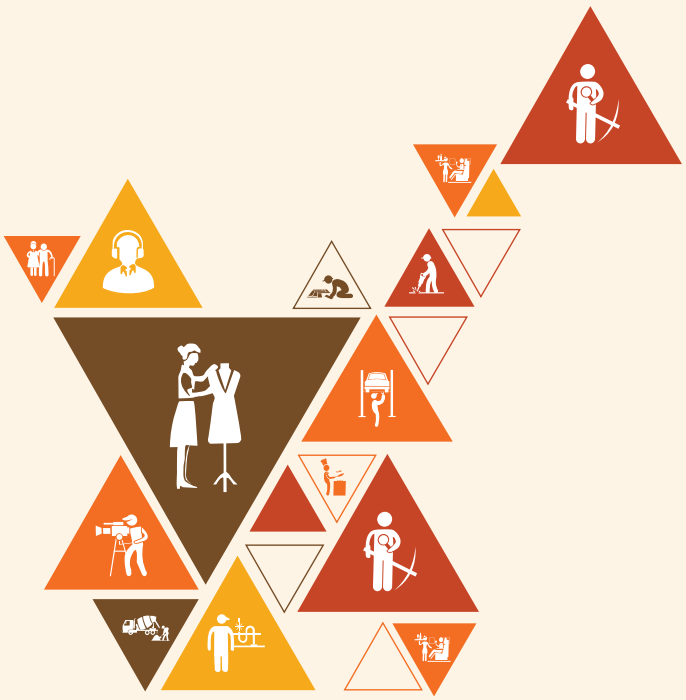
12. Joinery, Assembly, and Surface Finishing

Unit 12.1: Joinery Types, Fit, and Functionality
Unit 12.2: Tools, Adhesives, and Product Assembly
Unit 12.3: Surface Preparation and Finishing Techniques
Unit 12.4: Quality Control and Process Planning



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify commonly used wood joints in furniture construction such as butt joints, lap joints, mortise and tenon, dovetail, dowel joints, and box joints, and describe their shapes and configurations.
2. Explain the function of each joint in terms of strength, load-bearing ability, ease of fabrication, and suitability for different furniture parts like frames, corners, and panels.
3. Compare joints in terms of visibility, aesthetic finish, mechanical strength, and whether they allow for disassembly or not.
4. Select the appropriate type of joint based on furniture material, design requirements, available tools, and stress location.
5. Identify tools used for joinery tasks such as tenon saws, chisels, mallets, dowel jigs, mortising machines, and drill presses.
6. Use appropriate joining accessories such as wood glue, screws, nails, dowels, and brackets based on joint type and expected load.
7. Apply wood adhesives correctly by using brushes or rollers, ensuring even spread, correct open time, and pressure maintenance.
8. Demonstrate safe and proper use of clamps, jigs, and alignment blocks to stabilize components during assembly or drying.
9. Match grain direction and orientation across panels and frame parts to ensure both structural consistency and surface appearance.
10. Assemble components like side frames, top panels, carcasses, and dividers following a systematic order to avoid rework.
11. Identify and use surface preparation tools such as abrasive pads, hand sanders, orbital sanders, wood fillers, and cleaning rags.
12. Apply surface preparation methods including sanding, edge rounding, putty filling, grain sealing, and wiping to prepare components for painting or laminating.
13. Remove surface defects such as glue marks, small cracks, dents, and splinters before final finishing.
14. Ensure surfaces are smooth, uniform, and clean from dust or oil before applying further treatments or lamination sheets.
15. Create a quality checklist for joinery and assembly that includes parameters such as joint tightness, flush alignment, symmetry, grain matching, and corner square.
16. Explain the need for process control to prevent cumulative errors during multi-stage furniture construction (cutting, joining, finishing).
17. Identify common problems during assembly such as panel twist, poor adhesion, or joint gaps and apply early detection steps to avoid final product defects.
18. Maintain documentation on joinery types used, assembly times, defects observed, and materials consumed for traceability and quality monitoring.
19. Analyze current assembly practices and suggest workflow changes such as pre-checking materials, modifying clamping sequences, or standardizing adhesive application to improve consistency.
20. Recommend techniques for reducing rework, such as mock fitting before final joining, using assembly templates, or assigning tasks based on worker skill level.

Unit 12.1: Joinery Types, Fit, and Functionality

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify major types of wood joints used in furniture such as butt, lap, mortise and tenon, and dovetail.
2. Explain how different joints distribute load and enhance structural integrity.
3. Choose appropriate joint types based on material, function, and design details.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the different types of wood joints used in furniture making, such as butt joints, lap joints, mortise and tenon, and dovetail joints. Participants will explore how each joint supports structural integrity and distributes load. The unit also guides participants in selecting appropriate joint types based on the material, function, and design of the furniture component.

Ask

Ask the participants the following questions:

- Can you name one type of joint that is commonly used to connect two pieces of wood in furniture?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Joinery Types, Fit, and Functionality

In this session, participants will study about the essential types of wood joints used in furniture making and understand how each contributes to the strength, appearance, and usability of the product. Emphasis is placed on the functional role of joints in distributing loads, enhancing durability, and achieving seamless integration in furniture components. The session also equips participants with decision-making skills to choose suitable joinery methods based on materials and design requirements.

1. **Identify Major Types of Wood Joints Used in Furniture**
    - Participants will study various joints that are fundamental to carpentry and furniture fabrication.
    - Butt Joint: This is the simplest type of joint where two pieces of wood are joined at their ends or edges, usually with glue or mechanical fasteners. While easy to make, it offers minimal strength on its own.
    - Lap Joint: Created by overlapping sections of two wood pieces. It offers greater surface area for bonding and slightly better strength than a butt joint.
    - Mortise and Tenon Joint: A strong traditional joinery method where a tenon (tongue) on one piece fits into a mortise (hole) on another. It is ideal for frames and load-bearing furniture like chairs and tables.
    - Dovetail Joint: Known for its interlocking shape resembling a bird's tail, this joint is highly resistant to pulling apart. It is commonly used in drawers and cabinet corners due to its durability and decorative appeal.
    - Participants will also observe real samples or images of these joints to better identify their form and purpose.

2. **Explain How Different Joints Distribute Load and Enhance Structural Integrity**
    - Each joint type plays a specific role in how a piece of furniture withstands mechanical stress.
    - Mortise and tenon joints distribute loads evenly and are particularly good for resisting both tension and compression, making them ideal for legs, rails, and structural frames.
    - Dovetail joints are excellent for resisting forces that pull pieces apart such as in drawer fronts and add decorative value due to their angled interlocks.
    - Lap joints provide moderate strength and are often used in panel framing or temporary structures where easy alignment is important.
    - Butt joints, while simple and quick, are structurally weak and need reinforcement through glue, dowels, or fasteners to bear any significant load.
    - Understanding how these joints behave under different conditions helps participants choose the right joint for durability and performance.

3. **Choose Appropriate Joint Types Based on Material, Function, and Design Details**
    - Selecting the right joint depends on various practical and design considerations.
    - For example, softwoods like pine may not hold up well with joints that require tight compression, such as mortise and tenon, unless reinforced.
    - In contrast, hardwoods like teak or oak support more intricate joints like dovetails due to their density and strength.

- Function also plays a critical role — joints used for load-bearing parts (like table legs or frames) need to be stronger than those used for decorative trim.
- Aesthetic goals matter too — hidden joints like biscuit or dowel joints are preferred when a clean surface is needed, while exposed dovetails may be chosen for visual appeal.
- The unit guides participants to make practical decisions by matching joint types to specific furniture parts and functions, such as shelves, drawers, frames, and panels.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Real-Life Joinery Challenges and Decision-Making

Group Size: 4–6 participants

Materials:

- Flipchart or whiteboard
- Markers
- Sticky notes (2–3 colours)
- Joinery scenario cards (examples provided below)

Activity Duration: 60 minutes

Instructions

1. **Introduction**

   Begin with a short group discussion on why selecting the right wood joint matters in carpentry—considering factors like strength, function, appearance, and ease of making.

2. **Distribute Scenario Cards**

   Each card describes a practical challenge related to joinery selection or functionality in furniture-making. These are based on real-world contexts involving different materials, load conditions, or usage requirements.

3. **Group Discussion and Planning**

   Each group will discuss their joinery scenario using the following guiding prompts:

   - What type of load or movement will the joint handle?
   - Which joints are best suited to this situation?
   - What are the risks if the wrong joint is selected?
   - How would they explain their choice to a junior team member?

4. **Group Presentations**

   Each group presents their joinery challenge, the decision they took, and why their chosen joint is appropriate. Groups can use sticky notes to mark key points and visuals to illustrate ideas.

5. **Debriefing & Key Takeaways**

   Wrap up the session by reflecting on:

   - How different joints serve different functional needs
   - The role of materials and forces in selecting joints
   - The balance between strength, aesthetics, and feasibility

Examples of Scenario Cards

Scenario 1

You are building a cabinet frame that must support a countertop. The client wants strong support without visible screws. What joints would you choose and why?

Scenario 2

You're making drawers for a high-end dresser. The client values durability and craftsmanship. Which joint is best suited for the drawer sides and back?

Scenario 3

You're fabricating a folding table that will be assembled and disassembled multiple times. What joinery options provide functionality and ease of use?

Activity	Duration	Resources used
Real-Life Joinery Challenges and Decision-Making	60 minutes	Flipchart or whiteboard, Markers, Sticky notes (2–3 colours), Joinery scenario cards (examples provided below) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage participants to draw their joint choices on the flipchart.
- Make sure they justify their decision based on load, material type, and visibility.
- Circulate during group discussions to prompt questions like "Would this joint hold if someone sat on the edge?" or "What if the material is plywood instead of hardwood?"

Unit 12.2: Tools, Adhesives, and Product Assembly

Unit Objectives

At the end of this unit, participants will be able to:

1. Select appropriate tools for cutting, assembling, and reinforcing joints during furniture construction.
2. Use glues, screws, pins, and fasteners correctly during the assembly of panels and frames.
3. Demonstrate safe use of clamps, jigs, and alignment tools to stabilize parts during fixing.
4. Match wood grains and ensure seamless assembly for both visual appeal and strength.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the selection and use of tools, adhesives, and fasteners required for assembling furniture components. Participants will learn how to choose the right hand and power tools, apply glues and screws effectively, and use clamps and jigs to stabilize parts during assembly. The unit also covers techniques for matching grains and ensuring clean, strong joints for both functional and aesthetic quality.

Ask

Ask the participants the following questions:

- What is one common tool used to hold furniture parts in place while the glue dries?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Tools, Adhesives, and Product Assembly

This session focuses on the essential tools, adhesives, and techniques required for assembling furniture products effectively. Participants will understand how to select the correct tools, use adhesives and fasteners properly, and ensure both the structural strength and visual appeal of the final product.

1. **Selecting Suitable Tools for Assembly Tasks**
    - **Identify tool purpose clearly:** Different tools serve specific functions during furniture assembly. For example, saws are for cutting panels, drills are for creating screw holes, and routers are used for edge shaping or decorative detailing. Knowing which tool to use for each task is the first step to efficient assembly.
    - **Match tools to material properties:** Hardwoods like teak or sal require different cutting blades than softwoods or engineered boards like MDF. Selecting the wrong tool can lead to burn marks, splinters, or dull blades.
    - **Ensure clean, safe, and precise operation:** Tools that are too large, dull, or inappropriate for the task can cause accidents or poor-quality finishes. Using the correct type and size of tool ensures safety and accuracy in cuts and joints.
    - **Routine maintenance and checks:** Tools should be cleaned, sharpened, and checked for damage before use. For example, a dull chisel or a bent blade can lead to poor workmanship and increase physical effort during work.

2. **Using Adhesives and Fasteners Effectively**
    - **Select adhesive as per use case:** Wood glue is ideal for porous wood-to-wood bonding; contact adhesive works best for laminates and veneers; epoxy is suitable for gap-filling or moisture-prone areas. Choosing the right adhesive ensures lasting bonds.
    - **Proper glue application techniques:** Apply glue in a uniform layer using a brush, roller, or nozzle. Over-application can cause messy squeeze-out, while under-application leads to weak joints.
    - **Complement with mechanical fasteners:** Use screws, nails, pins, or dowels to support glued joints. These reinforcements add strength during curing and help align parts more securely.
    - **Respect setting and curing times:** After applying glue and pressing parts together, allow sufficient time (as per adhesive instructions) for the joint to dry and harden. Premature movement can break the bond and compromise quality.

3. **Applying Clamps and Jigs for Precision**
    - **Choose appropriate clamping tools:** Use different clamps based on the shape and scale of the project—bar clamps for straight panels, C-clamps for smaller parts, and corner clamps for box structures.
    - **Avoid uneven or excessive pressure:** Apply just enough pressure to hold components in place. Over-tightening can warp wood, create indentations, or push glue out of the joint.
    - **Use jigs to maintain consistency:** Templates and jigs help replicate accurate cuts, drill holes, or joinery alignments. They are especially useful in batch production or for parts requiring strict tolerance.
    - **Monitor alignment during setup:** Use measuring tools like set squares and try squares to verify that parts are aligned correctly during clamping. Misalignment at this stage can ruin the entire assembly.

4. **Ensuring Seamless Fit and Aesthetic Finish**
    - **Grain direction alignment for appearance:** When assembling panels or frames, make sure that wood grain patterns align in a natural flow. This enhances the visual appeal and gives a high-end look to finished products.
    - **Tight joints ensure durability:** Use precision marking and cutting techniques to avoid gaps or overlaps. A properly fit joint distributes load evenly and increases the lifespan of the furniture.
    - **Hide fasteners where possible:** Countersink screws so they don't protrude. You can cover them with wood plugs or filler for a clean surface before polishing or laminating.
    - **Final surface check and cleanup:** Before moving on to finishing, wipe off excess glue, sand rough edges, and inspect the surfaces for dents, scratches, or imperfections. This ensures professional quality and customer satisfaction.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Furniture Joint Assembly Practice and Evaluation

Group Size: 4–5 participants

Materials Required:

- Pre-cut wooden pieces (for simple joints: butt, lap, mortise & tenon)
- Assortment of hand tools (chisels, mallet, hammer, screwdriver)
- Adhesives (wood glue, epoxy)
- Fasteners (screws, pins)
- Clamps, jigs, measuring tape
- Markers, checklist templates, and observation sheets

Activity Duration: 60–75 minutes

Instructions:

1. **Briefing**

    Begin with a short demo on how to prepare, align, and assemble joints using tools and adhesives. Explain correct usage of clamps and the importance of grain direction in visible joints.

2. **Assembly Task**

    Each group is given a mini assembly task. They must:

    o Select appropriate tools and adhesives

    o Match and align wood grains

- Assemble a small frame or panel using butt/lap joints
- Apply clamps correctly and allow curing time as per adhesive type

3. **Evaluation and Presentation**

   Each group presents their joint or frame, explaining:

   - Why they chose a particular tool or adhesive
   - Any challenges faced in alignment or fixing
   - How they ensured visual appeal and joint strength

Activity	Duration	Resources used
Furniture Joint Assembly Practice and Evaluation	60-75 minutes	Pre-cut wooden pieces (for simple joints: butt, lap, mortise & tenon), Assortment of hand tools (chisels, mallet, hammer, screwdriver), Adhesives (wood glue, epoxy), Fasteners (screws, pins), Clamps, jigs, measuring tape, Markers, checklist templates, and observation sheets etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage participants to test adhesive bonding by lightly tapping or flexing the joint (if dry) — under supervision.
- Ensure safety gear like gloves and goggles are used, especially when using adhesives and clamps.
- Observe and provide feedback on tool handling technique, glue spread, alignment accuracy, and clamp usage.

Unit 12.3: Surface Preparation and Finishing Techniques

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify tools and materials used for surface preparation including abrasives, fillers, and cleaners.
2. Apply sanding, puttying, and grain sealing techniques based on finishing requirements.
3. Ensure smooth, defect-free surfaces for further finishing or lamination.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential steps involved in preparing wooden surfaces before final finishing. Participants will learn about tools and materials like sandpaper, fillers, and cleaners, as well as methods such as sanding, puttying, and sealing. The focus will be on achieving smooth, defect-free surfaces suitable for paint, polish, or laminate, ensuring both visual quality and long-term durability in finished furniture products.

Ask

Ask the participants the following questions:

- What is the purpose of sanding a wooden surface before applying polish or laminate?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Surface Preparation and Finishing Techniques

Surface preparation and finishing are essential stages in the furniture fabrication process that directly affect the product's appearance, durability, and quality. This unit focuses on using appropriate tools and methods such as sanding, filling, and grain sealing to achieve a clean and uniform surface ready for final finishing or lamination.

1. **Identifying Tools and Materials Used for Surface Preparation**

   - **Sandpaper (abrasives)**

     These are essential for sanding down surfaces to remove rough edges, marks, and imperfections. Coarse grits (e.g., 60–80) are used for initial rough sanding, while medium to fine grits (e.g., 120–320) are used for smooth finishing before polish or lamination. Choosing the right grit sequence is critical to avoid surface damage.

   - **Wood fillers and putties**

     These are paste-like substances applied to cracks, nail holes, or surface dents in the wood. Once dry, the area is sanded to match the surface level. This ensures that the final finish looks clean and uniform without visible flaws.

   - **Surface cleaners and tack cloths**

     These are used after sanding to remove fine dust particles that are invisible to the eye but can affect the adhesion of finishes or laminates. Tack cloths are slightly sticky and are effective in lifting off micro-dust without damaging the surface.

   - **Grain fillers or sanding sealers**

     Used especially on open-grain wood like oak, teak, or ash, these materials seal the pores so that finishing products don't get absorbed unevenly. This results in a smoother, more polished look and prevents surface blotching.

2. **Applying Sanding, Puttying, and Grain Sealing Techniques**

   - **Initial sanding**

     This step prepares the raw wood surface by removing saw marks, glue residues, and irregularities. It uses coarse grit sandpaper to shape and level the surface but must be done evenly to avoid over-sanding one area.

   - **Progressive sanding**

     After rough sanding, the surface is further smoothened using medium (100–150) and then fine (180–320) grit papers. Each stage removes the scratches left by the previous one. This gradual process helps in achieving a uniform and soft surface texture.

   - **Puttying or filling**

     Once the surface is sanded, filler is applied to any visible holes, gaps, or cracks. After drying, this filler is again sanded to ensure it is level with the wood. Correct filler selection and application ensure invisible patching under finishing.

   - **Grain sealing**

     Grain fillers are spread onto the surface with a brush or scraper to fill the wood pores. Once dried and sanded, they help in achieving a flat, closed-grain look which is especially useful before applying high-gloss or laminate finishes.

3. **Ensuring Smooth, Defect-Free Surfaces for Further Finishing or Lamination**

   - **Final inspection of the surface**

     Before moving to finishing, the surface is checked visually and by running fingers across it to detect bumps, splinters, or irregularities. Use of angled light helps spot inconsistencies.

   - **Correct sanding direction and pressure**

     Sanding must always be done along the wood grain. Cross-grain sanding can cause visible scratches and ruin the finish. Applying gentle, even pressure prevents gouging or creating low spots.

   - **Preparing for finishing or lamination**

     Once sanding and sealing are completed; the surface is wiped clean again. A smooth surface allows finishes like paints, varnishes, polishes, or laminates to bond evenly without peeling, bubbling, or lifting.

   - **Improved product quality and durability**

     A well-prepared surface results in an attractive, professional-looking product that resists moisture, stains, or mechanical wear. It also ensures fewer touch-ups and rework during final inspection or client delivery.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Surface Preparation Practice and Evaluation

Group Size: 4–6 participants

Materials Required:

- Wooden sample panels (unfinished)
- Sandpaper (various grits), putty, grain sealer
- Cleaning cloths
- Safety gloves and masks
- Evaluation checklist (prepared by facilitator)
- Markers and chart paper for reflection

Activity Duration: 60 minutes

Instructions

1. **Introduction**

   Begin with a short explanation on why surface preparation is important. Discuss common defects that arise from poor preparation such as visible grain, dents, or uneven finish.

2. **Task Assignment**

   Each group will receive a set of wooden panels and surface prep materials. Their task is to:

   - Inspect the surface for defects
   - Sand the panels (starting with coarse and ending with fine grit)
   - Apply putty on dents or gaps
   - Clean the surface and apply a thin layer of grain sealer

3. **Peer Evaluation & Presentation**

   Groups will exchange panels and evaluate each other's work using a simple checklist that includes smoothness, filler usage, and surface cleanliness. Then each group will present one key learning or challenge they faced.

4. **Wrap-up Discussion**

   Facilitator summarizes common mistakes, good practices observed, and real-world importance of consistent surface prep in carpentry.

Activity	Duration	Resources used
Surface Preparation Practice and Evaluation	60 minutes	Wooden sample panels (unfinished), Sandpaper (various grits), putty, grain sealer, Cleaning cloths, Safety gloves and masks, Evaluation checklist (prepared by facilitator), Markers and chart paper for reflection etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Safety First**

  Ensure participants wear masks while sanding and gloves while applying fillers or sealers.

- **Checklist Support**

  Provide a simple evaluation checklist with criteria like "Smooth Surface," "Proper Filler Application," and "Clean Finish."

- **Encourage Peer Feedback**

  Promote respectful and constructive comments during peer evaluations to reinforce teamwork and observational skills.

Unit 12.4: Quality Control and Process Planning

Unit Objectives

At the end of this unit, participants will be able to:

1. Prepare a checklist to monitor joint fit, alignment, assembly sequence, and surface quality.
2. Explain the importance of process control and how to detect errors early during assembly.
3. Document production and finishing data for traceability and workflow review.
4. Suggest workflow improvements to increase consistency and reduce rework.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to plan and control the quality of furniture components during and after assembly. Participants will learn to prepare checklists for inspecting joints, alignment, and surface finishes, as well as understand how to detect and correct errors early. The unit also covers how to document production and finishing data and suggest workflow improvements to avoid rework and improve efficiency.

Ask

Ask the participants the following questions:

- What is the purpose of using a checklist during furniture assembly?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Quality Control and Process Planning

In carpentry and furniture fabrication, maintaining quality at each step is essential to ensure durability, visual appeal, and client satisfaction. Quality control involves continuous checks, proper documentation, and process adjustments to minimize errors and rework. Process planning, on the other hand, helps in organizing tasks in a logical and efficient sequence. Together, these practices support smoother operations, consistency, and timely delivery.

1. **Preparing Quality Checklists**
   - **Covers All Key Inspection Parameters**

     The checklist acts as a comprehensive tool covering important checkpoints such as tightness of joints, proper alignment of edges, correctness of assembly sequence, and surface quality (e.g., smoothness, absence of dents or scratches).
   - **Ensures Consistent Quality Standards**

     It helps maintain uniformity in production by ensuring that every component passes through the same level of inspection before moving to the next step or being sent for final finishing.
   - **Supports Accountability Among Team Members**

     By using a documented checklist, each person involved in the assembly process knows what is expected and is responsible for verifying their part of the task.
   - **Minimizes Rework and Reduces Wastage**

     Spotting errors during the process—rather than at the end—allows for early correction, reducing the time and materials lost in repairs or replacements.

2. **Detecting Errors Early through Process Control**
   - **Implements Stage-Wise Monitoring**

     Instead of waiting until final inspection, quality checks are integrated at every major stage like cutting, joinery, assembly, and finishing. This step-by-step control helps reduce cumulative errors.
   - **Focuses on Common Faults and Their Prevention**

     Issues like inaccurate drilling, loose fit, or poor glue application can be caught early. This reduces the risk of product rejection at later stages.
   - **Improves Team Awareness and Skill**

     Continuous checking encourages workers to self-evaluate and become more attentive to detail. It also builds skill in identifying subtle issues early.
   - **Enhances Client Satisfaction and Delivery Time**

     Early corrections prevent delays in finishing or dispatching, leading to more timely delivery and fewer complaints from clients.

3. **Documenting Production and Finishing Data**
   - **Maintains Detailed Task Records**

     Sheets are maintained to track which tasks are completed, who handled them, and what materials were consumed. This allows for better project tracking and accountability.

- **Supports Traceability and Quality Audits**

  In the event of any issue, data logs help trace back to the exact step or team involved. This is especially useful in identifying process weaknesses.

- **Includes Finishing Details for Repeat Orders**

  Details such as the brand and type of laminate, sanding method, and polish used are recorded so that they can be reproduced for future orders or repairs.

- **Assists in Productivity Evaluation**

  The documented data can also help supervisors review progress, identify delays, and assign workloads more efficiently.

4. **Suggesting Workflow Improvements**

- **Encourages Observation and Feedback from the Floor:** Participants are encouraged to share what they observe during daily tasks—such as difficulties in accessing tools, overlapping tasks, or repeated movement between areas.
- **Finds Ways to Eliminate Inefficiencies:** Suggestions could include reorganizing the workstation, using tool trolleys, or changing the sequence of operations to reduce idle time or waiting.
- **Builds a Culture of Continuous Improvement:** By involving participants in improvement planning, they become more engaged and proactive about refining work practices.
- **Leads to Long-Term Gains in Productivity:** Small improvements such as using pre-prepared kits or optimizing clamp positioning can result in significant time and effort savings across multiple projects.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Creating and Reviewing a Quality Control Checklist for Assembly

Group Size: 4–6 participants

Materials:

- Sample assembly drawings
- Printed quality control (QC) checklist templates
- Sample fabricated components (or images)
- Markers, pens
- Flipchart or whiteboard

Activity Duration: 60 minutes

Instructions

1. **Introduction**

   Begin with a discussion on why quality control is important in furniture manufacturing. Emphasize the role of checklists in identifying defects early and reducing rework.

2. **Checklist Development**

   Each group is given a scenario where they are responsible for checking the assembly of a cabinet or table. Based on the drawing and sample components provided, they must:

   - Identify what checkpoints should be included in a QC checklist (e.g., joint tightness, surface finish, alignment).
   - Draft their own checklist using the template.

3. **Checklist Application**

   Groups then use their checklist to review the sample components or images. They must note any visible defects and record their observations clearly.

4. **Presentation & Feedback**

   Each group presents their checklist and findings. The facilitator and other groups provide feedback, focusing on the practicality, clarity, and completeness of each checklist.

Activity	Duration	Resources used
Creating and Reviewing a Quality Control Checklist for Assembly	60 minutes	Sample assembly drawings, Printed quality control (QC) checklist templates, Sample fabricated components (or images), Markers, pens, Flipchart or whiteboard etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage realistic thinking**

  Urge participants to consider actual workshop limitations like time pressure or missing tools when developing their checklist.

- **Highlight traceability**

  Discuss how documenting even small issues helps in improving future processes and reduces cumulative errors.

- **Support collaboration**

  Remind participants to divide roles within the group (e.g., scribe, presenter, inspector) to mirror real-world quality control teamwork.

Exercise

Multiple Choice Questions (MCQs)

1. Which joint provides excellent mechanical strength and is commonly used in traditional frame construction?
   a. Butt joint
   b. Lap joint
   c. Mortise and tenon joint
   d. Dowel joint
   Answer: c. Mortise and tenon joint

2. What is the purpose of using a clamp during assembly?
   a. To paint the surface evenly
   b. To ensure strong and stable holding of glued parts
   c. To cut the edges square
   d. To clean dust before lamination
   Answer: b. To ensure strong and stable holding of glued parts

3. Which tool is typically used for creating precise holes for dowel joints?
   a. Chisel
   b. Mortising machine
   c. Dowel jig
   d. Mallet
   Answer: c. Dowel jig

4. Which method is used to remove surface imperfections like glue marks or dents before final finishing?
   a. Edge banding
   b. Sanding and filling
   c. Drilling and routing
   d. Lamination
   Answer: b. Sanding and filling

Fill in the Blanks

1. A _____ joint is the simplest type of joint and involves joining two pieces end to end.
   Answer: butt

2. During surface preparation, _____ is applied to fill minor cracks or uneven areas.
   Answer: wood filler

3. A checklist for joinery should include checks for joint tightness, symmetry, and _____.
   Answer: grain matching

4. _____ tools like orbital sanders and hand sanders are used for achieving a smooth surface.

Answer: Abrasive

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Tenon saw	a. Driving dowels into holes
2. Mallet	b. Cutting straight tenons
3. Dowel jig	c. Aligning and drilling dowel holes
4. Drill press	d. Precise vertical drilling

Answers: 1 - b, 2 - a, 3 - c, 4 - d

2. Match Column A with Column B correctly.

Column A	Column B
1. Glue mark on surface	a. Apply filler and sand
2. Small surface dent	b. Sand the surface thoroughly
3. Panel twist during assembly	c. Panel twist during assembly
4. Joint gap	d. Use more adhesive and proper clamping pressure

Answers: 1 - b, 2 - a, 3 - c, 4 - d

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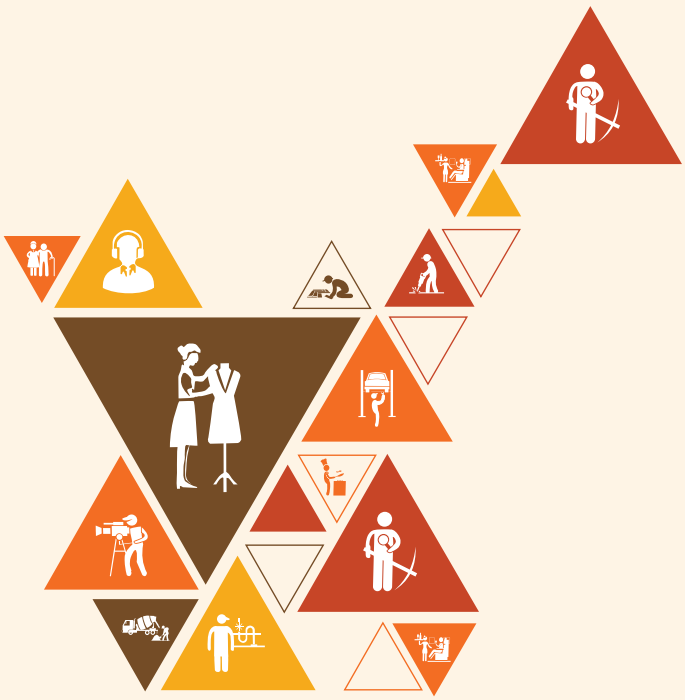
13. Installation, Handover, and Post-Work Reporting

Unit 13.1: Installation Planning and Execution
Unit 13.2: Defect Identification, Correction, and Post-Installation Clean-Up
Unit 13.3: Documentation, Handover, and Feedback Process



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Read and interpret different types of installation documents such as blueprint drawings, layout plans, and elevation sketches to identify mounting locations, hardware specifications, and part numbers.
2. Locate key references on installation drawings such as floor-to-wall offsets, appliance clearance zones, or centreline positions for mounting.
3. Select installation tools such as drilling machines, impact drivers, laser levels, measuring tapes, clamps, and safety PPE based on site conditions and installation type.
4. Set up safety barriers, cordon-off zones, and warning signage to ensure secure working during drilling, cutting, and fitting operations.
5. Install various furniture components including wall-mounted panels, shutters, cabinet carcasses, or display fixtures following alignment tools and fixed references.
6. Ensure structural integrity by checking plumb lines, horizontal levels, screw anchorage, and torque settings during installation.
7. Perform precise cut-outs for electrical switch boxes, plumbing outlets, or cable pass-throughs using jigsaws, hole saws, or routers while maintaining material strength and finish.
8. Identify installation-related defects such as gaps between wall and unit, visible scratches, tilted doors, or rattling drawers during or immediately after fitting.
9. Detect structural issues like improper anchoring, loose fasteners, or misaligned tracks through functional testing and visual checks.
10. Perform realignment, screw tightening, hinge readjustment, panel levelling, or other minor rework using appropriate hand tools and accessories.
11. Replace defective parts like cracked laminates, chipped mouldings, or damaged brackets using site-available spares or job cards.
12. Plan post-installation cleaning by sequencing activities such as clearing offcut debris, scraping adhesives, and collecting leftover hardware.
13. Supervise removal of protective films, dusting of fitted units, and waste segregation into recyclable and non-recyclable categories.
14. Document installation status using formatted checklists that include units installed, defects resolved, hardware used, and time of completion.
15. Fill in site records such as daily logs, handover sheets, product tag lists, and visual evidence (photos or signoffs) for final submission.
16. Compile handover documents including product guides, user instructions, warranty papers, and maintenance tips and organize them into a client file or folder.
17. Explain the completed scope of work to the client or site supervisor during handover, addressing any open points or pending tasks.
18. Use feedback forms or verbal interactions to capture client observations about functionality, cleanliness, and punctuality.
19. Suggest improvements to internal processes based on client remarks or observed site challenges for better planning in future projects.
20. Obtain formal sign-off from client or project supervisor by reviewing the checklist, verifying satisfaction, and securing written acknowledgment.

Unit 13.1: Installation Planning and Execution

Unit Objectives

At the end of this unit, participants will be able to:

1. Read and interpret installation blueprints, layout plans, and mounting instructions.
2. Select and set up appropriate tools and safety equipment required for site installation.
3. Install panels, shutters, or furniture components following accurate measurements and alignment protocols.
4. Make necessary cut-outs for electrical, plumbing, or fixture integrations without compromising product strength.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the step-by-step process involved in planning and executing the installation of furniture components at the site. Participants will learn how to read and interpret layout drawings, select suitable tools and safety gear, and carry out accurate installation of panels, shutters, or fixtures. The unit also covers how to make safe cut-outs for electrical or plumbing integrations without damaging the structure or compromising quality.

Ask

Ask the participants the following questions:

- What is the purpose of using a spirit level during furniture installation?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Installation Planning and Execution

In this session, participants will understand how to systematically plan, prepare, and execute the installation of furniture components such as panels, shutters, or complete assemblies. From interpreting layout plans to aligning parts accurately and making service cut-outs, this unit emphasizes precision, safety, and functional integration at the installation site.

1. **Reading and Interpreting Installation Plans**
   - **Understanding Blueprints and Layouts**

     Participants will learn how to read technical drawings such as floor plans, elevation views, and sectional details that show where furniture components should be positioned.
   - **Identifying Mounting Points**

     These plans include reference lines, dimensions, and fixing points which guide the exact location for each item, such as where a shutter or panel should be aligned or where hardware should be fixed.
   - **Avoiding Installation Errors**

     Accurate reading of layout plans helps in avoiding common on-site mistakes like incorrect alignment, misplacement of panels, or drilling in the wrong spot.

2. **Selecting Tools and Safety Equipment**
   - **Choosing Tools Based on Task**

     Participants will understand which tools are appropriate for drilling, screwing, aligning, or cutting tasks. For example, spirit levels help in alignment, while drills and bits of correct sizes are essential for mounting.
   - **Pre-Use Checks for Tools**

     Tools must be checked for sharpness, stability, and power supply before use. Faulty or uncalibrated tools can cause poor-quality installation or accidents.
   - **Using Personal Protective Equipment (PPE)**

     Safety gear such as gloves, goggles, helmets, and dust masks will be explained and demonstrated. This protects the participant from injury during tasks like drilling, cutting, or lifting heavy panels.

3. **Installing Panels and Components Accurately**
   - **Measuring and Marking the Installation Area**

     Participants will learn how to take accurate on-site measurements using layout drawings as reference and mark the positions using chalk, pencil, or tape.
   - **Alignment and Levelling Techniques**

     Before fixing, it is essential to ensure components are aligned horizontally and vertically. Tools like bubble levels, laser levels, and plumb lines will be used to check accuracy.
   - **Fixing Panels Securely**

     Fasteners, brackets, and adhesives will be used depending on the furniture part and its weight or location. Participants will also be taught how to handle corner units, wall-hung units, and floor-mounted pieces.

4. **Making Functional Cut-outs for Utilities**
    - **Purpose of Cut-outs**

      Many panels require openings for sockets, switches, plumbing lines, or appliance cables. Participants will understand where and how to make these cut-outs without damaging the product.
    - **Tools and Techniques**

      Tools like hole saws, jigsaws, and router bits are commonly used for making cut-outs. Careful marking, double-checking measurements, and working at safe speeds will be emphasized.
    - **Maintaining Structural Integrity**

      It is important that any cut-out does not weaken the panel. Participants will learn how to reinforce areas around large openings or avoid cutting near structural joints or fastener locations.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning a Furniture Installation with Focus on Accuracy and Site Coordination

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (various colours)
- Scenario cards (detailed below)
- Sample installation blueprint or layout diagram
- Chart paper and scale rulers

Activity Duration: 60 minutes

Instructions

1. **Setup and Briefing**

   Divide participants into small groups. Explain the objective of the activity—to simulate furniture installation planning by interpreting blueprints and resolving on-site challenges while ensuring accuracy, coordination, and safety.
2. **Scenario Card Distribution**

   Give each group a scenario card describing a site-specific installation challenge. Scenarios should require participants to think about layout interpretation, alignment, tool preparation, or cross-team communication.

3. **Group Discussion and Planning**

   Each group discusses their scenario using the following prompts:

   - What are the key components to be installed and where?
   - What tools and equipment are required?
   - What measurements and alignments are critical?
   - Are there any cut-outs or fixtures that must be considered?
   - What are the possible risks or coordination issues?
   - What is your plan for clear communication and workflow?

   Groups should prepare a mock layout or action plan on chart paper or whiteboard.

4. **Group Presentations**

   Each group presents:

   - Their scenario
   - Blueprint interpretation
   - Identified challenges
   - Proposed solutions and installation plan

   Encourage peer questions and constructive feedback.

5. **Debriefing and Key Takeaways**

   Facilitator leads a discussion:

   - What installation challenges were common?
   - How did planning tools (drawings, checklists) help?
   - What improved installation accuracy and team coordination?
   - What safety considerations were integrated?

Examples of Scenario Cards

Scenario 1

Your team is tasked with installing kitchen cabinets, but electrical outlets and plumbing lines are not marked on the blueprint. How do you adjust your plan to avoid cutting through essential services?

Scenario 2

The shutters for wardrobes are misaligned due to an uneven floor. How will your team measure and align the panels accurately while maintaining design intent?

Scenario 3

You are required to install a TV unit with a cut-out for cable routing. How will you mark and cut this section without damaging the panel or compromising strength?

Activity	Duration	Resources used
Planning a Furniture Installation with Focus on Accuracy and Site Coordination	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (various colours), Scenario cards (detailed below), Sample installation blueprint or layout diagram, Chart paper and scale rulers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Guide with Blueprint Basics**

  Ensure participants understand symbols, scales, and elevation marks before starting the task.
- **Encourage Realistic Thinking**

  Push for practical decisions—e.g., tool choice, sequence of installation, safety readiness.
- **Keep Teams Focused**

  Use a timer or gentle reminders to move them through discussion, drawing, and presentation stages.

Unit 13.2: Defect Identification, Correction, and Post-Installation Clean-Up

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify surface and structural defects such as misalignment, scratches, or loose hardware during or after installation.
2. Perform necessary adjustments and minor rework to ensure functional and visual correctness.
3. Plan and supervise post-installation site cleaning including removal of waste, adhesives, and packaging.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to identify common defects that may occur during or after the installation of furniture components, including issues like scratches, misalignment, and loose hardware. Participants will also learn how to make minor adjustments and perform touch-ups to restore quality. The unit concludes with steps for proper post-installation site clean-up to ensure a neat and professional finish.

Ask

Ask the participants the following questions:

- What should you do if you notice a scratch or loose hinge after installing a cabinet?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Defect Identification, Correction, and Post-Installation Clean-Up

In this session, participants will study how to assess, address, and finalize furniture installation work with a focus on quality and cleanliness. Identifying small errors, correcting them effectively, and ensuring a professionally finished site are key responsibilities that ensure client satisfaction and long-term durability of the installed products.

1. **Identifying Surface and Structural Defects**
   - **Surface Inspection**
     - Check for scratches, dents, glue marks, and chipped edges on all visible parts.
     - Use proper lighting to detect minor blemishes on finished surfaces.
   - **Structural Assessment**
     - Examine installed components (like shutters, panels, drawers) for misalignment, tilting, or warping.
     - Confirm that all parts are properly positioned and symmetrical using levels or measuring tapes.
   - **Hardware Verification**
     - Ensure all hardware (hinges, handles, brackets) is tightly secured and functions smoothly.
     - Identify any missing, loose, or wrongly fixed fittings that could impact durability or safety.

2. **Performing Adjustments and Minor Rework**
   - **Correcting Alignment and Fitting**
     - Realign shutters, doors, or panels using adjustment tools like screwdrivers, allen keys, and clamps.
     - Tighten or reposition hinges and brackets to ensure proper movement and fit.
   - **Touch-up and Minor Repair**
     - Use wood filler, putty, or colour-matched touch-up pens for scratches or minor surface damage.
     - Polish or buff surfaces to remove glue stains, adhesive residue, or fingerprints.
   - **Stability Checks and Fixes**
     - Test furniture for firmness and balance by applying light pressure.
     - Reinforce joints or supports if any wobbling, shifting, or looseness is observed.

3. **Planning and Supervising Post-Installation Clean-Up**
   - **Waste Removal and Segregation**
     - Collect and dispose of packaging, protective sheets, sawdust, or leftover materials.
     - Separate recyclable materials (like cardboard or plastic) from general waste.
   - **Furniture and Site Cleaning**
     - Wipe all installed surfaces using dry clothes or safe cleaning liquids suited for wood or laminates.

- Sweep or vacuum the floor around the worksite to remove dust, screws, or wood chips.

- **Final Handover Readiness**
  - Conduct a last visual check to ensure there are no loose items or unfinished fixes.
  - Leave the site neat, organized, and ready for use or client inspection.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Inspection and Rework Planning for Installed Furniture

Group Size: 4–6 participants

Materials Required:

- Sample installation plan or mock-up drawing
- Printed defect cards (scratches, misalignment, loose handles, etc.)
- Dummy hardware/tools (screwdriver, sandpaper, cloth)
- Post-installation clean-up checklist (printed)
- Whiteboard/flipchart & markers

Activity Duration: 45–60 minutes

Instructions:

1. **Setup**

   Provide each group with a mock installation layout or drawing and a set of defect cards representing common post-installation issues.

2. **Task 1 – Identify Defects**

   Participants will examine the given cards/drawings and note down what type of defects are present (e.g., scratch on panel, misaligned shutter, loose bracket).

3. **Task 2 – Plan**

   Each group will discuss and decide how to resolve each issue. They should list the correction method (e.g., tighten screws, apply filler, re-align components) and suggest appropriate tools.

4. **Task 3 – Clean-Up Plan**

   Based on the tasks completed, participants will prepare a quick checklist of post-installation cleaning steps (waste removal, adhesive wipe-down, floor sweeping, etc.).

5. **Presentation**

   Groups present their approach to defect correction and clean-up. Facilitator can invite cross-feedback from other teams.

Activity	Duration	Resources used
Inspection and Rework Planning for Installed Furniture	45-60 minutes	Sample installation plan or mock-up drawing, Printed defect cards (scratches, misalignment, loose handles, etc.), Dummy hardware/ tools (screwdriver, sandpaper, cloth), Post-installation clean-up checklist (printed), Whiteboard/flipchart & markers etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Ensure realism**

  Use visual aids like photos of real-life defects to help participants visualize better.
- **Guide discussions**

  Encourage teams to explain why a particular fix is necessary and how it affects final quality.
- **Highlight sequence**

  Emphasize that fixing defects should always precede the clean-up phase to avoid double effort.

Unit 13.3: Documentation, Handover, and Feedback Process

Unit Objectives

At the end of this unit, participants will be able to:

1. Record installation details, defect resolutions, and material usage in the project documentation.
2. Prepare handover files including inspection sheets, product manuals, and warranty terms.
3. Communicate completion status and final checklist with clients or supervisors.
4. Capture feedback and suggestions from clients to improve future installation procedures.
5. Ensure proper client acknowledgment and sign-off on the completed job.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the key steps involved in properly closing a furniture installation job, including how to document the work done, prepare handover files, and collect client feedback. Participants will learn how to maintain clear records, communicate job completion, and ensure client satisfaction through proper sign-off. This unit also highlights the importance of post-installation documentation for quality tracking and future improvements.

Ask

Ask the participants the following questions:

- What kind of documents should be handed over to the client after completing an installation job?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Documentation, Handover, and Feedback Process

This stage marks the final and equally important phase of a furniture installation project. Proper documentation, handover, and client feedback help in closing the project professionally, maintaining accountability, and improving future performance. The participant will understand the significance of organizing records, communicating with clients, and ensuring smooth closure.

1. **Recording Installation and Defect Resolutions**

   Participants will learn the importance of keeping a detailed record of all installation activities, including the sequence of work completed, tools and materials used, and any issues that occurred during the process. For example, if a shutter was misaligned or a handle came loose during fitting, the participant should document the problem and the exact steps taken to correct it. These records are helpful for supervisors, quality auditors, and future troubleshooting. Proper documentation also contributes to transparency and accountability in the work process.

2. **Preparing a Complete Handover File**

   Once the installation is completed, participants must prepare a formal handover file for the client or supervisor. This file typically includes inspection checklists, photographs of the final setup, user or product manuals, warranty terms, and maintenance tips. Learning how to compile this file neatly and professionally ensures that clients feel confident about the product and its upkeep. This step also reduces the chance of post-installation confusion and helps establish a standard procedure for future handovers.

3. **Communicating Completion Status to Client or Supervisor**

   Participants will understand how to clearly and confidently communicate that the job has been completed. This involves presenting the final checklist, pointing out key installation features, and informing the client or supervisor about any custom adjustments made during installation. Communication should also include showing the proper use of the product, highlighting areas that need special care, and answering any last-minute questions from the client. This step reinforces professionalism and client satisfaction.

4. **Capturing Client Feedback and Suggestions**

   Collecting feedback is essential for improving services and gaining insights into the client's experience. Participants will be trained to request honest feedback in a polite and respectful manner—either verbally or through a feedback form. Whether it is a suggestion to improve the alignment process or praise for neat work, all comments should be recorded and reviewed. Encouraging feedback also shows that the installer values the client's opinion and is open to growth.

5. **Ensuring Sign-Off and Acknowledgment**

   To close the project formally, participants will learn how to guide the client through the final review and obtain a written sign-off. This may include reviewing the checklist together, confirming that all points are addressed, and signing a completion form. This sign-off serves as legal and professional confirmation that the client is satisfied and that the job has been completed as per specifications. It also protects the team from liability for future alterations or misuse.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Preparing a Complete Handover and Feedback Package

Group Size: 4–6 participants

Materials Needed:

- Sample installation drawings
- Sample defect reports
- Blank handover templates (inspection sheets, sign-off forms, product manuals)
- Pens, markers, chart paper

Activity Duration: 60 minutes

Instructions:

1. **Scenario Assignment**

   Each group is given a scenario where a modular furniture installation has just been completed (e.g., kitchen cabinets, office partitions, or bedroom wardrobes). They are told that minor defects were fixed during installation, and now the handover is pending.

2. **Group Task**

   Each group must:

   - Prepare a mock handover file including:
     - Job completion report
     - Inspection checklist
     - Warranty and maintenance guide
     - Client feedback form
   - Fill in details such as materials used, minor issues resolved, client instructions, and safety notes.
   - Draft a short verbal client briefing to explain the documentation and encourage client feedback.

3. **Presentation and Discussion**

   - Each group presents its handover file and simulates delivering the final client briefing.
   - Peer groups and the facilitator give feedback on clarity, completeness, and professionalism of the documents and delivery.

Activity	Duration	Resources used
Preparing a Complete Handover and Feedback Package	60 minutes	Sample installation drawings, Sample defect reports, Blank handover templates (inspection sheets, sign-off forms, product manuals), Pens, markers, chart paper etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Emphasize Realism**

  Use realistic defects, timelines, and product manuals to simulate a professional context.
- **Encourage Role Play**

  Have one participant act as the client to simulate client-facing communication.
- **Guide with Templates**

  Provide clear templates to help participants focus on content rather than format creation.

Exercise

Multiple Choice Questions (MCQs)

1. What tool is most suitable for checking horizontal alignment during furniture installation?
   a. Chisel
   b. Spirit level
   c. Screwdriver
   d. Clamp
   Answer: b. Spirit level

2. What document is used to formally transfer ownership of the completed installation to the client?
   a. Job card
   b. Purchase order
   c. Handover checklist
   d. Warranty card
   Answer: c. Handover checklist

3. Which of the following is NOT a post-installation activity?
   a. Panel alignment
   b. Dusting and cleaning
   c. Waste segregation
   d. Film removal
   Answer: a. Panel alignment

4. If a shutter is visibly tilted after installation, what should be checked first?
   a. Panel finish
   b. Laminate colour
   c. Hinge adjustment
   d. Warranty details
   Answer: c. Hinge adjustment

Fill in the Blanks

1. During installation, a _____ level is used to ensure that surfaces are perfectly horizontal.
   Answer: spirit

2. _____ sheets are used to record daily progress, tools used, and any issues faced on-site.
   Answer: Site log

3. After installation, protective _____ should be removed from panels and shutters.
   Answer: films

4. The tool commonly used for making circular cut-outs for electrical boxes is a _____.

   Answer: hole saw

Match the following

1. Match Column A with Column B correctly.

Column A	Column B
1. Torque settings	a. Used to make round cut-outs
2. Hole saw	b. Helps ensure screw tightness
3. Installation checklist	c. Contains defect and work status

Answers: 1 - b, 2 - a, 3 - c, 4 - a

2. Match Column A with Column B correctly.

Column A	Column B
1. Visual inspection	a. Final approval of installation
2. Product manual	b. Sorting into recyclable and non-recyclable
3. Client sign-off	c. Identifies scratches, tilt, or loose parts
4. Waste segregation	d. Provides usage and maintenance instructions

Answers: 1 - c, 2 - d, 3 - a, 4 - b

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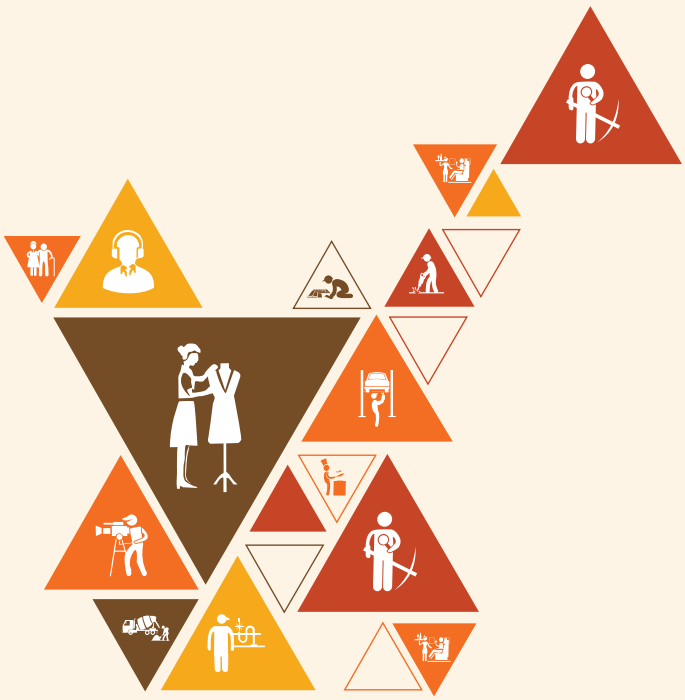
14. Health, Safety, and Green Practices

Unit 14.1: Worksite Safety and Emergency Preparedness
Unit 14.2: Personal Health and Protective Equipment (PPE)
Unit 14.3: Green Practices and Environmental Responsibility in Carpentry



Key Learning Outcomes

At the end of this module, participants will be able to:

1. List common on-site hazards in carpentry projects, such as accidental cuts from sharp tools, fire risks from electrical overloads, inhalation of dust from sanding, and tripping over scattered materials.
2. Describe proactive steps to prevent accidents, including daily housekeeping, use of guards, storing tools securely, and ensuring adequate lighting and ventilation.
3. Explain emergency procedures to be followed in the event of a fire, electrical fault, gas leak, or structural collapse using the site's emergency action plan.
4. Describe the evacuation procedure during emergencies, including identifying exit routes, assembly points, and how to respond to alarms.
5. Identify various types of safety equipment available at a worksite, such as ABC fire extinguishers, first aid kits, emergency sirens, spill kits, and safety signage.
6. Demonstrate how to locate and access fire extinguishers, understand their type and use, and explain the PASS (Pull-Aim-Squeeze-Sweep) technique.
7. Demonstrate how to apply basic first aid for minor workplace injuries such as cuts (bandaging), sprains (compression and elevation), and burns (cooling and covering).
8. Identify the full range of PPE used in carpentry, including hard hats, cut-resistant gloves, anti-skid safety shoes, ear plugs, safety goggles, dust masks, and reflective jackets.
9. Select appropriate PPE based on task type, such as using gloves for handling rough boards, goggles while cutting or sanding, and helmets in active installation zones.
10. Demonstrate the correct procedure for wearing, removing, and adjusting PPE to ensure complete protection without discomfort.
11. Describe basic maintenance of PPE, including cleaning of goggles, drying of gloves, and checking safety shoes for sole wear or toe cap integrity.
12. Store PPE in designated storage units to avoid contamination, loss, or damage when not in use.
13. Explain what green practices mean in the carpentry domain, including responsible sourcing of wood, reducing material wastage, and using low-VOC adhesives or paints.
14. Describe the difference between recyclable and non-recyclable carpentry waste, including how to segregate sawdust, scrap wood, plastic packaging, and chemical containers.
15. List safe disposal methods for wood adhesives, polish thinners, used sandpaper, and rusted metal parts following site or municipal waste norms.
16. Identify how using sustainable techniques, like panel optimization or modular designs, reduces costs, speeds up work, and contributes to environmental goals.
17. Suggest simple workplace actions like turning off machines when not in use, reusing packaging materials, limiting paper use, and reducing overcutting.
18. Promote environmental awareness in the team by labelling waste bins, displaying green posters, and conducting tool maintenance to save energy.

Unit 14.1: Worksite Safety and Emergency Preparedness

Unit Objectives

At the end of this unit, the participant will be able to:

1. List common on-site hazards including fire, electrical faults, and sharp tools, and describe steps to prevent accidents.
2. Explain procedures to be followed in case of fire, injury, or evacuation using workplace emergency plans.
3. Identify the location and use of safety equipment such as fire extinguishers, first aid kits, and emergency alarms.
4. Demonstrate how to administer basic first aid for cuts, sprains, and minor burns.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the importance of maintaining safety at the worksite and being prepared for emergency situations. Participants will learn how to identify common hazards, follow basic safety procedures, use emergency equipment like fire extinguishers and first aid kits, and respond effectively during accidents or evacuations. This unit emphasizes the need for alertness, quick action, and the correct use of safety tools to prevent injuries.

Ask

Ask the participants the following questions:

- What should you do if you see a loose electrical wire near your workstation?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Worksite Safety and Emergency Preparedness

In this session, we will focus on how to stay safe at a worksite by understanding potential risks and knowing how to act during emergencies. Participants will become familiar with the correct use of safety equipment, emergency response steps, and basic first aid techniques that help protect themselves and others in case of accidents or hazards.

1. **Identifying Common Worksite Hazards and Their Prevention**
   - **Types of Hazards**

     Participants will learn about typical risks found at furniture installation sites, such as sharp tools (chisels, saws), exposed electrical wires, flammable materials (adhesives, polish), and unstable ladders or scaffolds.
   - **Causes of Accidents**

     Hazards often arise due to poor tool storage, improper material handling, cluttered pathways, or lack of attention to surroundings.
   - **Prevention Measures**

     This includes using appropriate PPE (Personal Protective Equipment) such as gloves, helmets, safety goggles, and non-slip footwear. Participants will also learn how to keep workspaces clean and organized, report unsafe conditions, and follow worksite safety protocols strictly.
2. **Following Emergency Response Procedures**
   - **Types of Emergencies**

     These may include fire breakouts, electric shocks, accidental injuries (like deep cuts or fractures), or gas leaks.
   - **Emergency Steps**

     Participants will be taught how to act quickly and calmly. This includes sounding alarms, alerting co-workers, turning off power (if safe), and guiding people to evacuation points without panic.
   - **Evacuation Drills and Plans**

     Understanding site-specific evacuation routes, assembly areas, and emergency contacts is essential. Participants will also learn about fire watch duties and post-incident reporting.
3. **Using Safety Equipment Effectively**
   - **Identifying Equipment**

     The session introduces key safety tools like fire extinguishers (CO_2, dry powder types), first aid kits (bandages, antiseptics), emergency sirens, and safety signage (e.g., “No Entry”, “High Voltage”).
   - **Proper Usage**

     Participants will learn how to use extinguishers based on fire type (Class A, B, or C), when and how to apply first aid, and how to activate alarms or shut-off systems in an emergency.
   - **Routine Checks**

     Checking expiry dates on fire extinguishers, verifying the contents of first aid boxes, and ensuring emergency exits are clear are part of the safety responsibility.

4. **Administering Basic First Aid**
   - **Common Injuries**

     These may include minor cuts, scrapes, bruises, sprains, and small burns—typical in physical installation work.
   - **Steps for First Aid**

     Participants will be guided on cleaning wounds with antiseptic, applying pressure to stop bleeding, bandaging, using ice packs for swelling, and supporting sprains with splints or slings.
   - **When to Escalate**

     Training will include recognizing serious symptoms (heavy bleeding, unconsciousness, breathing issues) and how to seek professional medical help immediately.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Worksite Emergency Response Planning

Group Size: 4–6 participants per group

Materials Required:

- Chart paper or whiteboard
- Coloured markers
- Scenario cards (see below)
- Safety symbols printouts or flashcards (optional)

Activity Duration: 60 minutes

1. **Introduction**

   Briefly introduce the key safety concepts from the unit — types of workplace hazards, emergency procedures, first aid basics, and the use of safety equipment.
2. **Scenario Assignment**

   Each group receives a scenario card describing a potential emergency or hazard situation on a furniture installation worksite.
3. **Planning & Discussion**

   Each group will:
   - o Identify the type of hazard presented in the scenario.
   - o Develop a step-by-step emergency response plan, including:
     - Immediate actions

- Use of safety equipment
- Communication and reporting protocol
- First aid steps (if applicable)

o Illustrate or list preventive measures to avoid recurrence of the incident.

4. Presentation

Each group presents their emergency response plan and safety suggestions. They should point out:

o What risks were present

o What equipment or steps would be used

o How first aid or evacuation would be handled

5. Debrief and Key Learning Points

Discuss similarities between group strategies. Reinforce key safety practices and clarify any misunderstandings about emergency procedures or equipment use.

Examples of Scenario Cards

Scenario 1

An electrical short circuit causes smoke in a corner of the site where panel saws are in use.

Scenario 2

A team member accidentally cuts their hand with a chisel and starts bleeding.

Scenario 3

A fire extinguisher is missing from its wall bracket during a minor fire incident.

Activity	Duration	Resources used
Worksite Emergency Response Planning	60 minutes	Chart paper or whiteboard, Coloured markers, Scenario cards (see below), Safety symbols printouts or flashcards (optional) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Ensure clarity of roles**

  Guide participants to assign roles such as responder, communicator, first aider, etc., within their teams.

- **Encourage use of real-life tools and terms**

  Promote the use of actual terms for PPE (helmet, gloves), safety signage, and emergency protocols.

- **Promote inclusivity and engagement**

  Ensure all participants contribute, especially in brainstorming safety improvements.

Unit 14.2: Personal Health and Protective Equipment (PPE)

Unit Objectives

At the end of this unit, the participant will be able to:

1. Identify different types of PPE (helmets, gloves, goggles, safety shoes) required for carpentry tasks.
2. Demonstrate the correct method to wear, maintain, and store PPE.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the importance of Personal Protective Equipment (PPE) in carpentry tasks. Participants will learn about different types of PPE such as helmets, gloves, goggles, and safety shoes, and how each item helps prevent workplace injuries. The unit also covers the correct methods for wearing, inspecting, maintaining, and storing PPE to ensure safety, comfort, and compliance on the job site.

Ask

Ask the participants the following questions:

- Can you name any two types of protective equipment that carpenters wear at the worksite?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Personal Health and Protective Equipment (PPE)

In carpentry and furniture installation work, there are several physical risks associated with tools, materials, and environmental conditions. Using the right Personal Protective Equipment (PPE) is essential not only for personal safety but also for maintaining hygiene, confidence, and professionalism on-site. This session explains the purpose, use, care, and storage of various PPE items commonly used in the carpentry trade.

1. **Identify different types of PPE (helmets, gloves, goggles, safety shoes) required for carpentry tasks**
    - **Helmets (Hard Hats)**

      Protect the head from falling objects, sharp edges, or low-hanging beams. Essential on active construction or installation sites where overhead work is common.
    - **Gloves**

      Provide protection against cuts, splinters, and abrasions during handling of wood, tools, and machinery. Different types include leather gloves for general use and rubber-coated gloves for better grip.
    - **Safety Goggles or Face Shields**

      Shield the eyes from wood dust, flying debris, or splashes from chemicals (like adhesives or finishes). Essential during cutting, grinding, and sanding.
    - **Safety Shoes (Steel-Toe Boots)**

      Prevent injuries from dropped tools or panels and protect from stepping on sharp objects. Non-slip soles also help prevent falls on slick surfaces.
2. **Demonstrate the correct method to wear, maintain, and store PPE**
    - **Correct Usage**

      Participants must wear PPE that fits properly and is suited to the specific task. For example, goggles should cover the eyes snugly without gaps, and helmets should sit level and be securely fastened.
    - **Maintenance Practices**

      PPE must be inspected regularly for wear and tear. Damaged items such as cracked helmets or torn gloves should be replaced immediately. Goggles should be kept clean and free from scratches for clear visibility.
    - **Proper Storage**

      PPE should be stored in a clean, dry, and designated area to prevent contamination or damage. For instance, gloves should not be left on dusty benches, and helmets should not be hung in direct sunlight to avoid material degradation.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: PPE Identification and Correct Usage Relay

Group Size: 4–6 participants per team

Materials Needed:

- PPE items: helmets, gloves, goggles, safety shoes, ear protection, masks, reflective vests
- Flipchart or whiteboard
- Marker pens
- Timer or stopwatch

Activity Duration: 45–60 minutes

Activity Instructions:

1. **Set Up Stations**

   Prepare 4–5 workstations with different PPE items placed randomly (some correct, some incorrect for carpentry).

2. **Brief Participants**

   Explain the objective: each team will go through the stations and identify the correct PPE required for specific carpentry tasks mentioned at each station (e.g., sanding wood, using a circular saw, lifting panels).

3. **Relay Rounds**

   Each team sends one member at a time to a station. The participant:

   - Selects the correct PPE for the task.
   - Wears it correctly (if applicable).
   - Explains why it is needed.
   - Tags the next member to proceed to the next station.

4. **Presentation & Discussion**

   After completing all stations, teams will present key takeaways:

   - What PPE was used and why
   - Common mistakes noticed
   - How proper use reduces injuries

Activity	Duration	Resources used
PPE Identification and Correct Usage Relay	45–60 minutes	PPE items: helmets, gloves, goggles, safety shoes, ear protection, masks, reflective vests, Flipchart or whiteboard, Marker pens, Timer or stopwatch etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Ensure Safe Handling**

  Demonstrate first how to wear each PPE item correctly before the activity begins.

- **Encourage Participation**

  Rotate team roles so all members get hands-on exposure to identifying and handling PPE.

- **Provide Feedback**

  Offer corrections and tips at each station so participants learn in real-time and avoid repeating errors.

Unit 14.3: Green Practices and Environmental Responsibility in Carpentry

Unit Objectives

At the end of this unit, participants will be able to:

1. Explain the concept of green practices in carpentry, including low-waste production, energy efficiency, and responsible material use.
2. Identify recyclable materials and describe safe methods for separating and disposing of wood waste, adhesives, and finishes.
3. Describe how sustainable practices can reduce cost and improve environmental impact in furniture manufacturing.
4. Suggest practical steps to reduce electricity, water, and material consumption during project execution.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how carpentry work can be made more eco-friendly by adopting green practices. Participants will learn about minimizing waste, using sustainable materials, saving electricity and water, and safely disposing of hazardous items like adhesives and finishes. The unit also highlights how environmentally responsible methods not only reduce harm to the environment but also help in cost savings and create a healthier workspace.

Ask

Ask the participants the following questions:

- What is one way you can reduce waste while working on a carpentry project?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Green Practices and Environmental Responsibility in Carpentry

In today's carpentry and furniture industry, adopting green practices is essential to minimize environmental impact and promote sustainability. This unit focuses on how carpenters can work efficiently while being mindful of energy use, material waste, and eco-friendly methods. Participants will explore recyclable material handling, waste reduction strategies, and ways to reduce the carbon footprint of carpentry activities.

1. **Explain the concept of green practices in carpentry**
    - Green practices refer to eco-friendly methods that reduce the environmental impact of carpentry activities. This includes selecting responsibly sourced timber, such as FSC-certified wood, and using engineered boards that make better use of raw materials.
    - It also involves minimizing waste by careful material planning, avoiding overcuts, and reusing usable offcuts in smaller components or secondary products.
    - Carpenters are encouraged to use water-based adhesives, low-VOC (volatile organic compound) finishes, and adopt cleaner production techniques.
    - Emphasis is placed on energy conservation, such as turning off machines when not in use, using natural lighting where possible, and operating tools at optimal efficiency.
2. **Identify recyclable materials and describe safe methods for separating and disposing of wood waste, adhesives, and finishes**
    - Participants learn to segregate materials used on-site or in workshops. Clean wood pieces, metal fasteners, cardboard packaging, and plastic wrap are often recyclable.
    - Hazardous waste like used solvents, adhesives, or paint cans should be stored in clearly labelled containers and disposed of following local environmental guidelines.
    - Wood shavings and sawdust, if free of chemical treatments, can be composted or used in agricultural applications.
    - A color-coded bin system is recommended to separate dry recyclable waste from wet or hazardous items, helping reduce contamination and increase recycling rates.
3. **Describe how sustainable practices can reduce cost and improve environmental impact in furniture manufacturing**
    - Sustainable practices can lower operational costs by reducing the quantity of raw materials purchased, minimizing offcuts, and preventing rework due to mistakes.
    - Using energy-efficient tools and proper lighting helps reduce electricity bills, while reducing reliance on hazardous materials also lowers waste disposal costs.
    - Environmentally responsible methods contribute to a cleaner and safer work environment, improving employee health and morale.
    - From a business standpoint, using green practices can enhance brand reputation and attract environmentally conscious clients.
4. **Suggest practical steps to reduce electricity, water, and material consumption during project execution**
    - Electricity conservation includes unplugging idle machines, using energy-efficient power tools, and turning off lights and fans when not in use.

- To reduce water consumption, avoid unnecessary cleaning or rinsing and consider reusing water for non-critical cleaning tasks.
- For material conservation, plan cutting layouts on boards using software or templates to optimize usage and minimize offcuts.
- Maintain tools properly to ensure clean cuts, which reduces errors and material loss. Also, store materials in proper conditions to avoid spoilage or damage.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Designing a Green Carpentry Workshop Plan

Group Size: 4–6 participants

Materials Needed:

- Chart paper or whiteboard
- Markers, pens
- Sample images or printouts of carpentry tools and materials (optional)
- Sticky notes

Activity Duration: 60 minutes

Activity Instructions:

1. **Form Groups and Set the Context**

   Divide participants into small groups and introduce the idea of setting up a furniture workshop that follows green carpentry practices.

2. **Workshop Planning Task**

   Each group will design a workshop layout and workflow that follows environmentally responsible practices. The plan should include:

   - Selection of sustainable or recyclable materials
   - Methods for reducing wood and adhesive waste
   - Ideas for minimizing electricity and water use
   - Proper waste sorting and disposal practices
   - Use of energy-efficient tools or lighting

3. **Group Presentation**

   Each group will present their green workshop plan, explaining how their choices promote environmental responsibility.

4. **Debriefing**

   The facilitator summarizes key green practices mentioned and links them to real-world carpentry contexts.

Activity	Duration	Resources used
Designing a Green Carpentry Workshop Plan	60 minutes	Chart paper or whiteboard, Markers, pens, Sample images or printouts of carpentry tools and materials (optional), Sticky notes etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage Practical Thinking**

  Ask participants to think of real-life carpentry challenges and how green methods could be realistically applied.

- **Use Visuals to Guide Planning**

  Provide sample photos of eco-friendly workshops, recyclable labels, or sustainable tools to help groups visualize their ideas.

- **Promote Collaboration**

  Ensure each group member takes a role—one can focus on materials, another on energy use, another on waste handling, etc. This promotes teamwork and shared learning.

Exercise

Multiple Choice Questions (MCQs)

1. What is the correct order of steps when using a fire extinguisher using the PASS technique?
   a. Pull, Spray, Sweep, Aim
   b. Pull, Aim, Squeeze, Sweep
   c. Push, Aim, Squeeze, Spray
   d. Pull, Aim, Spray, Sweep
   Answer: b. Pull, Aim, Squeeze, Sweep

2. Which of the following is considered Personal Protective Equipment (PPE) in carpentry?
   a. Broom and mop
   b. Paint brush
   c. Safety goggles
   d. Screwdriver
   Answer: c. Safety goggles

3. Which of the following is a green practice in carpentry?
   a. Using non-recyclable wood polish
   b. Disposing of sawdust with regular garbage
   c. Using low-VOC adhesives
   d. Burning plastic wrappers on site
   Answer: c. Using low-VOC adhesives

4. The purpose of wearing a dust mask is to:
   a. Protect eyes from flying dust
   b. Protect ears from loud noise
   c. Prevent inhalation of sanding dust
   d. Keep warm in winter
   Answer: c. Prevent inhalation of sanding dust

Fill in the Blanks

1. The technique used to operate a fire extinguisher is called the _____ method.
   Answer: PASS

2. PPE such as gloves and safety shoes help prevent _____ injuries.
   Answer: physical

3. _____ is used to treat minor burns by cooling and covering the affected area.
   Answer: First aid

4. Tools should be stored in designated areas to avoid _____ hazards on site.

Answer: tripping

Match the following

1. Match Column A with Column B correctly.

A – Item	B – Purpose
1. Ear plugs	a. Eye protection during cutting
2. Safety goggles	b. Prevent hearing damage
3. First aid kit	c. Treat minor injuries
4. Safety shoes	d. Protect feet from sharp objects

Answers: 1 - b, 2 - a, 3 - c, 4 - d

2. Match the Following (Green Practices)

A – Action	B – Green Practice
1. Reusing wood offcuts	a. Waste segregation
2. Using low-VOC polish	b. Material conservation
3. Labelling bins	c. Energy saving
4. Turning off machines	d. Air quality and safety

Answers: 1 - b, 2 - d, 3 - a, 4 - c

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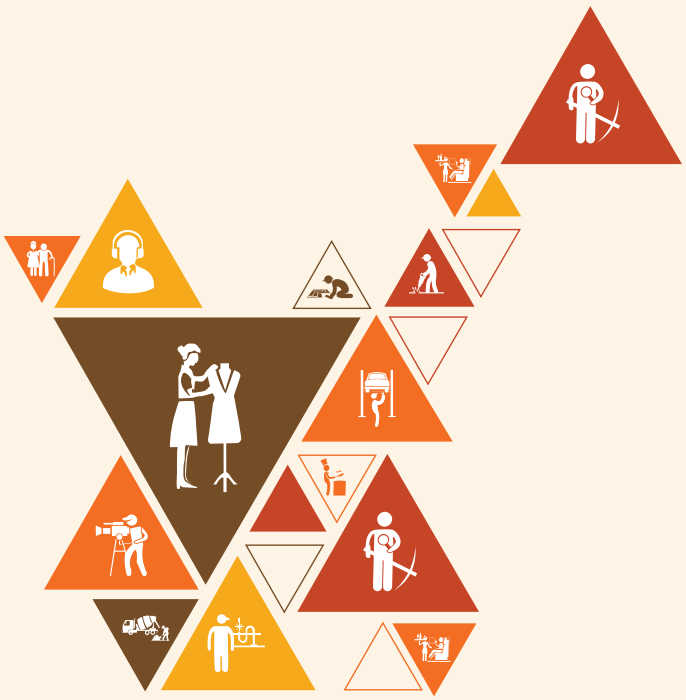
15. Fabrication and Installation of Wooden Doors and Windows with Frames

Unit 15.1: Types of Wooden Doors and Wooden Windows with Frames
Unit 15.2: Material Selection, Planning, and Preparation
Unit 15.3: Frame and Shutter Fabrication Techniques
Unit 15.4: Installation, Hardware Fitting, and Quality Checks



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify different types of wooden doors such as panel doors, flush doors, louvered doors, and glazed doors and explain the typical areas of use for each type based on ventilation, security, aesthetics, and cost.
2. Identify and describe wooden window types including casement, sliding, fixed, and bay windows, and explain their specific suitability for homes, offices, or commercial spaces.
3. Differentiate between doors and windows based on how they manage light, airflow, security, privacy, and structural requirements of a space.
4. Select the appropriate type of door or window unit based on project specifications, climate considerations, and client preferences.
5. Choose suitable timber or board material for door and window fabrication by evaluating properties like straight grain, moisture resistance, load capacity, and termite resistance.
6. Assess available boards for knots, splits, and warping to ensure selected materials meet quality and aesthetic standards.
7. Interpret layout drawings of door and window frames, including sill height, frame width, and shutter orientation, to prepare fabrication plans.
8. Plan fabrication steps and material allocation based on drawing sequence, joinery requirements, and hardware slots.
9. Measure and mark timber sections accurately using measuring tape, try square, marking gauge, and pencil, following the dimensional details provided in the drawings.
10. Cut frame members such as stiles, rails, and heads using power tools like circular saws and meter saws with proper edge control and safety.
11. Assemble frames using joinery techniques such as mortise and tenon joints or dowels and clamps, ensuring right-angle accuracy and glue bonding.
12. Sand the frame surfaces using abrasive paper or sanding machines to remove rough spots and prepare the surface for polish or laminate.
13. Cut, shape, and assemble shutter components such as panels, battens, and ribs ensuring the correct grain orientation and spacing allowances for expansion.
14. Verify shutter and frame fitment using gauges or dry fitting methods to ensure proper gaps, swing, and structural balance.
15. Fix door and window frames into masonry openings using levelling tools, plastic or metal anchors, cement grouting, and spacers for load transfer and alignment.
16. Align the frame vertically and horizontally using plumb bob, laser level, or spirit level and adjust as required for accurate shutter operation.
17. Mount the shutter into the fixed frame using appropriate hinges, aligning for consistent gaps, swing clearance, and lock fitting.
18. Fit hardware components like handles, tower bolts, stoppers, locks, and stays at marked points using drilling, screwing, or slotting tools.
19. Ensure that the shutter operates without binding, rattling, or misalignment and check for sealing with rubber gaskets or padding if required.
20. Inspect the installation for surface finish defects, operational issues, loose hardware, and misaligned components.

21. Rectify minor issues such as paint scratches, shutter rubbing, misfitted locks, or loose screws before final client inspection.
22. Record the installation quality and defect list in a completion sheet and obtain feedback from the client or site engineer for final acceptance.

Unit 15.1: Types of Wooden Doors with Frames and Types of Wooden Windows with Frames

Unit Objectives

At the end of this unit, the participant will be able to:

1. Identify major types of wooden doors with frames such as panel doors, flush doors, louvered doors, and glazed doors, and describe their suitable use cases.
2. Identify common types of wooden windows with frames such as casement, sliding, fixed, and bay windows, and explain where they are typically installed.
3. Differentiate doors and windows based on design, ventilation, privacy, and structural considerations.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the commonly used types of wooden doors and windows along with their frame styles and practical applications. Participants will learn how to identify various door types like panel, flush, and louvered doors, and different window types such as casement, sliding, and fixed windows. The unit will also explain how design, ventilation, and functionality influence the selection of doors and windows in carpentry work.

Ask

Ask the participants the following questions:

- Can you name one type of wooden door and where it is usually used in a house?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Types of Wooden Doors with Frames and Types of Wooden Windows with Frames

Wooden doors and windows are essential architectural elements that influence the functionality, ventilation, aesthetics, and privacy of a space. In carpentry and furniture installation, understanding their types, structure, and application is crucial for selecting the right frame and fitting method. In this session, participants will explore various door and window types, their common uses, and how to distinguish between them based on design and performance needs.

1. **Types of Wooden Doors with Frames**

   i. **Panel Doors**

   Panel doors are made using a framework of vertical stiles and horizontal rails that hold panels made of wood, glass, or a combination of both. These panels may be raised or flat, decorative or plain. Due to their strong construction, panel doors are highly durable and are ideal for entry doors, room partitions, or where visual aesthetics are important.

   ii. **Flush Doors**

   These doors have a completely flat surface on both sides and usually contain a hollow core filled with cardboard, particle board, or solid timber. They are covered with plywood or laminate. Flush doors are cost-effective, easy to clean, and provide a clean, modern appearance. They are commonly used for interior applications such as bedrooms, bathrooms, and offices.

   iii. **Louvered Doors**

   Louvered doors have angled wooden slats (louvers) fixed within the frame to allow airflow while maintaining some privacy. These are ideal for places where ventilation is necessary even when the door is closed, such as wardrobes, utility cabinets, or bathrooms. They help in avoiding moisture buildup and maintaining airflow.

   iv. **Glazed Doors**

   Glazed doors incorporate one or more glass panels within a wooden frame. These doors are used to allow natural light to enter adjoining spaces and offer visibility. They are suitable for areas like kitchens, dining rooms, or offices where a combination of separation and transparency is desired. Glazed panels can be clear, frosted, or patterned for privacy and design.

2. **Types of Wooden Windows with Frames**

   i. **Casement Windows**

   Casement windows are side-hinged and swing outward or inward like doors, usually operated using a handle or crank. These windows allow full ventilation as they can be opened completely. They provide a tight seal when closed, making them energy efficient. Casement windows are often installed in bedrooms and living rooms.

   ii. **Sliding Windows**

   Sliding windows have one or more panels that slide horizontally along a track within the window frame. These windows are space-saving as they do not protrude outward or inward. They are ideal for areas like kitchen backsplashes, corridors, or locations where space outside is restricted.

   iii. **Fixed Windows**

   Fixed windows do not open and are used solely for light entry or decorative purposes. They are commonly used in staircases, lobbies, or feature walls where ventilation is not needed but external views or daylight is desirable. Their airtight design also helps improve insulation.

iv. **Bay Windows**

Bay windows project outward from the wall and typically consist of a central fixed window flanked by two angled casement or sliding windows. They add extra interior space and allow a panoramic view. Bay windows are ideal for lounges, reading corners, or front-facing rooms to enhance aesthetics and functionality.

3. **Differentiation Based on Function and Structure**

- **Wooden Doors**

  Wooden doors are primarily used to provide security, privacy, and controlled access between spaces. The design and construction vary depending on whether the door is used indoors or at entry points. For instance, a glazed panel door may be appropriate for internal partitions, whereas a panel door with solid core is preferred for main entrances.

- **Wooden Windows**

  Wooden windows are chosen based on the need for ventilation, natural lighting, and aesthetics. Operable windows like casement or sliding types allow airflow, while fixed windows serve as decorative or light-transmitting units. The decision also depends on insulation needs, location in the building, and maintenance considerations.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Managing On-Site Furniture Installation Challenges

Group Size: 4–6 participants

Materials Required:

- Whiteboard or flipchart
- Markers
- Sticky notes (in different colours)
- Scenario cards (furniture installation-related challenges)
- Sample floor plan or project drawing handouts

Activity Duration: 60 minutes

Instructions:

1. **Introduction**

   Brief the participants on the importance of planning, communication, and safety in on-site furniture installation. Discuss the role of team coordination when facing unexpected challenges such as space constraints, missing parts, or installation errors.

2. **Scenario Distribution**

   Each group receives one scenario card outlining a real-world furniture installation issue that involves safety risks, teamwork coordination, or technical decision-making.

3. **Group Discussion & Planning**

   Groups discuss the scenario and answer the following:

   - What aspect of the installation process is affected?
   - How does this issue impact safety or team coordination?
   - What preventive or corrective steps can be taken?
   - How should team members communicate and respond effectively?

   Each group must write down there:

   - Identified issues
   - Planned response
   - Safety considerations
   - Roles/responsibilities within the team

4. **Group Presentation**

   Each group presents their scenario, analysis, and proposed solution to the entire class.

5. **Debrief and Key Takeaways**

   Facilitator summarizes key learnings:

   - Were safety protocols followed?
   - How did teams respond under time or pressure challenges?
   - What communication methods worked best?
   - How can such scenarios be prevented through better planning?

Examples of Scenario Cards

Scenario 1

While installing a kitchen cabinet set, you realize the wall has hidden electrical wiring close to the mounting area. How do you proceed without delaying the work or compromising safety?

Scenario 2

On the final day of installation, the hinges provided are of the wrong type and don't fit the pre-drilled holes. How do you coordinate a quick resolution without damaging the panels or frustrating the client?

Scenario 3

During wardrobe installation, a side panel gets scratched and chipped. The client is present and watching. What should you do to maintain professionalism, ensure quality, and complete the job?

Activity	Duration	Resources used
Managing On-Site Furniture Installation Challenges	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (in different colours), Scenario cards (furniture installation-related challenges), Sample floor plan or project drawing handouts etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage Problem-Solving**

  Let participants debate different approaches to identify the most practical and safe response.
- **Highlight Real-World Stress**

  Simulate time or client pressure for realism mention deadlines or customer presence.
- **Use Visuals**

  Floor plans and visuals help participants better relate to real site conditions and spatial challenges.

Unit 15.2: Material Selection, Planning, and Preparation

Unit Objectives

At the end of this unit, the participant will be able to:

1. Select appropriate timber or boards by evaluating strength, grain direction, moisture content, and visual finish.
2. Interpret door and window layout drawings to plan the sequence of fabrication and assembly.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to select suitable timber or boards for manufacturing wooden doors and windows by evaluating strength, grain direction, moisture levels, and visual finish. We will also learn how to read and interpret layout drawings to plan the correct sequence of fabrication and assembly. This unit helps participants prepare materials systematically to ensure better accuracy, durability, and finish in joinery work.

Ask

Ask the participants the following questions:

- What factors should you check before selecting timber for making a door frame?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Material Selection, Planning, and Preparation

This session focuses on helping participants develop the ability to select suitable materials and plan the fabrication steps before beginning work on wooden doors and windows. Proper planning not only improves the structural strength and aesthetics of the final product but also reduces errors and waste.

1. **Selecting Appropriate Timber or Boards**
   - **Assess Material Strength and Load Capacity**

     Different parts of a door or window require materials with specific strength levels. For example, door frames need hardwood like teak or Sal for durability, while shutters can use lighter boards. Selecting materials based on the load they will bear ensures long-term performance.
   - **Check Grain Direction and Visual Appearance**

     Grain direction not only affects how a piece of timber will behave under stress (such as bending or shrinking) but also impacts the visual appeal. Consistent grain is preferred for visible surfaces, while internal parts can accommodate more irregular patterns.
   - **Measure and Evaluate Moisture Content**

     Timber must be seasoned or kiln-dried to reduce moisture content before use. Moist wood can lead to problems like swelling, shrinking, or warping once installed. Using a moisture meter or confirming supplier specs helps ensure material stability.
   - **Select Based on Finish Requirements**

     If the final product will be polished or left with a natural finish, a better grade of timber with fewer knots or surface blemishes is needed. For painted or laminated doors, economical grades with minor defects may be acceptable if surface preparation is thorough.
2. **Interpreting Door and Window Layout Drawings**
   - **Identify Overall Dimensions and Part Details**

     Layout drawings typically include measurements for width, height, thickness, and part separation. Reading these correctly ensures that raw material is cut to the exact size required, minimizing waste and fitting issues.
   - **Understand Sectional Views and Orientation**

     Sectional and elevation views show how components like frames, sills, and shutters fit together. Understanding these views helps in determining the orientation of parts, such as where grooves or rebates are needed.
   - **Sequence the Fabrication Tasks Logically**

     By reading the drawings carefully, participants can plan the fabrication steps — for example, cutting frame sections first, then routing grooves, and finally assembling the parts. Logical sequencing prevents errors and saves time during assembly.
   - **Account for Hardware and Cut-Outs in Planning**

     Door locks, hinges, handles, or glass panels must be planned during the early stages. Drawings often show their locations. Participants should incorporate these into the cutting and machining plan to avoid rework or misalignment.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Timber Selection and Fabrication Planning for Doors and Windows

Group Size: 4–5 participants

Materials Needed:

- Sample images or small pieces of different timber/board types (e.g., teak, sal, MDF, plywood)
- Moisture meter or moisture content cards (if available)
- Copies of simplified door/window layout drawings
- Flipchart or A3 sheets
- Markers and pens

Activity Duration: 45–60 minutes

Activity Instructions:

1. Divide participants into small groups.
2. Distribute sample timber/board pieces or images and layout drawings to each group.
3. Task: Each group will:
   - Assess and select the most suitable timber or board for the given door/window design based on the drawing provided.
   - Justify their choice by discussing grain direction, strength, finish, and moisture suitability.
   - Plan the basic steps for fabrication and assembly based on the drawing, identifying where cuts, joints, and finishing will be needed.
4. Group Sharing

   Each group presents:
   - Their selected material and why it is suitable.
   - The planned fabrication sequence (step-by-step process overview).

Activity	Duration	Resources used
Timber Selection and Fabrication Planning for Doors and Windows	45–60 minutes	Sample images or small pieces of different timber/board types (e.g., teak, sal, MDF, plywood), Moisture meter or moisture content cards (if available), Copies of simplified door/window layout drawings, Flipchart or A3 sheets, Markers and pens etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage hands-on analysis**

  If possible, provide real wood samples so participants can touch, observe grain direction, and note surface finish.

- **Guide drawing interpretation**

  Assist groups in reading layout drawings if they are unfamiliar with symbols or views (top, front, etc.).

- **Prompt discussion on trade-offs**

  Help participants consider practical issues like cost, ease of cutting, or finish quality when choosing materials.

Unit 15.3: Frame and Shutter Fabrication Techniques

Unit Objectives

At the end of this unit, the participant will be able to:

1. Measure, mark, and cut frame components using power tools with accuracy.
2. Assemble door and window frames using joinery techniques such as mortise and tenon or dowels.
3. Perform surface inspection and sanding to prepare shutters for finishing or hardware installation.
4. Fabricate and align shutter components ensuring gap allowances and grain matching.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to measure, cut, and assemble door and window frames with precision, using appropriate joinery techniques such as mortise and tenon or dowels. Participants will also learn how to inspect and prepare shutter surfaces for finishing, and how to align shutter components correctly, ensuring proper gap allowances and grain matching for both durability and visual appeal.

Ask

Ask the participants the following questions:

- What are some common tools used to cut and assemble wooden door or window frames?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Frame and Shutter Fabrication Techniques

In this session, participants will study the step-by-step process of crafting wooden frames and shutters used in doors and windows. The focus will be on precision, proper joinery, alignment, and surface readiness to ensure functional and visually consistent components.

1. **Measure, mark, and cut frame components using power tools with accuracy**
    - Understand and interpret frame measurements from design drawings or specifications.
    - Use tools like measuring tape, steel ruler, and set square to mark exact dimensions.
    - Operate cutting equipment such as circular saws or mitre saws to achieve clean, precise cuts.
    - Follow proper safety practices such as securing workpieces and checking blade sharpness.
    - Maintain right angles and accurate lengths to ensure a perfect fit during frame assembly.
2. **Assemble door and window frames using joinery techniques such as mortise and tenon or dowels**
    - Select suitable joinery methods like mortise and tenon, or dowel joints based on frame type.
    - Use chisels, dowel jigs, or mortising machines to shape accurate joint profiles.
    - Apply wood adhesive evenly to joining surfaces before assembly.
    - Clamp the joints properly to ensure tight bonding and frame alignment.
    - Verify that assembled frames are square and stable after drying.
3. **Perform surface inspection and sanding to prepare shutters for finishing or hardware installation**
    - Check shutter surfaces for defects like scratches, glue stains, or unevenness.
    - Use sanding tools (manual or powered) to smoothen surfaces and round edges.
    - Fill minor dents or cracks with wood filler if necessary.
    - Ensure that the surface is free of dust and ready for paint, laminate, or varnish.
    - Prepare a clean and even surface to support durable and aesthetic finishing.
4. **Fabricate and align shutter components ensuring gap allowances and grain matching**
    - Cut rails, stiles, and panels to correct dimensions as per the design.
    - Match grain direction across shutter parts to maintain visual consistency.
    - Assemble shutter parts with equal clearances to allow smooth movement and avoid jamming.
    - Use alignment tools or jigs to ensure even spacing between shutter components.
    - Check that shutters are level, aligned, and operate without obstruction.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Fabricating a Miniature Door or Window Frame with Shutters

Group Size: 4–6 participants per group

Materials Required:

- Softwood or cardboard strips (for model frames)
- Measuring tapes, rulers, and pencils
- Joinery templates or pre-cut dowel pieces
- Sandpaper or sanding blocks
- Flipchart or chart paper
- Safety gloves and goggles

Duration: 60–75 minutes

Activity Instructions:

1. Divide participants into groups and assign each group the task of preparing a miniature door or window frame with shutter components using the provided materials.
2. Each group should:
   - Measure and mark frame and shutter components accurately.
   - Assemble the frame using either mock mortise and tenon or dowel-style joinery.
   - Ensure correct alignment, gap allowances, and grain direction (if visible or indicated).
   - Lightly sand the visible areas to prepare for finishing.
   - Label their components and prepare a short explanation of their process.
3. Once completed, each group will briefly present their model, explaining:
   - The joinery technique they used
   - How they maintained accuracy and alignment
   - Any practical tips they discovered during the process

Activity	Duration	Resources used
Fabricating a Miniature Door or Window Frame with Shutters	60–75 minutes	Softwood or cardboard strips (for model frames), Measuring tapes, rulers, and pencils, Joinery templates or pre-cut dowel pieces, Sandpaper or sanding blocks, Flipchart or chart paper, Safety gloves and goggles etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Provide Reference Diagrams**

  Share printed diagrams of standard door and window frames to guide measurements and assembly.

- **Encourage Collaboration**

  Remind participants to divide responsibilities among the team (measuring, cutting, assembling, sanding, etc.).

- **Focus on Finish and Accuracy**

  Emphasize neatness, alignment, and smoothness of surfaces as key criteria for evaluating the models.

Unit 15.4: Installation, Hardware Fitting, and Quality Checks

Unit Objectives

At the end of this unit, the participant will be able to:

1. Install frames in masonry openings using levelling tools and appropriate anchors.
2. Fix doors and window shutters into the frames with correct functional clearances.
3. Fit hardware such as hinges, locks, and handles with accurate placement and alignment.
4. Perform final inspection to ensure proper functioning, sealing, and surface finishing of the installed unit.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the key steps involved in installing wooden door and window units, including how to level and fix frames securely into masonry openings. Participants will also learn how to fit shutters, install essential hardware like hinges and locks, and perform quality checks. The unit focuses on ensuring both functionality and finishing standards are met during and after installation.

Ask

Ask the participants the following questions:

- What tool is commonly used to check if a door or window frame is level during installation?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

1. **Installing Frames in Masonry Openings Using Levelling Tools and Appropriate Anchors**
   - Participants will learn to position wooden frames within wall openings for doors or windows.
   - Techniques include measuring wall openings, placing the frame at the correct position, and checking vertical and horizontal alignment using spirit levels or laser levels.
   - Proper anchoring methods, such as using fasteners, metal clamps, or anchor bolts, will be taught to secure the frame firmly into concrete or brick without damage.
   - Special focus is given to preventing frame twist or skewing during the fixing process.
2. **Fixing Shutters into Frames with Correct Functional Clearances**
   - Participants will practice mounting shutters (movable parts) into the installed frame, ensuring correct hinge placement.
   - Emphasis will be placed on maintaining functional clearance or gaps (typically 2–4 mm) on all sides to allow smooth swinging or sliding movement without friction.
   - Participants will also be shown how to check for flush alignment and test for free movement after fixing.
   - Adjustments such as sanding edges or re-aligning hinges may be demonstrated to achieve precision.
3. **Fitting Hardware (Hinges, Locks, Handles) with Accurate Placement and Alignment**
   - The unit will cover the careful installation of mechanical hardware components, including types of hinges (butt, concealed), locks (mortise, cylindrical), and door/window handles.
   - Participants will mark fitting locations using measuring tools, jigs, or templates and learn correct methods for drilling and fastening.
   - They will also check for alignment of the lock mechanisms and handle operation to ensure functionality and safety.
   - Attention is given to using compatible hardware based on door thickness, weight, and usage requirements.
4. **Performing Final Inspection to Ensure Functioning, Sealing, and Surface Finishing**
   - The final step involves inspecting the fully installed unit for any flaws in alignment, movement, or aesthetics.
   - Participants will check shutter swing, lock operation, surface finish, and overall alignment of the installation.
   - Defects such as scratches, misaligned parts, rattling shutters, or hardware that's not flush-fitted will be identified and rectified.
   - Surface finishing touch-ups may include minor sanding, paint retouching, or sealant application where needed.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Mock Installation and Inspection of a Wooden Door Frame

Group Size: 4–6 participants

Duration: 60 minutes

Materials Required:

- Wooden frame components (sample-sized or full)
- Dummy shutters (or lightweight panels)
- Basic hardware (hinges, handles, screws)
- Spirit level, measuring tape, screwdriver/drill
- Marking tools (pencil, chalk)
- Inspection checklist template (provided by trainer)

Activity Instructions:

1. **Frame Setup**

   Each group will receive a mock wooden frame and will be asked to position and level it as if installing in a masonry opening using marking and levelling tools.

2. **Shutter and Hardware Installation**

   Participants will then simulate fitting the shutter and install basic hardware like hinges or handles using provided tools, ensuring correct clearance and alignment.

3. **Quality Inspection**

   Using the checklist, each group will inspect their installation for alignment, smooth movement, hardware positioning, and surface finish.

4. **Presentation and Discussion**

   Groups will briefly present their observations and discuss challenges they faced during installation or fitting.

Activity	Duration	Resources used
Mock Installation and Inspection of a Wooden Door Frame	60 minutes	Wooden frame components (sample-sized or full), Dummy shutters (or lightweight panels), Basic hardware (hinges, handles, screws), Spirit level, measuring tape, screwdriver/drill, Marking tools (pencil, chalk), Inspection checklist template (provided by trainer) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure safety and supervision when participants use hand tools—demonstrate tool use if needed before starting.
- Use lightweight or demo components for ease of handling and to avoid accidents during the activity.
- Provide printed or projected checklists that help guide participants in what to inspect (e.g., level, gap, hardware fit, movement).

Exercise

Multiple Choice Questions (MCQs)

1. Which type of door is best suited for areas that require high ventilation and partial privacy?
   a. Flush Door
   b. Louvered Door
   c. Glazed Door
   d. Panel Door
   Answer: b. Louvered Door

2. What is the purpose of using a plumb bob or laser level during frame installation?
   a. To measure board thickness
   b. To align the shutter grain
   c. To ensure vertical and horizontal alignment
   d. To check screw tightness
   Answer: c. To ensure vertical and horizontal alignment

3. Which type of window is most appropriate for a fixed view with no ventilation?
   a. Casement Window
   b. Bay Window
   c. Fixed Window
   d. Sliding Window
   Answer: c. Fixed Window

4. What joinery technique is commonly used to connect stiles and rails in door frames?
   a. Lap Joint
   b. Dado Joint
   c. Mortise and Tenon Joint
   d. Finger Joint
   Answer: c. Mortise and Tenon Joint

Fill in the Blanks

1. A _____ door is made with a solid core and is commonly used in modern residential interiors for its simple look and cost efficiency.
   Answer: flush

2. _____ saws and meter saws are used to cut timber components for frame fabrication.
   Answer: Circular

3. The _____ tool is used to ensure right angles when marking or assembling door frame joints.
   Answer: try square

4. A common method to test shutter movement before final fitting is called _____ fitting.

   Answer: dry

Match the following

1. Match Column A with Column B correctly.

A: Component/Tool	B: Function
1. Glazed Door	a. Ensures horizontal alignment
2. Dowels	b. Prevent shutters from over-opening
3. Spirit Level	c. Allows natural light entry
4. Stays	d. Used for invisible joining

   Answers: 1 - c, 2 - d, 3 - a, 4 - b

2. Match Column A with Column B correctly.

A: Activity	B: Purpose
1. Measuring & Marking	a. Prepares surface for finishing
2. Sanding	b. Enables door locking or movement
3. Hardware Fitting	c. Confirms quality before handover
4. Installation Checklist Completion	d. Ensures dimensional accuracy

   Answers: 1 - d, 2 - a, 3 - b, 4 - c

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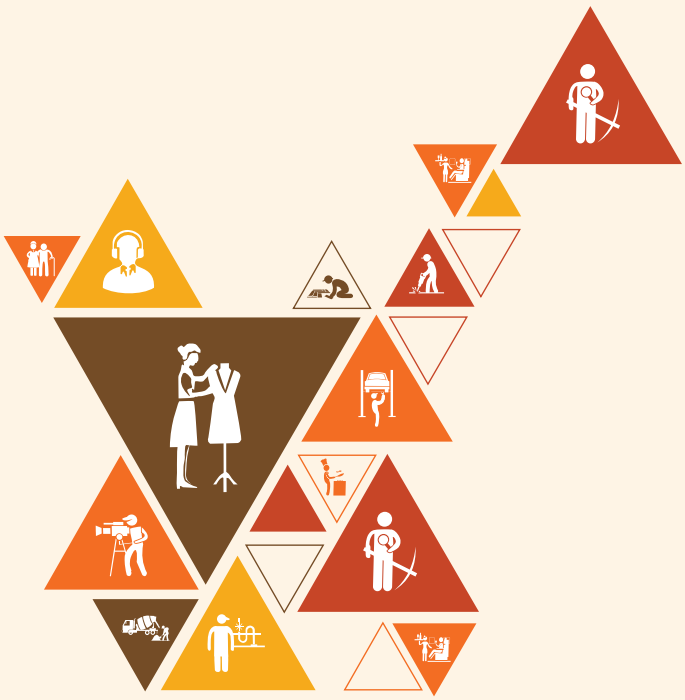
16. Fabrication and Installation of Wooden Cladding and Panelling

Unit 16.1: Types of Wooden Cladding and Panelling
Unit 16.2: Material Selection, Planning, and Preparation
Unit 16.3: Fabrication of Cladding and Panelling Components
Unit 16.4: Installation, Alignment, and Finishing



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify different types of wooden cladding profiles such as tongue and groove, shiplap, and board-and-batten, and explain how they are used in both interior and exterior surface treatments for protection and visual enhancement.
2. Recognize wooden panelling types like raised panel, beadboard, and flat panel, and describe their common use in wall décor, ceilings, and cabinetry in residential or commercial interiors.
3. Compare wooden cladding and panelling based on factors such as placement (interior vs. exterior), structural purpose (protection vs. aesthetics), material thickness, fixing method, and visual impact.
4. Explain the key design objectives for choosing cladding (e.g., weather resistance, insulation) versus panelling (e.g., symmetry, depth, elegance).
5. Select appropriate timber species and engineered panel materials for cladding or panelling based on environmental factors like humidity, sunlight exposure, and required surface finish.
6. Assess the suitability of boards based on grain uniformity, knot frequency, moisture content, and pre-treatment quality.
7. Organize the workspace by allocating cutting zones, storage areas, safety clearances, and tool stations before starting fabrication.
8. Identify and gather required tools such as measuring tapes, table saws, routers, clamps, and finishing tools, and ensure all PPE is in place before work begins.
9. Measure and mark timber lengths and widths as per the material list and design layout using marking tools, templates, and measuring tapes.
10. Cut timber or panel boards using saws and routers while maintaining precision for edge consistency and fit accuracy.
11. Perform machining operations such as tongue-grooving, rebating, chamfering, or joining using appropriate bits and jigs.
12. Sand surface and edge areas using abrasives to smoothen wood grain and remove splinters before applying primer or sealant.
13. Apply base coatings, anti-fungal sealers, or primers depending on whether the cladding/panelling is meant for indoor or outdoor exposure.
14. Fix cladding or panelling strips to substrates using clamps, mechanical fasteners (nails/screws), adhesives, or interlocking systems as per site specification.
15. Use levelling tools like spirit levels or laser lines to ensure horizontal or vertical alignment and gap consistency between adjacent panels.
16. Adjust panel fitment around corners, window openings, or ceiling curves using cutting tools and site templates for precision.
17. Apply final sealants or edge trims to protect joints from water, dust, or wear and improve surface integration.
18. Carry out polishing or painting tasks after installation as per client finish requirements, ensuring uniform coverage and clean edges.
19. Identify on-site challenges like wall undulation, unexpected framing gaps, or thermal expansion in boards, and apply corrective actions such as back-blocking, spacers, or panel trimming.
20. Maintain visual and functional quality throughout the installation process and communicate any material or fitment issues to supervisors for timely resolution.

Unit 16.1: Types of Wooden Cladding and Panelling

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify types of wooden cladding such as tongue and groove, shiplap, and board-and-batten, and explain their typical applications.
2. Identify types of wooden panelling such as raised panel, beadboard, and flat panel, and describe their interior use cases.
3. Compare cladding and panelling based on placement, purpose, and design intent.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss various types of wooden cladding and panelling used in both exterior and interior applications. You will learn about common styles such as tongue and groove, shiplap, board-and-batten for cladding, and raised panel, beadboard, and flat panel for panelling. The unit also explores the purpose, placement, and aesthetic use of these wood treatments in construction and decor.

Ask

Ask the participants the following questions:

- Can you name one type of wooden wall covering that is used to decorate the inside of a room?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Types of Wooden Cladding and Panelling

In this unit, we will discuss the different types of wooden cladding and panelling used in construction and interior design. Learners will explore commonly used styles like tongue and groove, shiplap, beadboard, and raised panels, along with their applications in interiors and exteriors. The unit will also help compare cladding and panelling in terms of design purpose, installation placement, and functional value.

1. **Identification of Wooden Cladding Types and Their Applications**
   - **Tongue and Groove Cladding**

     This type features interlocking edges that fit together snugly, creating a smooth surface. It is commonly used in ceilings, walls, and exterior siding due to its clean finish and moisture resistance.
   - **Shiplap Cladding**

     Shiplap boards have overlapping edges that create horizontal shadow lines. Popular in rustic or farmhouse-style interiors and for exterior weatherproof cladding.
   - **Board-and-Batten Cladding**

     A traditional style where wide vertical boards are joined with narrow battens to cover seams. It's used both externally and in decorative interior applications for a bold, structured look.
2. **Identification of Wooden Panelling Types and Their Interior Use**
   - **Raised Panel Panelling**

     Consists of central panels raised above the frame using mouldings, often used in formal rooms, wainscoting, or classic interior settings to add depth and sophistication.
   - **Beadboard Panelling**

     Made of narrow vertical planks with a "bead" or groove between each board. It is a popular choice for cottage-style or informal interiors, commonly used in kitchens and bathrooms.
   - **Flat Panel Panelling**

     Features flat, smooth panels that sit flush with the surface. This modern and minimalist option is widely used in contemporary homes and offices for a clean, uniform appearance.
3. **Comparison Between Cladding and Panelling**
   - **Placement**

     Cladding is often used for exterior walls or ceilings, while panelling is typically meant for interior decorative finishes.
   - **Purpose**

     Cladding serves functional purposes like protection from weather, insulation, and aesthetics, whereas panelling is primarily used for interior beautification and wall treatment.
   - **Design Intent**

     Cladding generally aims to create a structural barrier with aesthetic appeal, while panelling enhances the ambience and style of interior spaces through patterns and textures.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Real-Life Design Scenarios with Focus on Cladding and Panelling Selection

Group Size: 4–6 participants per group

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (in different colours)
- Scenario cards (described below)
- Samples or printed visuals of cladding and panelling types (optional but helpful)

Activity Duration: 60 minutes

Instructions:

1. **Divide participants into small groups and explain the learning objective:**

   To apply understanding of wooden cladding and panelling in real-world interior and exterior projects by considering design intent, placement, and functional purpose.

2. **Distribute scenario cards (one per group).**

   Each scenario should describe a design situation where wooden cladding or panelling is needed for aesthetic or functional purposes.

Group Discussion and Planning

Each group discusses their assigned scenario using these prompts:

- What space or structure is involved (interior/exterior)?
- Which type of cladding or panelling best fits the need (based on moisture, durability, aesthetics)?
- What is the design intent (e.g., warmth, luxury, rustic look)?
- Are there any functional concerns (e.g., ventilation, concealment, cost)?

Groups must choose the best solution and create a simple layout or idea sketch on chart paper.

Group Presentations

Each group presents:

- Their scenario
- Chosen cladding/panelling type
- Key reasons for selection
- Basic layout or sketch

Encourage other groups to ask questions and provide alternative suggestions.

Debriefing and Key Takeaways

Facilitator leads a group reflection on:

- What criteria guided material selection?
- How did groups balance function with aesthetics?
- What design or material lessons were learned?

Examples of Scenario Cards

Scenario 1

A hotel lobby wall needs a luxurious and elegant wooden treatment that also helps reduce noise. Choose a type of panelling and explain your design logic.

Scenario 2

An exterior facade of a café is to be redesigned with durable wooden cladding that adds rustic charm and withstands rain and sun. What would you select?

Scenario 3

A compact urban apartment has a narrow hallway with plain walls. Suggest a suitable wall panelling treatment to make the space more attractive and warmer.

Activity	Duration	Resources used
Real-Life Design Scenarios with Focus on Cladding and Panelling Selection	60 minutes	Whiteboard or flipchart,Markers,Sticky notes (in different colours),Scenario cards (described below),Samples or printed visuals of cladding and panelling types (optional but helpful) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Clarify technical terms (e.g., what is tongue and groove vs. beadboard) using visuals or actual samples.
- Encourage practical reasoning — balance cost, aesthetics, and environment.
- Support group interaction by rotating among teams and prompting with “why” and “what if” questions.

Unit 16.2: Material Selection, Planning, and Preparation

Unit Objectives

At the end of this unit, participants will be able to:

1. Select suitable timber and engineered panels based on strength, moisture resistance, and indoor/outdoor applicability.
2. Prepare the work area, tools, and safety setup before beginning fabrication tasks.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to fabricate wooden cladding and panelling components by following layout drawings and material specifications. You will learn how to measure and cut timber, perform grooving and shaping tasks, and join components using appropriate tools. The unit also covers surface preparation techniques like sanding and sealing to ensure panels are smooth, safe, and installation-ready.

Ask

Ask the participants the following questions:

- What kind of wood should you use for outdoor cladding—one that absorbs water or resists it?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Material Selection, Planning, and Preparation

In this unit, we will discuss how to choose the right types of wood and engineered panels for cladding and panelling projects, depending on where and how they will be used. We will also learn how to prepare the work area, organize tools, and follow basic safety steps before starting any fabrication work. This helps ensure accuracy, safety, and better quality in the final installation.

1. **Selecting Suitable Timber and Engineered Panels**
    - The selection of materials for cladding and panelling must consider mechanical strength, moisture resistance, and whether the application is indoor or outdoor.
    - Solid hardwoods like teak or oak are ideal for high-load or exposed conditions due to their durability and weather resistance.
    - Engineered panels like plywood, MDF, or HDF are commonly used for interior panelling where cost-efficiency, smooth finish, and ease of installation are important.
    - Moisture-prone areas (e.g., bathrooms or exterior walls) require water-resistant or treated materials such as marine ply or weather-coated boards.
    - Aesthetic appeal also influences selection—grain pattern, finish compatibility, and colour tone must align with design requirements.
2. **Preparing Work Area, Tools, and Safety Setup**
    - Before starting fabrication, the work area must be cleared, organized, and well-lit to support efficient movement and reduce risk of error.
    - All required tools—such as saws, drills, clamps, sanding equipment, measuring tape, and marking tools—should be inspected and arranged systematically.
    - Safety gear such as goggles, gloves, masks, and hearing protection must be available and worn according to the task.
    - Dust collection systems or fans should be in place to reduce air-borne particles, especially during cutting and sanding.
    - Checking the flatness of the work surface and ensuring stable support is essential to avoid material warping or errors in marking.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: "Cladding and Panelling Planning Challenge"

Group Size: 4–5 participants

Duration: 60 minutes

Materials Required:

- Sample images or physical samples of different types of timber and engineered boards (plywood, MDF, HDF, etc.)
- Workspace layout sheets (mock plans of a living room wall, exterior façade, ceiling panel, etc.)
- Markers, paper, and sticky notes
- Safety gear chart (goggles, gloves, helmets, etc.)
- Tool cards (images/names of power and hand tools)

Activity Instructions:

1. **Distribute Layout Sheets**

   Each group receives a unique mock layout (e.g., indoor ceiling panel, exterior wall cladding, decorative wall panel). The group must analyse the purpose and environment of the layout.

2. **Material and Tool Selection**

   Based on the assigned layout, groups select the most appropriate materials (timber or boards) considering indoor/outdoor use, moisture exposure, strength, and finish quality. They also choose necessary tools and safety gear for the task.

3. **Planning and Preparation Steps**

   Each group will list key steps to prepare the work area, including surface prep, tool setup, PPE required, and any space constraints.

4. **Group Presentation**

   Each group presents their selected material, tools, and workspace prep plan, explaining their reasoning.

Activity	Duration	Resources used
"Cladding and Panelling Planning Challenge"	60 minutes	Sample images or physical samples of different types of timber and engineered boards (plywood, MDF, HDF, etc.),Workspace layout sheets (mock plans of a living room wall, exterior façade, ceiling panel, etc.,Markers, paper, and sticky notes,Safety gear chart (goggles, gloves, helmets, etc.),Tool cards (images/names of power and hand tools) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Encourage reasoning**

  Ask groups to explain why they chose a certain board for indoor vs. outdoor use (e.g., “Why did you pick HDF instead of plywood?”).

- **Prompt safety focus**

  Ensure groups mention essential PPE (e.g., gloves for cutting MDF, masks for sanding).

- **Support visual learners**

  Use real or printed material samples and tool pictures to assist in identification and selection.

Unit 16.3: Fabrication of Cladding and Panelling Components

Unit Objectives

At the end of this unit, participants will be able to:

1. Measure and cut timber components according to layout drawings and material lists.
2. Perform grooving, shaping, and joining operations using suitable woodworking tools.
3. Prepare surfaces for installation by sanding and applying sealants as required.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to fabricate wooden cladding and panelling components by following layout drawings and material specifications. You will learn how to measure and cut timber, perform grooving and shaping tasks, and join components using appropriate tools. The unit also covers surface preparation techniques like sanding and sealing to ensure panels are smooth, safe, and installation-ready.

Ask

Ask the participants the following questions:

- What tool can be used to measure the length of a wooden panel before cutting it?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Fabrication of Cladding and Panelling Components

This unit focuses on the essential skills and steps required to fabricate cladding and panelling components for wood-based interior and exterior applications. Participants will learn to interpret layout drawings, cut materials accurately, shape and join wood pieces, and prepare surfaces for smooth and durable installation.

1. **Measure and cut timber components according to layout drawings and material lists**
    - Learners will understand how to read panel layout drawings and material specifications to identify correct sizes and shapes for each wooden component.
    - Proper techniques will be practiced measuring length, width, and depth using tools such as measuring tapes, steel rules, try squares, and marking gauges.
    - Cutting of timber and board material will be performed using tools like hand saws, circular saws, or panel saws, ensuring clean and accurate edges for joint fitting.
2. **Perform grooving, shaping, and joining operations using suitable woodworking tools**
    - This section trains participants to use routers, chisels, or table saws for grooving edges or slots as required in tongue-and-groove or shiplap cladding.
    - Shaping tasks, such as rounding edges or profiling panels, will be carried out to meet design aesthetics and safety requirements.
    - Learners will assemble components using joints like tongue and groove, dowels, or adhesive-bonded edges, applying clamps and alignment tools to ensure uniformity.
3. **Prepare surfaces for installation by sanding and applying sealants as required**
    - Participants will prepare fabricated components for final installation by smoothing surfaces using hand sanding blocks or orbital sanders to remove roughness and splinters.
    - Techniques for applying sealants, wood primers, or base coats will be introduced to protect surfaces from moisture, dust, and wear.
    - This step ensures that all panels are visually consistent, smooth to touch, and ready for mounting or decorative finishing.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Fabricating a Panel Practice Together

Group Size: 4–6 participants

Materials Needed:

- Sample layout drawings or diagrams
- Measuring tapes, rulers, pencils
- Cardboard sheets or lightweight wooden strips (for practice)
- Sandpaper (fine and medium grit)
- Hand saws or plastic/wood cutters (as applicable)
- Clamps, wood glue, mock sealant
- PPE: safety gloves, goggles

Duration: 60 minutes

Activity Instructions

1. **Introduction**

   Provide each group with a panel layout drawing showing dimensions and joinery points. Briefly explain each step—measuring, cutting, grooving/shaping, and surface preparation.

2. **Hands-On Task**

   - Groups assign roles: measurement, cutting, joining, and sanding.
   - Members mark the measurements and cut practice materials accordingly.
   - Surfaces are then sanded smooth, and edges are prepared using glue or mock sealant.
   - Assemble the pieces using clamps to show proper fitting.

3. **Group Sharing and Feedback**

   Each group explains their steps, challenges faced, and how they ensured alignment and finish. Other groups and facilitator provide constructive feedback.

Activity	Duration	Resources used
Fabricating a Panel Component Together	60 minutes	Sample layout drawings or diagrams,Measuring tapes, rulers, pencils,Cardboard sheets or lightweight wooden strips (for practice),Sandpaper (fine and medium grit),Hand saws or plastic/wood cutters (as applicable),Clamps, wood glue, mock sealant,PPE: safety gloves, goggles etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Demonstrate Each Step Before Starting:**

  Show learners how to measure accurately, handle tools safely, and prepare surfaces properly.

- **Reinforce Team Roles and Workflow:**

  Encourage rotation of tasks so that each participant gains exposure to more than one step in the process.

- **Encourage Attention to Detail:**

  Ask groups to double-check measurements and cut lines—reinforcing that precision is key in cladding and panelling.

Unit 16.4: Installation, Alignment, and Finishing

Unit Objectives

At the end of this unit, participants will be able to:

1. Install cladding or panelling components using clamps, guides, and appropriate adhesives or fasteners.
2. Align and level panels for horizontal or vertical layouts using installation references.
3. Apply edge sealing and finishing techniques to ensure durability and appearance.
4. Identify and address typical on-site challenges such as uneven walls or panel expansion.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the methods and tools used for installing wooden cladding and panelling, with a focus on alignment, surface finishing, and managing on-site challenges. Learners will explore techniques for using clamps, adhesives, and fasteners, aligning panels accurately, sealing edges, and finishing surfaces. The unit also covers how to deal with common problems like uneven walls or material expansion during installation.

Ask

Ask the participants the following questions:

- What is the purpose of using a spirit level during panel installation?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Installation, Alignment, and Finishing

This unit focuses on the practical skills required to install wooden cladding and panelling with accuracy, aesthetic appeal, and structural stability. Participants will learn how to manage the positioning and fixing of panels, ensure proper alignment, apply edge finishes, and resolve common issues encountered on-site such as irregular walls or material expansion.

1. **Installing Cladding or Panelling Components**
    - Learn to use tools such as clamps, wooden guides, adhesives, nails, or screws to fix panels securely to the surface.
    - Understand how to choose between adhesives and fasteners depending on surface type (brick wall, plywood base, etc.) and panel material.
2. **Aligning and Levelling Panels**
    - Use levelling tools such as spirit levels, plumb lines, or laser levels to ensure that horizontal or vertical arrangements are straight and consistent.
    - Follow layout references and spacing plans to maintain uniform gaps and proper visual alignment.
3. **Edge Sealing and Finishing**
    - Apply sealing materials like wood filler, edge tape, or trim strips to exposed panel edges for moisture protection and clean appearance.
    - Finish surfaces with polish, laminates, or varnish to enhance durability, aesthetic value, and ease of maintenance.
4. **Handling On-Site Installation Challenges**
    - Learn to detect and resolve irregularities such as bulging or sloped walls by using spacers, padding, or trimming techniques.
    - Understand how to accommodate material expansion (especially in wood) by providing movement gaps and using flexible adhesives or clips.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Panel Installation Practice Workshop

Group Size: 4–6 participants

Materials Needed:

- Wooden panel samples (small sizes for simulation)
- Clamps, measuring tapes, spirit levels
- Adhesives or screws (mock use)
- Chart paper, markers
- Sample layout drawing for panel installation
- Protective gear (gloves, goggles)

Activity Duration: 60 minutes

Instructions:

1. **Setup & Briefing**

   Provide each group with a sample wall layout and a toolkit. Explain the objective: simulate panel installation on a vertical wall using mock materials.

2. **Planning & Role Assignment**

   Each group should review the layout and assign roles: measurer, cutter (if required), installer, level checker, and finisher.

3. **Mock Installation**

   - Participants will align the panels on a chart paper "wall" using clamps and mock adhesive (tape).
   - Ensure spacing, symmetry, and edge alignment.
   - Mark areas for sealant application and finishing with sketch or labels.

4. **Review & Feedback**

   Groups present their finished "installation." Instructor and peers provide feedback on accuracy, alignment, and creative problem-solving (e.g., uneven surface handling).

Activity	Duration	Resources used
Panel Installation Simulation Workshop	60 minutes	Wooden panel samples (small sizes for simulation),Clamps, measuring tapes, spirit levels,Adhesives or screws (mock use),Chart paper, markers,Sample layout drawing for panel installation,Protective gear (gloves, goggles) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- **Ensure Safety Protocols**

  Even in a simulation, ensure proper handling of clamps and mock tools.

- **Encourage Collaboration**

  Assign clear roles to enhance coordination and decision-making during alignment and finishing steps.

- **Provide a Visual Reference**

  Show real photos of good and faulty panel installations to help participants visualize quality benchmarks.

Exercise

Multiple Choice Questions (MCQs)

1. Which type of wooden cladding consists of boards that overlap slightly to create a weather-resistant joint?

   a. Tongue and groove

   b. Shiplap

   c. Flat panel

   d. Raised panel

   Answer: b. Shiplap

2. What is the primary purpose of applying a base coat or sealer before installing exterior wooden cladding?

   a. Increase cost

   b. Change colour

   c. Prevent fungal attack and moisture damage

   d. Add weight to the panel

   Answer: c. Prevent fungal attack and moisture damage

3. Beadboard panelling is most used in which of the following applications?

   a. Roof shingles

   b. Decorative wall treatments and ceilings

   c. Outdoor fencing

   d. Foundation walls

   Answer: b. Decorative wall treatments and ceilings

4. What tool is most appropriate for ensuring the horizontal alignment of wooden panels during installation?

   a. Clamps

   b. Measuring tape

   c. Spirit level

   d. Hammer

   Answer: c. Spirit level

Fill in the Blanks

1. _____ joints are commonly used in tongue and groove profiles for creating tight-fitting cladding systems.

   Answer: Interlocking

2. Moisture content in timber should be checked before fabrication to prevent _____ and warping.

   Answer: expansion

3. _____ is applied to exposed joints after panel installation to prevent dust and water entry.

   Answer: Sealant

4. Tools like routers and _____ are used for shaping edges and cutting grooves in cladding boards.

   Answer: table saws

Match the following

1. Match the type of cladding/panelling with its typical feature:

Column A	Column B
1. Raised Panel	a. Smooth vertical joints
2. Board-and-Batten	b. Traditional, decorative look
3. Tongue and Groove	c. Alternating wide and narrow boards

Answers: 1 - b, 2 - c, 3 - a

2. Match the task with the appropriate tool:

Column A	Column B
1. Measuring timber length	a. Spirit level
2. Ensuring horizontal level	b. Measuring tape
3. Applying surface primer	c. Paint brush

Answers: 1 - b, 2 - a, 3 - c

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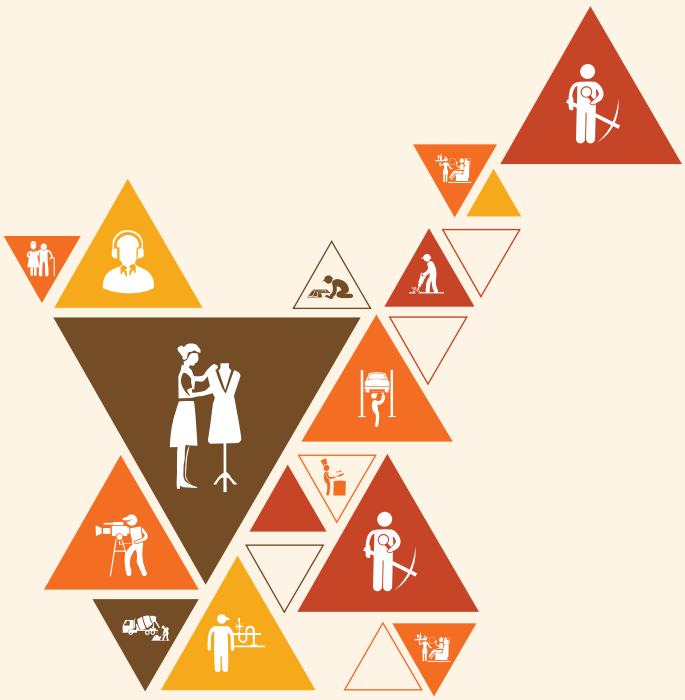
17. Fabrication and Installation of Wooden Flooring

Unit 17.1: Flooring Types, Material Selection, and Sub-Floor Preparation
Unit 17.2: Fabrication and Customization of Floorboards
Unit 17.3: Installation Techniques and Alignment
Unit 17.4: Sealing, Finishing, and Quality Checks



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify various wooden flooring types such as hardwood planks, laminate flooring, and multi-layer engineered wood, and explain where each is best suited based on room usage, expected foot traffic, and visual design.
2. Differentiate flooring materials by evaluating durability, grain appearance, moisture sensitivity, expansion behaviour, and long-term maintenance needs.
3. Select appropriate flooring systems based on site conditions — for example, using floating floors over dry, stable sub-floors or glue-down for permanent installations.
4. Inspect the sub-floor condition by checking levelness, smoothness, presence of cracks or surface undulation, and readiness for board installation.
5. Detect and assess moisture levels in sub-floors using simple tools like moisture meters or polythene sheet tests to decide if vapor barriers are necessary.
6. Install vapor barrier sheets or foam underlays in line with product guidelines to prevent future moisture damage or squeaking in floor installations.
7. Interpret floor plans and room layout drawings to calculate total board quantity, identify starting points, and allow for wastage during edge trimming or alignment correction.
8. Measure usable floor dimensions manually and estimate board quantity, layout direction, and reserve for expansion gaps or utility cut-outs.
9. Cut flooring panels using circular saws, jigsaws, or table saws based on panel type, thickness, and cut shape (straight, notched, L-shaped).
10. Shape floorboards to meet profile specifications such as beveled edges, decorative grooves, or interlocking joints.
11. Sand and smooth panel surfaces and edges to eliminate splinters, improve grain finish, and prepare them for sealing or polish.
12. Create accurate tongue-and-groove or click-lock joints on customized panels using routers or ready-machined boards.
13. Visually inspect floorboards for quality issues like cracks, surface chipping, warping, and joint imperfections and select matching grain patterns to ensure aesthetic continuity.
14. Install flooring boards using the appropriate method—nail-down, glue-down, or floating installation—based on material, sub-floor, and layout plan.
15. Use tools like flooring nailers, rubber mallets, clamps, wedges, and spacers to install boards securely and maintain expansion gaps.
16. Ensure proper board alignment, starting from the reference line or wall, and correct offsets across rows to avoid gaps or misfits.
17. Cut out floorboards accurately around ducts, electrical boxes, or plumbing fixtures using jigsaws or hand saws.
18. Apply suitable sealants to board edges, wall joints, and perimeter gaps to improve moisture resistance and stability of the installed floor.
19. Sand the entire flooring surface evenly using orbital or belt sanders to eliminate uneven spots, glue marks, or texture irregularities.
20. Buff the floor with polishing pads or buffing machines to achieve a consistent appearance, shine, and finish texture.

21. Conduct a detailed final inspection to verify alignment, levelness, gap presence, squeaking boards, or loose corners.
22. Clean the entire floor surface, remove debris or adhesive residue, and prepare the site for handover, including a checklist for client review.

Unit 17.1: Flooring Types, Material Selection, and Sub-Floor Preparation

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify types of wooden flooring systems including hardwood, laminate, and engineered boards, and explain their usage based on foot traffic and room function.
2. Select flooring material based on wear resistance, appearance, moisture content, and dimensional stability.
3. Inspect and prepare sub-floors by checking for levelness, cracks, and moisture, and install vapor barriers where required.
4. Estimate panel quantities and cutting allowances using floor plans and room measurements.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss different types of wooden flooring systems such as hardwood, laminate, and engineered boards, and how to choose the right one based on room usage and durability needs. We will also learn how to inspect and prepare sub-floors, check for levelness and moisture, and estimate the quantity of flooring material required using room measurements and floor plans.

Ask

Ask the participants the following questions:

- Can you name any one type of wooden flooring you have seen or heard of?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Flooring Types, Material Selection, and Sub-Floor Preparation

This session introduces participants to various types of wooden flooring systems, helping them understand how to select appropriate materials and prepare the site for effective installation. It covers material properties, sub-floor inspection, moisture barriers, and estimation techniques using floor plans.

1. **Identification of Wooden Flooring Types and Their Usage**
    - Participants will explore the differences between solid hardwood flooring, laminate flooring, and engineered wood boards.
    - Hardwood is best suited for living areas and low-moisture zones, whereas laminate is cost-effective and suitable for medium traffic. Engineered wood offers dimensional stability, ideal for rooms prone to moisture or temperature variations.
2. **Selection of Flooring Material Based on Functional Needs**
    - Participants will understand how to select flooring by comparing durability, appearance, moisture resistance, and dimensional stability.
    - For example, high-footfall areas like hallways need wear-resistant surfaces, while moisture-prone zones like kitchens may require treated or engineered wood panels.
3. **Sub-Floor Inspection and Preparation Techniques**
    - The unit covers how to check levelness, identify cracks or gaps, and test for residual moisture before installation.
    - It also explains when to install vapor barriers to prevent flooring damage, especially on concrete sub-floors or ground-level installations.
4. **Estimation Using Floor Plans and Site Measurements**
    - Participants will learn to read floor layout drawings and use tools like measuring tapes or digital apps to calculate total floor area.
    - They will also estimate cutting allowances, wastage margins, and determine how many panels or planks are needed for the job efficiently.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Planning a Wooden Flooring Installation Project

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (different colours)
- Scenario cards (see below)
- Room layout printouts
- Sample flooring material chart (showing types, durability, size, cost per m^2)

Activity Duration: 60 minutes

Instructions:

1. **Form Groups and Explain Objective:**

   Divide the participants into small groups. Explain that each group will plan a wooden flooring installation based on the specific conditions of a client site and the type of space provided in a scenario card.

2. **Review Concepts:**

   Revisit key points on:

   - Flooring types (hardwood, laminate, engineered boards)
   - Sub-floor inspection requirements
   - Moisture and wear resistance
   - How to estimate material quantity using floor dimensions

3. **Distribute Scenario Cards:**

   Each group gets a unique flooring project situation involving room use, sub-floor condition, and client preference.

Group Task

Each group will:

- Select a suitable flooring type and justify the choice
- List necessary checks and sub-floor preparation steps
- Calculate approximate material quantity, including cutting allowance
- Identify possible issues and how they would be addressed before installation

Group Presentations

Groups present:

- The details of their scenario
- Their flooring selection and planning strategy
- Sub-floor preparation steps

- Material estimation approach

Encourage follow-up questions and comparisons between groups.

Debriefing and Key Learnings

Facilitator leads discussion on:

- Why material selection must match usage and room condition
- What a proper sub-floor checks prevent long-term flooring issues
- Importance of planning for waste and installation sequence

Examples of Scenario Cards

Scenario 1

You are working on a small living room (3m x 4m) that has a concrete sub-floor with minor cracks. The client prefers a natural wood look that is easy to maintain.

Scenario 2

A kitchen area (3m x 5m) is to be fitted with flooring. The room has high moisture and frequent foot traffic. The sub-floor is level but has traces of dampness.

Scenario 3

A large master bedroom (4m x 5m) needs wooden flooring. The client wants an eco-friendly option with good insulation. The sub-floor is wooden with slight creaking in one corner.

Activity	Duration	Resources used
Planning a Wooden Flooring Installation Project	60 minutes	Whiteboard or flipchart,Markers,Sticky notes (different colours),Scenario cards (see below),Room layout printouts,Sample flooring material chart (showing types, durability, size, cost per m^2) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Prompt discussion on client needs vs. technical suitability.
- Use actual plank samples or printed material specs if available.
- Allocate 5 minutes for each team presentation, leaving enough time for debriefing.

Unit 17.2: Fabrication and Customization of Floorboards

Unit Objectives

At the end of this unit, participants will be able to:

1. Cut, shape, and sand flooring panels as per design and profile requirements.
2. Perform necessary grooves, tongues, or joint detailing for secure installation.
3. Inspect floorboards for defects and select matching grains for seamless appearance.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to fabricate and customize floorboards to meet specific design and installation requirements. Learners will explore how to cut, shape, and smoothen wooden panels, create proper joints like tongues and grooves for secure fitting, and inspect boards for quality and grain matching. The focus will be on achieving both structural integrity and visual uniformity in flooring applications.

Ask

Ask the participants the following questions:

- What is the purpose of adding a tongue and groove to floorboards?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Fabrication and Customization of Floorboards

This session focuses on the essential processes involved in preparing, modifying, and finishing floorboards to meet design and installation requirements. It covers technical skills like cutting, profiling, sanding, and joint detailing, as well as quality-checking for visual consistency and durability.

1. Cutting, Shaping, and Sanding Flooring Panels as per Design and Edge Profile Requirements

   Floorboards need to be accurately cut and shaped according to layout measurements and design specifications. This involves using tools like circular saws, routers, and planers to create smooth, precise edges and desired contours. Sanding ensures the surface is level and free from splinters, preparing the board for finishing or coating.

2. Performing Necessary Grooves, Tongues, or Joint Detailing for Secure Installation

   To enable interlocking and stability during floor installation, specific edge details such as grooves, tongues, or click-lock joints must be fabricated. This process enhances alignment and prevents movement after installation. Proper tools and jigs are used to ensure consistency in joint detailing across all panels.

3. Inspecting Floorboards for Defects and Selecting Matching Grains for Seamless Appearance

   Before final installation, each floorboard should be visually and physically inspected for cracks, warping, discoloration, or knots that may weaken the structure or affect aesthetics. Boards with similar grain direction, tone, and texture are grouped together to maintain a uniform and attractive floor finish.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Floorboard Fabrication and Layout Planning

Group Size: 4–5 participants

Materials Required:

- Sample wooden planks or cardboard strips (to represent floorboards)
- Measuring tape or scale
- Sandpaper
- Pencils and markers
- Templates for tongue and groove profiles
- Floor layout sheet or marked floor space
- Inspection checklist

Activity Duration: 60 minutes

Activity Instructions:

1. Divide participants into small groups and assign them a basic flooring task based on a given layout.
2. Provide materials such as mock floorboards, measuring tools, and templates.
3. Ask each group to measure, mark, and shape the floorboard edges according to the layout and edge profile requirements.
4. Using the templates, participants will mark and explain the placement of grooves and tongues for secure joints.
5. Each group will inspect their boards for visible defects (such as cracks, marks, or uneven edges) and select matching grain patterns.
6. Finally, they will arrange the floorboards on the layout sheet to present a clean and aligned floor plan.

Activity	Duration	Resources used
Floorboard Fabrication and Layout Planning	60 minutes	Sample wooden planks or cardboard strips (to represent floorboards),Measuring tape or scale,Sandpaper,Pencils and markers,Templates for tongue and groove profiles,Floor layout sheet or marked floor space,Inspection checklist etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Assign clear roles within each group (e.g., measurer, marker, inspector, arranger) to ensure full participation.
- Demonstrate tongue and groove profiles before the activity to guide accurate detailing.
- Encourage discussion within groups on why certain boards are chosen or rejected, focusing on grain matching and defect identification.

Unit 17.3: Installation Techniques and Alignment

Unit Objectives

At the end of this unit, participants will be able to:

1. Install flooring using appropriate methods such as glue-down, nail-down, or floating technique.
2. Use clamps, spacers, and nail guns to position and secure floorboards during installation.
3. Align boards for even layout and fit cut-outs precisely around utilities like ducts and outlets.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the various techniques used for installing floorboards, including glue-down, nail-down, and floating methods. Learners will explore how to use essential tools like clamps, spacers, and nail guns to secure boards properly. The unit also covers how to maintain straight alignment and make accurate cut-outs around fixtures such as pipes and outlets to ensure a clean, professional finish.

Ask

Ask the participants the following questions:

- What tool is used to maintain a small gap between the floorboard and the wall during installation?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Installation Techniques and Alignment

This session equips participants with the techniques and tools required to install floorboards accurately and efficiently. It emphasizes selecting suitable installation methods, using essential tools for secure fixing, and ensuring precise alignment, especially when working around structural features like outlets, ducts, or pipes.

1. **Understanding and Applying the Right Installation Method**

   Floorboards can be installed using different techniques based on the type of flooring material, subfloor condition, and site requirements.

   - The glue-down method involves spreading adhesive on the subfloor and pressing each board into place. This method offers a stable, long-lasting bond and is commonly used with engineered or hardwood flooring.
   - The nail-down method uses nails or staples to fasten floorboards directly to wooden subfloors. This is ideal for solid hardwood flooring and provides excellent structural strength.
   - The floating method allows boards to connect to one another using tongue-and-groove or click-lock systems, without attaching them to the subfloor. This method is quick, allows for expansion, and is often used for laminate and engineered floors.

   Choosing the right method is crucial to ensure proper performance, ease of installation, and longevity.

2. **Using Tools to Ensure Proper Fit and Fixing**

   Proper installation requires the use of specific tools that help achieve precision and stability.

   - Clamps are used to hold the boards tightly together during installation, especially in glue-down applications, to prevent movement while the adhesive sets.
   - Spacers are placed between the floorboards and the walls to maintain uniform expansion gaps, allowing the wood to naturally expand and contract with temperature and humidity changes.
   - Nail guns or flooring staplers are used for fast and consistent fastening of boards, especially in the nail-down method. They reduce manual effort and improve the speed and accuracy of the installation.

   Using these tools correctly ensures a strong, gap-free, and neatly finished floor.

3. **Maintaining Alignment and Making Accurate Cut-Outs**

   Precise alignment of floorboards is essential for both aesthetics and durability. Boards should be laid in straight, consistent rows with staggered joints to distribute load evenly and avoid weak spots.

   During installation, there are often areas where boards must fit around utilities such as electrical outlets, heating vents, or plumbing pipes. These require careful measurement, marking, and cutting to ensure the board fits snugly around the feature without visible gaps.

   Any misalignment or poorly cut sections can lead to functional issues and reduce the overall visual quality of the flooring. Attention to detail at this stage ensures a seamless and professional finish.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Floorboard Installation Planning and Alignment Practice

Group Size: 4–5 participants

Materials Required:

- Sample wooden floorboards or cardboard strips
- Measuring tape or ruler
- Pencil and chalk
- Mock floor layout sheet or marked floor area
- Clamps or adhesive tape (to simulate holding boards)
- Cut-out templates for pipes/outlets
- Spacers (wooden or plastic pieces)

Activity Duration: 60 minutes

Activity Instructions:

1. Divide participants into groups and provide each group with a simple floor layout and a set of mock floorboards.
2. Ask them to choose an appropriate installation method (glue-down, nail-down, or floating) and explain their choice briefly.
3. Using the layout sheet, participants will arrange floorboards while maintaining alignment, applying spacers at the edges, and simulating the use of clamps.
4. Each group must mark and cut boards (using templates) to fit around mock utilities like pipes or electrical boxes.
5. After completing the layout, each group will present their process and explain how they ensured alignment and accuracy.

Activity	Duration	Resources used
Floorboard Installation Planning and Alignment Practice	60 minutes	Sample wooden floorboards or cardboard strips,Measuring tape or ruler,Pencil and chalk,Mock floor layout sheet or marked floor area,Clamps or adhesive tape (to simulate holding boards),Cut-out templates for pipes/outlets,Spacers (wooden or plastic pieces) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Demonstrate tool use (like how to place spacers and align boards) before the activity begins.
- Encourage planning before action – ask groups to map their first two rows before placing anything.
- Observe and guide participants on how to maintain staggered joints and proper expansion gaps throughout the layout.

Unit 17.4: Sealing, Finishing, and Quality Checks

Unit Objectives

At the end of this unit, participants will be able to:

1. Apply sealants to joints and perimeters for moisture resistance and durability.
2. Sand and buff the installed surface to enhance appearance and smoothness.
3. Conduct final inspection for alignment, defects, and movement, and clean the site for handover.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the final steps involved in completing a flooring project, including the application of sealants, surface finishing techniques, and quality checks. Learners will understand how to protect the floor from moisture, enhance its appearance through sanding and buffing, and carry out a final inspection to ensure proper alignment, stability, and cleanliness before handover.

Ask

Ask the participants the following questions:

- Why is it important to apply sealant to the joints and edges of a floor?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Sealing, Finishing, and Quality Checks

This unit focuses on the final phase of floorboard installation, where protective sealing, surface refinement, and thorough inspection are carried out. These steps not only enhance the appearance and durability of the flooring but also ensure that the site is ready for handover in a clean and professional condition.

1. **Applying Sealants for Protection and Longevity**

   After the floorboards are securely installed, sealants are applied along the joints, edges, and perimeter of the flooring. This process creates a moisture-resistant barrier, especially important in areas exposed to water or humidity, such as kitchens or entryways. By sealing the small gaps between boards and around the room's edges, the flooring is protected from potential swelling, warping, and Mold formation. A well-sealed floor increases the lifespan of the installation and improves its overall resistance to environmental wear.

2. **Sanding and Buffing the Installed Floor Surface**

   Once the sealant has cured, sanding is carried out to level the surface and eliminate minor height differences between adjacent boards. This step also removes any leftover glue marks, scratches, or imperfections. After sanding, the surface is buffed using appropriate tools to enhance the natural shine or finish of the material. Buffing smooths the grain and helps achieve a polished, attractive look that matches the desired aesthetic of the space. Together, sanding and buffing transform the raw installed boards into a finished, high-quality surface.

3. **Conducting Final Inspection and Cleaning the Site**

   Before the site can be handed over, a complete inspection is performed to check for any remaining issues. This includes verifying board alignment, ensuring there are no visible gaps or loose pieces, and testing the flooring for movement or instability. Any defects or irregularities are corrected immediately. Once the inspection is passed, the entire work area is cleaned thoroughly—dust, debris, adhesive residue, and tool marks are removed to ensure a spotless finish. This step reflects the professionalism of the work and prepares the floor for immediate use by the client.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Floor Finishing and Final Inspection Practice

Group Size: 4–5 participants

Materials Required:

- Sample wooden floor panels or pre-installed mock floor section
- Masking tape (to simulate sealant areas)
- Sandpaper and soft cloths
- Buffing pads (manual or tool-attached, if available)
- Inspection checklist (alignment, gaps, surface finish, cleanliness)
- Cleaning materials (broom, cloth, vacuum, etc.)

Activity Duration: 60 minutes

Activity Instructions:

1. Divide participants into groups and assign each group a mock flooring area or surface with minor flaws (gaps, uneven boards, dust).
2. Ask them to begin by identifying areas that need sealing and mark them using masking tape to simulate sealant application.
3. Next, participants will sand and manually buff the surface using provided tools to improve its finish.
4. Finally, groups will perform a detailed inspection using a checklist to check for alignment, gaps, or unfinished spots and clean the entire area to meet handover standards.
5. Each group will present their inspection findings and explain their approach to sealing and finishing.

Activity	Duration	Resources used
Floor Finishing and Final Inspection Practice	60 minutes	Sample wooden floor panels or pre-installed mock floor section,Masking tape (to simulate sealant areas),Sandpaper and soft cloths,Buffing pads (manual or tool-attached, if available),Inspection checklist (alignment, gaps, surface finish, cleanliness),Cleaning materials (broom, cloth, vacuum, etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Demonstrate each step (especially sanding and inspection) before the activity so learners are clear about quality expectations.
- Provide a sample inspection checklist with simple points like “Are the joints sealed?”, “Is the surface smooth?”, and “Is the area clean and ready for handover?”
- Encourage discussion within groups on what issues they observed and how they resolved them, promoting critical thinking and teamwork.

Exercise

Multiple Choice Questions (MCQs)

1. Which type of wooden flooring is best suited for high foot traffic areas due to its durability and natural strength?
   a. Laminate flooring
   b. Multi-layer engineered wood
   c. Hardwood planks
   d. Vinyl flooring

   Answer: c. Hardwood planks

2. What tool is commonly used to measure moisture levels in a sub-floor before installation?
   a. Levelling ruler
   b. Moisture meter
   c. Chalk line
   d. Orbital sander

   Answer: b. Moisture meter

3. Floating floors are most suitable when the sub-floor is:
   a. Uneven and cracked
   b. Carpeted
   c. Dry, flat, and stable
   d. Moist and damp

   Answer: c) Dry, flat, and stable

4. What is the purpose of using spacers during floorboard installation?
   a. To make decorative patterns
   b. To secure the boards permanently
   c. To maintain uniform expansion gaps
   d. To join uneven boards

   Answer: c. To maintain uniform expansion gaps

Fill in the Blanks

1. _____ saws are used to make straight or L-shaped cuts on flooring panels.

   Answer: Circular

2. A _____ sheet or foam underlay is installed to prevent moisture damage and squeaking.

   Answer: Vapor barrier

3. Floorboards are _____ and buffed after installation to enhance appearance and smoothness.

   Answer: Sanded

4. Matching _____ patterns across boards ensures a seamless and visually appealing finish.

   Answer: Grain

Match the Following

1. Match the terms in Column A with the correct descriptions in Column B.

Column A	Column B
1. Nail-down installation	a) Used to detect floor moisture
2. Moisture meter	b) Boards connected without fixing to the sub-floor
3. Click-lock system	c) Fastens boards mechanically to a wooden sub-floor
4. Orbital sander	d) Used to smooth and level the installed floor surface

Answers: 1 - c, 2 - a, 3 - b, 4 - d

2. Match the terms in Column A with the correct descriptions in Column B.

Column A	Column B
1. Spacers	a) Creates decorative or interlocking edge profiles
2. Buffing machine	b) Maintains uniform gaps for floor expansion
3. Router	c) Polishes the flooring for an even finish and shine
4. Inspection checklist	d) Used to verify final alignment, surface quality, and cleanliness

Answers: 1 - b, 2 - c, 3 - a, 4 - d

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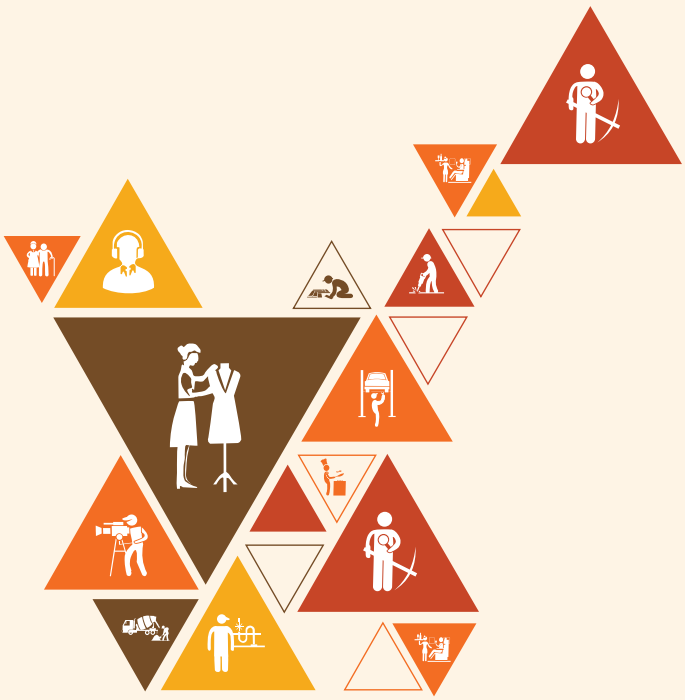
18. Fabrication and Installation of Kitchens, Cabinets, and Beds

Unit 18.1: Types of Cabinets and Their Functional Applications
Unit 18.2: Material Selection, Workshop Setup, and Component Fabrication
Unit 18.3: Furniture Assembly, Cut-Outs, and Installation Techniques
Unit 18.4: Hardware Fitting, Adjustment, and Final Quality Assurance



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Identify key types of cabinets such as base cabinets, tall storage units, wall-mounted cabinets, and drawer modules, and describe their roles in kitchens, bedrooms, and utility spaces.
2. Differentiate cabinet categories based on structure, depth, height, and hardware requirements specific to kitchen counters, wardrobe internals, or utility organizers.
3. Explain how cabinet size, orientation, and opening type influence user accessibility, storage convenience, and ergonomic functionality in different environments.
4. Select suitable timber and board materials like plywood, MDF, particle board, and laminated boards based on functional load, finish expectations, and exposure conditions.
5. Assess material characteristics such as strength, dimensional stability, edge retention, termite resistance, and moisture behavior for selection in beds, cabinets, or kitchens.
6. Design a workshop layout for safe and efficient fabrication including distinct zones for cutting, sanding, assembly, storage, and packaging.
7. Set up proper lighting, ventilation, waste disposal, and workbench ergonomics in accordance with productivity and safety norms.
8. Identify key tools for each fabrication stage such as saws (table, circular), planers, drills, routers, clamps, and sanding equipment, and inspect them for readiness.
9. Maintain and calibrate tools by checking blade sharpness, alignment settings, motor stability, and cleanliness before use.
10. Read and interpret drawings for cabinets and beds, noting part dimensions, joint details, and assembly order.
11. Develop cutting lists from design files that clearly lay out material sizing, edge referencing, and coding for each part.
12. Measure and mark panel components using layout pencils, measuring tapes, scribers, and squares with accurate referencing to minimize cumulative error.
13. Use machines and power tools to cut, shape, and drill components while maintaining burr-free finishes and correct tolerance limits.
14. Check fabricated parts for overall finish, dimensional consistency, drill hole alignment, and visual quality standards before proceeding to assembly.
15. Use jigs, benches, and holding clamps to position and stabilize workpieces during gluing, fastening, and alignment stages of assembly.
16. Assemble furniture components such as carcasses, shelves, tops, headboards, and legs in a defined sequence using adhesives, screws, dowels, and pneumatic fasteners.
17. Match grain flow across parts, align panel joints symmetrically, and ensure consistent spacing and edge profiles to maintain structural integrity and aesthetics.
18. Use spirit levels, plumb lines, and framing squares to check alignment in horizontal and vertical planes during cabinet or bed assembly.
19. Create accurate cut-outs in panels for switches, pipes, hinges, or embedded hardware using jigsaws, routers, and hole saws.
20. Choose suitable mounting systems like L-brackets, French cleats, and angle cleats for wall installation depending on load and substrate type.

21. Interpret specification sheets for hardware components such as soft-close hinges, concealed drawer slides, magnetic catches, and deadbolt locks.
22. Select appropriate hand tools and accessories like driver bits, hex keys, torque wrenches, and jigs required for accurate and safe hardware installation.
23. Mark hinge and accessory locations on shutters, drawers, or panels using measuring tools and templates provided with the hardware kit.
24. Cut or drill required holes and recesses for fitting hardware, ensuring depth, diameter, and spacing align with installation requirements.
25. Install all hardware fittings with precision, checking that handles, knobs, runners, and locking mechanisms are cantered, flush, and smooth in operation.
26. Test the fit and movement of cabinet doors and drawers, and adjust for proper clearance, resistance, and self-closing where applicable.
27. Identify common issues like shutter sag, misalignment, screw tear-out, or hardware clash and apply corrective actions using realignment or replacement.
28. Perform final checks for scratches, gaps, incorrect alignments, and mechanical faults and resolve them before client walkthrough or handover.
29. Clean the surface of units using microfiber cloths and appropriate cleaning agents and remove protective films, dust, or adhesive residue.
30. Ensure all units are complete, aligned, secured, and properly labelled for final review or delivery to the client.

Unit 18.1: Types of Cabinets and Their Functional Applications

Unit Objectives

At the end of this unit, participants will be able to:

1. Identify major cabinet types such as base cabinets, wall cabinets, tall units, and modular drawer units and describe their uses.
2. Distinguish between kitchen, wardrobe, and multipurpose storage cabinets based on structure and fitting needs.
3. Explain how cabinet selection affects layout planning, accessibility, and user experience.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss different types of cabinets such as base units, wall-mounted cabinets, tall storage units, and modular drawer systems. Learners will understand where each type is best used based on space, function, and user needs. The unit will also explore how cabinet selection impacts layout planning, storage efficiency, and ease of access in kitchens, wardrobes, and multipurpose areas.

Ask

Ask the participants the following questions:

- What type of cabinet is usually installed on the floor to support a countertop?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Types of Cabinets and Their Functional Applications

This unit provides an in-depth understanding of various cabinet types and how they contribute to storage, space planning, and user comfort in different environments. It emphasizes how cabinet design and placement affect functionality, accessibility, and visual organization in kitchens, wardrobes, and multipurpose areas.

1. **Identifying Common Cabinet Types and Their Functions**

   Cabinets come in multiple forms, each with a specific purpose based on its placement and design.

   - Base cabinets are installed directly on the floor and often support countertops, making them ideal for kitchens and workstations. They usually contain shelves or drawers and provide primary storage at a convenient reach level.
   - Wall cabinets are fixed above the countertop or workspace, offering elevated storage without taking up floor space. These are ideal for storing frequently used items like dishes, spices, or toiletries.
   - Tall units are floor-to-ceiling or pantry-style cabinets designed for vertical storage, often used for bulkier items, cleaning tools, or pantry stock.
   - Modular drawer units offer flexibility and customization. They typically include a series of stackable drawers and compartments, making them ideal for organizing tools, documents, or kitchen essentials in a compact, easy-to-access format.

2. **Distinguishing Cabinets by Usage and Construction**

   Cabinets are designed differently depending on their location and intended use.

   - Kitchen cabinets are engineered to withstand moisture, heat, and constant usage. They are equipped with specialized compartments for appliances, utensils, spices, and waste bins. The internal fittings are often customized for efficiency and durability.
   - Wardrobe cabinets are designed to store clothing and accessories. They typically include hanging rods for garments, drawers for folded clothes, and shelves for shoes or boxes. The internal layout is focused on maximizing vertical space and keeping items organized and accessible.
   - Multipurpose storage cabinets are more adaptable and used in various rooms like living rooms, offices, or utility spaces. They may include adjustable shelves, sliding doors, or open units to accommodate items such as files, books, electronics, or tools. The fittings and hardware vary based on flexibility and user preferences.

3. **Impact of Cabinet Choice on Layout and Accessibility**

   The type and placement of cabinets significantly affect how a space functions and feels.

   - Choosing the wrong cabinet type or size can obstruct movement, create clutter, or lead to underutilized space. For instance, installing swing-door cabinets in a narrow corridor can reduce mobility, while sliding door cabinets offer better clearance in tight spaces.
   - Tall units make use of vertical space and are ideal for storage in areas with limited floor area. In contrast, base and wall cabinets should be installed to ensure comfort and easy access during daily activities.
   - The selection also influences the overall user experience, with well-designed cabinets making it easier to organize, access, and maintain items. Good cabinet planning enhances workflow in kitchens, simplifies clothing management in wardrobes, and keeps multipurpose areas neat and efficient.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Planning Cabinet Layouts for Functional Spaces

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (different colors)
- Room layout handouts (kitchen, bedroom, office, etc.)
- Scenario cards (described below)

Activity Duration: 60 minutes

Instructions:

1. Divide participants into groups. Explain the activity objectives and briefly review the different cabinet types (base, wall, tall, modular drawer) and their functional uses in various rooms.
2. Distribute one scenario card to each group. Each card presents a practical challenge related to cabinet planning and selection for a specific type of room (e.g., a small kitchen or a shared wardrobe).
3. Encourage teams to approach the problem by considering cabinet function, layout constraints, user comfort, and accessibility.

Group Discussion and Planning

Each group discusses the scenario using the following prompts:

- What are the primary functional needs of the space?
- Which cabinet types are most appropriate and why?
- How can cabinet selection improve layout efficiency and user convenience?
- Are there space constraints or fitting challenges to consider?

Group Presentations (20 minutes):

Each group presents:

- Their assigned scenario
- The cabinet types they selected and how they arranged them
- The reasoning behind their choices in terms of space usage and user experience
- Any trade-offs they had to make due to size, access, or fitting issues

Encourage questions and comparisons between groups.

Debriefing and Key Takeaways (20 minutes):

Facilitate a class discussion focused on:

- The different approaches groups took in selecting and placing cabinets
- How user needs, layout size, and cabinet function influenced decisions
- Common mistakes to avoid when planning cabinet placement
- Key takeaways about optimizing storage and access through thoughtful cabinet selection

Examples of Scenario Cards

Scenario 1

You are designing storage for a compact kitchen in a studio apartment. There is limited wall space, and the owner wants to fit a microwave, utensils, and a pull-out pantry. Which cabinet types would you use, and how would you arrange them?

Scenario 2

A shared bedroom needs wardrobe space for two people. The users want individual sections with hanging space, drawers, and lockable compartments. How would you divide and arrange the wardrobe cabinet units?

Scenario 3

An office workspace needs a combination of storage for files, office supplies, and a small pantry section for employees. How would you balance functional storage and aesthetics using modular and tall cabinets?

Activity	Duration	Resources used
Planning Cabinet Layouts for Functional Spaces	60 minutes	Whiteboard or flipchart,Markers,Sticky notes (different colors),Room layout handouts (kitchen, bedroom, office,Scenario cards (described below) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Provide cabinet type visuals or printed references to help groups make informed decisions.
- Encourage groups to sketch basic layouts on chart paper or the provided floor plan sheets.
- Prompt deeper thinking by asking: “How would this layout affect daily movement or access?” or “What happens if this space is used by children or older adults?”

Unit 18.2: Material Selection, Workshop Setup, and Component Fabrication

Unit Objectives

At the end of this unit, participants will be able to:

1. Select appropriate timber and engineered wood-based boards for manufacturing kitchen units, cabinets, and beds based on design, strength, moisture content, and application.
2. Identify key timber properties such as durability, dimensional stability, and suitability for different functional furniture elements.
3. Plan and organize a safe and efficient workshop setup for furniture fabrication and installation, including layout, ventilation, and space utilization.
4. Select, test, and maintain hand tools and woodworking machinery used for cutting, shaping, finishing, and assembly.
5. Interpret cabinet and bed designs and develop cutting lists to estimate and organize required components.
6. Perform accurate measurement and marking using tapes, measuring squares, scribers, and layout pencils.
7. Use woodworking machines and tools (saws, planers, drills, routers) to fabricate furniture parts with precision and smooth finish.
8. Inspect each fabricated component for correct dimensions, surface finish, and fit against design standards.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to select the right types of wood and boards for making cabinets, beds, and kitchen units based on strength, moisture resistance, and usage. We will also learn how to organize a safe and efficient workshop, use hand tools and machines properly, and fabricate accurate furniture parts by reading designs, measuring, cutting, and checking quality.

Ask

Ask the participants the following questions:

- Which type of material is commonly used for making moisture-resistant kitchen cabinets—solid wood or plywood?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Material Selection, Workshop Setup, and Component Fabrication

This session provides participants with a solid foundation in selecting appropriate furniture-making materials, setting up a safe and organized workshop, and fabricating components with accuracy and quality. It combines theoretical understanding with hands-on practical skills that are essential for professional cabinet and furniture making.

1. **Selecting Suitable Wood and Boards**

   Choosing the right wood is essential for producing strong, long-lasting furniture.

   - Participants are taught how to evaluate various materials such as natural timber (like teak, pine, or sheesham) and engineered boards including plywood, MDF, and particle board.
   - The selection process considers the application of the furniture—for example, moisture-resistant plywood is ideal for kitchen cabinets, while MDF is preferred for smooth painted surfaces like decorative drawers.
   - Participants also understand how to judge strength, surface finish, cost, and suitability based on intended usage and environmental exposure.

2. **Understanding Timber Properties for Functional Use**

   Different types of timber offer varying mechanical and aesthetic properties.

   - Participants explore key features like durability (resistance to decay and insect attack), dimensional stability (resistance to warping or swelling), and grain quality for visual appeal.
   - These properties influence where and how a material is used—for instance, hardwoods are ideal for structural frameworks, while softwoods or veneers might be used for panels or decorative elements.
   - Knowledge of these factors helps in selecting the most appropriate timber for load bearing, decorative, or utility furniture components.

3. **Workshop Setup and Space Planning**

   A well-organized workshop ensures safety and efficient workflow.

   - Participants learn to divide the workshop into dedicated zones—such as cutting, assembly, finishing, and storage—to reduce delays and avoid accidents.
   - Adequate lighting and ventilation are emphasized to ensure precision during tasks and to maintain air quality, especially when working with dust-producing tools.
   - Proper storage of materials and tools, as well as clear movement paths, allows multiple workers to operate safely and comfortably without interference.

4. **Tool and Machine Selection and Maintenance**

   Efficient tool usage supports quality workmanship and reduces downtime.

   - Participants are introduced to hand tools (like saws, chisels, and hammers) and woodworking machines (such as planers, circular saws, routers, and drills), along with their specific applications.
   - Training includes how to inspect tools for damage, check alignment, and ensure blades are sharp for clean cuts.
   - Regular maintenance practices—like lubrication, cleaning, and proper storage—are highlighted to keep equipment in optimal condition and prevent accidents during use.

5. **Design Interpretation and Cutting List Preparation**

   Before cutting materials, it is essential to understand the design.

   - Participants are trained to read technical drawings, design layouts, and dimensioned sketches of furniture like cabinets or beds.
   - From these, they prepare a cutting list that includes all required parts, their dimensions, and material types.
   - This planning helps in estimating material quantities, minimizing waste, and organizing the fabrication process in a step-by-step manner.

6. **Precision in Measurement and Marking**

   Accuracy in measurement is key to well-fitting furniture components.

   - Participants use tools like measuring tapes, steel rules, try squares, and scribers to measure and mark wood surfaces precisely.
   - Marking must be done carefully to maintain symmetry, alignment, and fitting accuracy, especially when preparing multiple pieces for assembly.
   - Proper layout markings also guide machine operation, reducing chances of error during cutting or drilling.

7. **Fabricating Furniture Parts with Machines and Tools**

   The fabrication stage involves shaping raw materials into usable parts.

   - Participants use woodworking machines like table saws, planers, routers, and drills to cut and shape timber or boards into specified components.
   - Emphasis is placed on achieving smooth finishes, correct dimensions, and edge detailing (e.g., bevels or grooves) according to design needs.
   - Safety practices, such as using guards, clamps, and push sticks, are reinforced during this process.

8. **Inspection and Quality Control of Fabricated Components**

   Quality checks ensure that the final product meets both visual and structural standards.

   - Each fabricated part is measured and inspected to confirm it matches the design dimensions and tolerances.
   - Surface quality is checked for smoothness, absence of defects (like chips or cracks), and readiness for finishing.
   - Fit between parts is tested to ensure proper assembly, and any defects are corrected before final installation or handover.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Workshop Planning and Material Selection for a Cabinet Fabrication Project

Group Size: 4–5 participants

Materials Required:

- Sample cabinet design sheets (with basic dimensions)
- Material option cards (e.g., plywood, MDF, particle board, teak, pine)
- Tool and machine option cards
- Workshop layout templates (blank grids)
- Markers, sticky notes, and chart paper

Activity Duration: 60 minutes

Activity Instructions:

1. **Scenario Setup:**

   Each group is given a design for a small kitchen cabinet and asked to plan how they will fabricate it. They must:

   - Select appropriate materials based on the cabinet's location (e.g., near a sink or stove).
   - Choose suitable tools and machines for cutting, shaping, and finishing the parts.
   - Design a basic layout for a small workshop to carry out this project, including zones for cutting, assembly, and finishing.

2. **Planning Phase**

   Groups discuss and make decisions using provided cards and layout templates. They create a simple project plan that includes material selection, required tools, and workshop organization.

3. **Presentation Phase (**

   Each group presents their project plan, justifying:

   - Why they chose specific materials
   - How their workshop layout supports safe and efficient work
   - What tools and machines they will use during fabrication

4. **Discussion & Feedback**

   Facilitator and peers provide feedback, compare group choices, and discuss alternate approaches.

Activity	Duration	Resources used
Workshop Planning and Material Selection for a Cabinet Fabrication Project	60 minutes	Sample cabinet design sheets (with basic dimensions),Material option cards (e.g., plywood, MDF, particle board, teak, pine),Tool and machine option cards,Workshop layout templates (blank grids),Markers, sticky notes, and chart paper etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage groups to justify their material and layout choices based on practical use (e.g., moisture-prone areas).
- Provide blank workshop grid templates to help learners visually plan zones like cutting, shaping, and finishing.
- Use guiding questions to prompt thinking, such as “Would MDF be suitable near a sink?”

Unit 18.3: Furniture Assembly, Cut-Outs, and Installation Techniques

Unit Objectives

At the end of this unit, participants will be able to:

1. Use jigs, clamps, benches, and holding devices to center and stabilize workpieces during assembly.
2. Assemble furniture components such as cabinet bodies and bed frames using nails, screws, adhesives, and pneumatic tools with correct sequence and alignment.
3. Ensure neat matching of wood grain, staggered end joints, and symmetrical construction for both aesthetic and structural quality.
4. Align panels and components in vertical and horizontal planes using levels, squares, and alignment tools.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the key tools, techniques, and best practices involved in assembling furniture components and ensuring accurate installation. Learners will explore how to use jigs, clamps, and alignment tools to stabilize and position parts correctly. The unit also covers methods for achieving proper joint alignment, neat finishes, and secure fitting using nails, screws, adhesives, and pneumatic tools to ensure strength and aesthetics in the final product.

Ask

Ask the participants the following questions:

- What tools can help you hold and align furniture parts during assembly?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Furniture Assembly, Cut-Outs, and Installation Techniques

This session provides participants with essential skills for assembling furniture accurately and installing it with proper alignment and visual appeal. It covers the use of holding tools, fastening techniques, grain matching, and the application of alignment tools to ensure high-quality, professional installations.

1. **Stabilizing Workpieces During Assembly**
    - Before assembly begins, it's important to secure each part of the furniture in a stable position.
    - Learners are trained to use jigs, clamps, benches, and other holding devices to keep workpieces steady and correctly aligned.
    - These tools help prevent the components from slipping or shifting while applying fasteners or adhesives, ensuring accuracy and safety during the process.
    - Proper stabilization leads to precise joins, especially when working with large parts like cabinet sides or bed frames.
2. **Joining Components with Proper Fasteners and Sequence**
    - Participants learn the correct use of nails, screws, wood adhesives, and pneumatic tools (like nail guns) to assemble furniture securely.
    - Emphasis is placed on following a step-by-step sequence to avoid errors such as misaligned edges, twisted frames, or uneven surfaces.
    - For example, starting with the main frame before attaching drawers or shelves helps maintain squareness and strength.
    - Using appropriate fasteners based on material thickness and joint type ensures long-lasting and sturdy construction.
3. **Maintaining Aesthetic and Structural Quality**
    - Beyond just strength, good furniture must also look neat and balanced.
    - Learners are taught to match wood grains across panels so that the furniture has a consistent and appealing appearance.
    - Staggering end joints adds structural strength and prevents weak spots in long panels or extended frames.
    - Special attention is given to symmetry—making sure that sides, fronts, and openings are evenly balanced to achieve a professional and attractive finish.
4. **Aligning Panels and Parts Precisely**
    - During final assembly and installation, ensuring that each component is properly aligned is crucial.
    - Tools like spirit levels, try squares, straight edges, and alignment blocks are used to position parts both vertically and horizontally.
    - This is especially important for fitting doors, drawers, or bed slats, where even a small misalignment can affect functionality.
    - Accurate alignment results in smooth movement, balanced panels, and a polished overall look once the furniture is installed.

5. **Creating Precise Cut-Outs in Panels**
    - Participants are trained to mark and cut out accurate openings in furniture panels for electrical sockets, plumbing pipes, or built-in accessories (like cable ports or switches).
    - Tools such as jigsaws, hole saws, and plunge routers are used depending on the shape and size of the cut-out.
    - Proper measurement and careful execution are emphasized to prevent damage to surrounding surfaces and to ensure the cut-outs are clean, aligned, and properly placed.
    - These cut-outs are essential in making custom furniture compatible with site-specific features and utilities.
6. **Selecting and Applying Mounting Systems**
    - Learners understand how to choose the appropriate mounting technique based on the type of wall (brick, drywall, concrete) and the furniture load.
    - Common mounting methods taught include wall cleats (for simple load-bearing support), French cleats (for easy hanging and adjustment), and mechanical brackets (for heavier or fixed installations).
    - Emphasis is placed on safety, stability, and proper alignment when using drills, anchors, and fasteners.
    - This competency ensures that cabinets, wall units, or decorative panels are mounted securely and functionally.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Furniture Assembly and Installation Planning

Group Size: 4–6 participants

Materials:

- Printed component diagrams (e.g., cabinet parts, bed frame parts)
- Assembly instruction sheets
- Cardboard cutouts or wooden mock-ups (optional)
- Markers, masking tape, rulers, spirit levels
- Sample tools (jigs, clamps, measuring square – real or image-based)
- Large workspace or table surface

Activity Duration: 60 minutes

Instructions:

1. Divide participants into small groups and assign each group a furniture item such as a cabinet or bed frame.
2. Provide diagrams and component layouts of the assigned item.
3. Ask each group to plan the assembly process, mark cut-out positions, and decide where tools like jigs or clamps will be used.
4. Groups use markers, tape, and layout sheets to represent the assembly and installation steps on their workspace.
5. Each group presents their plan, explaining how they ensured proper alignment, stability, and neat finish.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Encourage tool-specific planning by asking, “Where will you use clamps or jigs to ensure stability?”
- Reinforce correct sequence by prompting, “Which part needs to be assembled first for accurate alignment?”
- Support teamwork by assigning roles like planner, marker, and checker to ensure active participation.

Unit 18.4: Hardware Fitting, Adjustment, and Final Quality Assurance

Unit Objectives

At the end of this unit, participants will be able to:

1. Read and interpret hardware specifications for hinges, handles, knobs, drawer runners, locks, and other accessories.
2. Identify, gather, and check tools for accurate and safe installation of hardware components.
3. Measure and mark positions for hinges and accessories on cabinet doors, panels, and drawers according to design templates.
4. Cut or drill neat slots and holes to accommodate hardware fittings securely and without damaging surrounding material.
5. Fix and fasten hinges, handles, knobs, and locks to functional furniture units, ensuring strength and alignment.
6. Adjust doors and drawers after hardware installation to ensure smooth opening, closing, and gap clearance.
7. Identify and resolve common installation problems such as misalignment, jamming, or improper fitting.
8. Perform final quality checks, surface cleaning, and ensure a professional finish upon completion of installation.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to properly fit, adjust, and inspect hardware components used in furniture such as hinges, handles, drawer runners, and locks. Participants will learn how to read hardware specifications, use appropriate tools, ensure correct alignment, and troubleshoot common fitting issues. The unit also focuses on performing final quality checks and achieving a clean, professional finish for fully installed furniture pieces.

Ask

Ask the participants the following questions:

- What is the purpose of using hinges and handles in cabinets and drawers?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Hardware Fitting, Adjustment, and Final Quality Assurance

This session focuses on the careful and professional installation of furniture hardware, from interpreting technical specifications to adjusting and inspecting the final output. It equips learners with essential skills for achieving both functional reliability and a polished aesthetic in finished furniture pieces.

1. **Understanding and Selecting Hardware Components**

   Participants are taught how to carefully examine and interpret hardware product manuals and technical sheets to determine the appropriate components for specific furniture types. This includes understanding the load capacity, hinge swing angles, drawer slide types, locking mechanisms, and installation requirements. Learners gain the ability to differentiate between various hardware types—such as soft-close hinges, telescopic runners, and deadbolt locks—and select the right model and size based on furniture use, weight distribution, and user expectations.

2. **Tool Identification and Safe Usage**

   Before beginning any installation, learners must identify, gather, and test the required tools. These may include screwdrivers, electric drills, drill bits, clamps, measuring tapes, chisels, router bits, and templates. Participants are trained in proper handling and maintenance of each tool to avoid damaging hardware or panels and to maintain safety during installation. Correct usage ensures accuracy in hardware placement and helps avoid surface cracks or misalignment during drilling and fastening.

3. **Measuring and Marking for Precision Fitting**

   Accurate hardware installation begins with detailed measurement and layout. Learners use measuring tapes, steel rulers, templates, and centre punches to mark exact positions for hinges, knobs, drawer runners, and locks. These markings are done according to the hardware's design standards and furniture alignment requirements. Emphasis is placed on symmetry, gap clearance, and consistency, especially for components like dual-door cabinets or drawer stacks where uneven placement would compromise function and appearance.

4. **Cutting and Drilling for Hardware Installation**

   Once marked, participants use appropriate tools such as drills, hole saws, chisels, or routers to make clean holes or slots in the wood or board surface. This step requires care to ensure holes are the correct depth and diameter to securely hold the hardware without damaging the furniture surface. Learners are trained to avoid over-drilling, wood splitting, and rough edges, which can compromise both the appearance and structural integrity of the furniture.

5. **Installing and Fastening Hardware Components**

   This phase involves the actual placement and fixing of hardware parts. Learners are guided to use appropriate screws, dowels, or inserts to install hardware such as hinges, handles, knobs, and locks. Special attention is given to alignment, spacing, and depth, ensuring the components are tightly secured and aesthetically consistent. This ensures long-term durability and prevents issues like loose fittings or skewed handles.

6. **Adjusting for Smooth Functionality**

   Once installed, hardware components may need minor adjustments for perfect operation. For instance, cabinet doors may need hinge screws adjusted to close evenly and drawer runners aligned to prevent sticking. Learners are trained to identify signs of improper alignment—such as uneven gaps, squeaking, or misaligned locks—and resolve them using fine adjustments. This step ensures the furniture works smoothly and comfortably in day-to-day use.

7. **Troubleshooting Common Installation Issues**

   Participants are introduced to common problems that may arise during or after installation, such as hardware misalignment, improper screw depth, or jamming of drawers. They are taught troubleshooting methods like repositioning misaligned parts, reinforcing weak joints, or replacing incompatible components. Emphasis is placed on resolving issues efficiently without damaging existing furniture elements.

8. **Final Quality Checks and Surface Finishing**

   In the final step, learners perform a thorough quality inspection to ensure everything is correctly aligned, securely fastened, and functioning as intended. They also clean all surfaces, remove adhesive marks or pencil lines, and check the aesthetic consistency of the installation. The unit concludes with preparing the furniture for handover by ensuring it looks polished and operates flawlessly, reflecting professional standards.

Say

Let us participate in an activity to study the unit a little more.

Activity

Group Activity: Hardware Fitting Practice and Final Inspection Challenge

Group Size: 4–5 participants per group

Materials Needed:

- Pre-cut wooden cabinet panels or drawer fronts
- Hinges, handles, knobs, drawer runners, screws
- Drill machines, screwdrivers, measuring tapes, pencils
- Hardware specification sheets
- Final inspection checklist (printed for each group)

Activity Duration: 60–75 minutes

Activity Instructions:

1. **Briefing**

   Introduce different hardware items (hinges, runners, handles, etc.) and distribute their specification sheets to each group. Explain the importance of alignment, neat fitting, and post-installation adjustment.

2. **Hands-On Task**

   Each group will:

   - Identify hardware based on the specification sheet.
   - Measure and mark points for fitting on the panels.
   - Use tools to install at least 2 types of hardware (e.g., a hinge and a knob or a drawer runner).
   - Adjust the fittings as needed for smooth operation and alignment.

3. **Final Inspection & Peer Review**

   Groups will exchange their work and perform a final inspection using a checklist. They will assess:

   - Correct placement and alignment
   - Functionality (open/close movement)
   - Surface finish and neatness

Activity	Duration	Resources used
Hardware Fitting Practice and Final Inspection Challenge	60–75 minutes	Pre-cut wooden cabinet panels or drawer fronts,Hinges, handles, knobs, drawer runners, screws,Drill machines, screwdrivers, measuring tapes, pencils,Hardware specification sheets,Final inspection checklist (printed for each group) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure all tools are in working condition and participants wear safety gear (e.g., goggles if drilling).
- Let participants make decisions based on specs and encourage teamwork during problem-solving.
- During the inspection phase, prompt groups to provide constructive feedback to one another using clear criteria from the checklist.

Exercise

Multiple Choice Questions (MCQs)

1. Which material is best suited for moisture-prone areas like under-sink cabinets?
   a. MDF
   b. Solid wood
   c. Plywood with laminate
   d. Particle board
   Answer: c. Plywood with laminate

2. Which tool is commonly used to ensure horizontal alignment during cabinet installation?
   a. Jigsaw
   b. Router
   c. Spirit level
   d. Allen key
   Answer: c. Spirit level

3. What is the main purpose of a cutting list in fabrication?
   a. To estimate costs
   b. To organize material sizing and part reference
   c. To list tool maintenance tasks
   d. To describe painting process
   Answer: b. To organize material sizing and part reference

4. Soft-close hinges are primarily used to:
   a. Lock cabinet doors
   b. Reduce noise during door closing
   c. Increase shelf load
   d. Prevent rust
   Answer: b. Reduce noise during door closing

Fill in the Blanks

1. _____ is used to make accurate cut-outs for electrical and plumbing fittings in panels.
   Answer: Jigsaw

2. To align panels during assembly, tools like _____ and plumb lines are used.
   Answer: Spirit levels

3. _____ boards are often preferred for wardrobe panels due to their cost-efficiency and ease of lamination.
   Answer: Particle

4. Tools must be _____ and tested before use to ensure safe and accurate fabrication.

   Answer: Calibrated

Match the Following

1. Match the terms in Column A with the correct descriptions in Column B.

Column A	Column B
1. Drawer runner	a. Supports vertical load
2. Tall unit	b. Smooth sliding mechanism
3. MDF	c. Prone to moisture damage
4. Jigs	d. Guides drilling and alignment

Answers: 1 - b, 2 - a, 3 - c, 4 - d

2. Match the terms in Column A with the correct descriptions in Column B.

Column A	Column B
1. Router	a. Checks for gaps and movement
2. Final inspection	b. Used to clean surfaces
3. Microfiber cloth	c. Makes grooves or profiles
4. Hardware adjustment	d. Aligns hinges and slides

Answers: 1 - c, 2 - a, 3 - b, 4 - d

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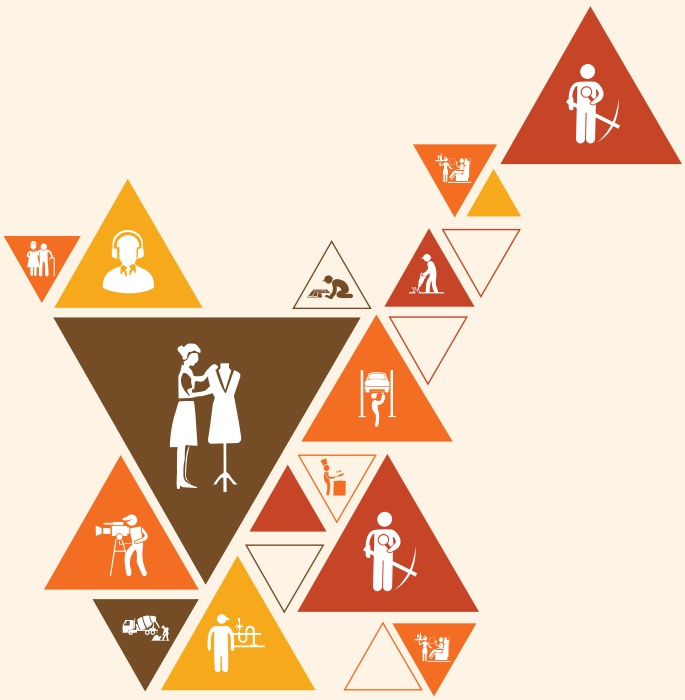
19. Fabrication and Installation of Wooden House Structures

Unit 19.1: Timber Selection, Framing Concepts, and Site Preparation
Unit 19.2: Structural Framing and Installation Techniques
Unit 19.3: Structural Connections, Finishing, and Quality Assurance



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Select suitable timber types (e.g., pine, sal, cedar) or engineered boards for structural applications such as walls, floors, and roofs by assessing their load-bearing capacity, natural durability, and dimensional behavior in varying weather.
2. Evaluate timber based on moisture content, seasoning level, grain orientation, density, and resistance to warping, twisting, or splitting during and after installation.
3. Identify defects in structural timber such as knots, checks, sap pockets, and fungal stains, and reject or reclassify stock before framing begins.
4. Interpret layout drawings and framing blueprints to extract measurements, spacing, and material quantity for frame components like wall studs, sill plates, top plates, floor joists, and rafters.
5. Use standard architectural symbols and construction notation to understand structural details such as load paths, stud spacing (e.g., 16” or 24” o.c.), and header sizes.
6. Prepare the construction site by clearing the foundation or subfloor, marking layout lines, and organizing zones for cutting, stacking, and assembly.
7. Set up temporary staging areas, safety barriers, and tool zones, ensuring easy access to equipment and minimal site congestion.
8. Differentiate between platform framing, balloon framing, and post-and-beam framing systems based on their method of wall construction, structural rigidity, and application in single or multi-story buildings.
9. Select the appropriate framing technique by evaluating design requirements, local building codes, labor availability, and material constraints.
10. Measure and mark framing members like studs, beams, and rafters accurately using framing squares, tape measures, chalk lines, and scribers.
11. Cut timber components to exact lengths and angles using power saws, miters, and jigs to prepare them for precise on-site joining.
12. Join frame parts using nails, screws, metal plates, or brackets, ensuring joints are square, firm, and level according to layout.
13. Lay sill plates accurately on foundation walls or floors and secure them using anchor bolts and washers in alignment with the framing plan.
14. Install floor joists, rim boards, wall studs, headers, window and door openings, and ceiling beams maintaining proper spacing and vertical alignment.
15. Install pre-cut roof trusses or construct rafters on-site based on pitch, span, and wind load considerations.
16. Fix sheathing materials (plywood, OSB, or fiberboard) over wall frames and sub-floors using adhesive and mechanical fasteners ensuring flush surfaces and nail spacing.
17. Identify dead loads (structure weight), live loads (occupants/furniture), and environmental loads (wind/snow) and distribute them evenly across structural members.
18. Reinforce joints and load-bearing points with additional studs, tie-down straps, cross bracing, or structural connectors as per load calculations.
19. Create robust junctions between floor systems, wall framing, and roof members using metal brackets, angle cleats, or interlocking joints to maintain structural integrity.

20. Apply finishing operations to structural elements, such as trimming exposed edges, sanding uneven surfaces, and applying edge sealers to resist moisture ingress.
21. Conduct levelness checks using laser levels, spirit levels, and plumb bobs during and after frame assembly to detect warping, leaning, or structural displacement.
22. Document progressive inspections using quality checklists at each stage of work — foundation to framing to sheathing.
23. Identify framing discrepancies such as stud misalignment, sheathing gaps, or loose fixings, and report them to site supervisors for immediate resolution.
24. Record corrective actions taken (e.g., member replacement, joint reinforcement), update progress sheets, and communicate rework details to the project team.

Unit 19.1: Timber Selection, Framing Concepts, and Site Preparation

Unit Objectives

At the end of this unit, the participant will be able to:

1. Select suitable timber or board material for walls, floors, and roofing frames based on moisture content, load-bearing strength, and dimensional stability.
2. Explain key timber properties that affect framing, such as grain orientation, density, and resistance to warping.
3. Read building layout drawings and extract frame component dimensions such as studs, joists, plates, and rafters.
4. Prepare the workshop and construction site for framing tasks by organizing tools, safety arrangements, and workflow areas.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the selection of timber and board materials for framing, understanding important timber properties, interpreting layout drawings, and preparing the site for framing work. Participants will learn how to choose the right type of wood for structural use, extract accurate frame dimensions from building plans, and organize the workshop and site to ensure safety and efficiency during the framing process.

Ask

Ask the participants the following questions:

- Why is it important to use dry timber for framing work?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Timber Selection, Framing Concepts, and Site Preparation

In this session, we will study timber selection, basic framing concepts, and how to prepare both the workshop and construction site for framing work. Learners will explore how to choose suitable timber or boards based on moisture levels, strength, and stability. They will also learn to read construction drawings, extract frame dimensions, and organize framing tasks efficiently and safely. This unit lays the foundation for precise and durable wooden framing in furniture or construction projects.

1. **Selecting Suitable Timber or Board Material for Framing**

   Choosing the right timber or engineered board is fundamental for ensuring the structural strength and longevity of framed construction elements. Participants will learn to assess materials like softwood, hardwood, plywood, or oriented strand board (OSB) based on critical parameters such as moisture content (to avoid swelling or shrinkage after installation), load-bearing capacity (important for floors and roof frames), and dimensional stability (to maintain shape over time). For instance, kiln-dried pine may be preferred for wall studs, while stronger hardwood or treated timber is ideal for roof rafters exposed to heavier loads or outdoor moisture.

2. **Understanding Timber Properties That Affect Framing**

   Framing effectiveness depends heavily on the inherent qualities of the timber. Participants will explore how grain orientation impacts bending strength and resistance to splitting; density determines the weight and ability to hold fasteners like nails and screws; and warp resistance ensures the frame remains aligned even after environmental changes. Understanding these properties helps in deciding where a particular timber type should be used—for example, denser woods may be suitable for sill plates or headers, while lighter, straight-grained timber can be used for studs or joists.

3. **Reading Drawings and Extracting Frame Dimensions**

   Learners will be trained to read construction layout drawings that show the structure's framing plan. From these, they will identify and extract exact measurements for framing components like studs (vertical wall members), joists (horizontal floor or ceiling members), plates (top and bottom connectors for studs), and rafters (roof framing elements). This process is essential to ensure each piece is cut to the correct size and assembled according to structural requirements. Participants will also become familiar with standard framing symbols, line types, and notation used in layout diagrams.

4. **Preparing Workshop and Site for Framing Work**

   Before beginning any framing task, it's crucial to organize both the workshop area (for material preparation) and the construction site (where framing is installed). Participants will learn how to lay out the work zones efficiently—designating areas for cutting timber, storing materials, assembling frames, and staging tools. Safety measures such as proper ventilation, use of personal protective equipment (PPE), secure storage for sharp tools, and clear pathways for movement are emphasized. This planning reduces risks, saves time during work execution, and supports smoother coordination among team members.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Timber Framing Scenario with a Focus on Material Choice, Drawing Interpretation, and Site Readiness

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (in different colours)
- Scenario cards (examples below)
- Sample timber specification charts or board property cards
- A3-sized printouts of simple layout drawings (floor/wall/roof frame)

Activity Duration: 60 minutes

Instructions:

1. **Divide participants into small groups.**

   Explain the objective: to simulate real-life framing planning scenarios by using technical drawings, selecting materials, and organizing the worksite setup.

2. **Distribute one scenario card per group.**

   Each card will present a unique challenge related to timber selection, layout interpretation, or site preparation.

3. **Group Discussion and Planning**

   Ask each group to work through their scenario by answering the following:

   - What material properties or drawing details are important in this case?
   - What framing components are most critical?
   - What site setup issues or risks should be addressed before work begins?
   - What decisions need to be made, and how will you ensure quality and safety?

4. **Group Presentations**

   Each group will present:

   - A summary of their scenario
   - The selected timber/material choices and reasoning
   - Interpretation of the drawing or frame component involved
   - Their proposed site setup plan and safety considerations

5. **Debriefing and Key Takeaways**

   Facilitate a class discussion based on:

   - How groups selected different materials for the same task
   - Challenges faced in drawing interpretation or framing prep
   - Importance of material choice, accurate planning, and team coordination on-site

Examples of Scenario Cards

Scenario 1: Framing with Warped Timber

Your team begins wall framing work and realizes that some of the timber on-site has begun to warp due to poor storage. The project deadline is tight.

How will you identify which timber can still be used, what framing adjustments you might need, and how to avoid similar issues in the future?

Scenario 2: Drawing Confusion on Frame Size

You've received a new layout drawing for a ceiling frame, but two-dimension labels are missing, and your team is unsure where to position the joists.

How will you approach verifying the dimensions, and what precautions should you take before cutting and installing timber?

Scenario 3: Site Hazards Before Work Begins

The site is cluttered with leftover materials from another contractor, there is no clear ventilation, and power cords are loosely hanging near the work zone.

How will you reorganize the space to make it safe and workable for framing tasks? Who will you involve in this preparation?

Activity	Duration	Resources used
Timber Framing Scenario with a Focus on Material Choice, Drawing Interpretation, and Site Readiness	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (in different colours), Scenario cards (examples below), Sample timber specification charts or board property cards, A3-sized printouts of simple layout drawings (floor/wall/roof frame) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Help participants review basic framing components (e.g., studs, plates, rafters) and their placement.
- Encourage use of visual aids (e.g., sketching the layout or timber plan on chart paper).
- Reinforce decision-making around material selection and worksite safety before execution begins.

Unit 19.2: Structural Framing and Installation Techniques

Unit Objectives

At the end of this unit, the participant will be able to:

1. Differentiate between platform, balloon, and post-and-beam framing methods and select the appropriate one for a given structure.
2. Accurately measure, cut, and join timber components using standard power tools and manual layout techniques.
3. Lay sill plates, install floor joists, wall studs, headers, and roof trusses with alignment and spacing as per structural drawings.
4. Install sheathing materials for walls and floors using adhesives and mechanical fasteners to ensure stability and insulation compatibility.
5. Calculate and integrate load-bearing considerations (live, dead, wind loads) and provide reinforcement where necessary.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential techniques and components involved in timber structural framing. Learners will explore different framing methods such as platform, balloon, and post-and-beam, and understand how to accurately measure, cut, and install key structural elements like joists, studs, and trusses. The unit also highlights how to apply sheathing materials and integrate structural reinforcements based on various load conditions for safe and durable construction.

Ask

Ask the participants the following questions:

- Which part of the building structure is typically made using timber framing?
  - (a) Wallpaper
  - (b) Floor and wall support structures
  - (c) Glass windows
  - (d) Paint coatings

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Structural Framing and Installation Techniques

In this session, we will study the key methods and techniques used in structural timber framing, including platform, balloon, and post-and-beam systems. Participants will learn how to measure, cut, and assemble structural components such as joists, studs, and trusses based on layout drawings. The unit also covers sheathing installation and how to reinforce structures by accounting for various load conditions, ensuring strong, safe, and stable wooden frames for construction.

Structural Framing and Installation Techniques

1. **Understanding Framing Types and Their Usage**

   This point introduces learners to the three major types of structural framing used in timber construction:

   - **Platform framing:** is the most used method in residential construction. It involves constructing each floor level as a platform before the next level is built above it. This method is safe, easy to manage, and supports good alignment.
   - **Balloon framing:** uses long, continuous studs that extend from the foundation to the roof. It allows for uninterrupted wall height but is less commonly used today due to fire risks and difficulty in handling long studs.
   - **Post-and-beam framing:** uses fewer, larger vertical and horizontal members to create a strong skeleton-like structure. It is ideal for open interiors or heavy-load areas.

   Participants will compare these methods and select the appropriate one based on building type, number of floors, and design goals.

2. **Timber Cutting and Joinery with Precision**

   Accurate cutting and joining of timber is fundamental in framing. Learners are trained to use tools like tape measures, framing squares, circular saws, and chisels to mark and cut timber components (such as studs, joists, or headers). They will practice making both straight and angled cuts.

   Joinery methods include the use of nails, screws, brackets, and even specialized metal connectors to fix members securely. This point emphasizes the importance of following layout lines, checking squareness, and maintaining safety while working with sharp or powered tools.

3. **Installing Key Framing Components Correctly**

   This section covers the actual construction of timber frames following architectural or structural drawings. Participants will install:

   - **Sill plates:** as the base for wall framing, anchored to the foundation
   - **Floor joists:** to support flooring systems
   - **Wall studs:** to carry vertical loads
   - **Headers:** above door and window openings to redistribute loads
   - **Roof trusses:** to support the roof structure

   Proper alignment, verticality, and spacing are essential to maintain strength and ensure that the structure is ready for cladding, insulation, and finishes.

4. **Fixing Wall and Floor Sheathing Securely**

   After framing is complete, participants will install sheathing materials like plywood or oriented strand board (OSB) over wall and floor frames. These panels provide lateral strength, prevent racking (sideways shifting), and form a base for external cladding or flooring.

   The application involves using adhesives and mechanical fasteners (nails or screws) placed at regular intervals, following a staggered pattern to distribute loads evenly and avoid weak points. This step ensures both structural stability and compatibility with insulation and weatherproofing layers.

5. **Managing Load and Structural Reinforcement**

   Understanding structural loads is vital for safe construction. Participants will learn to calculate and account for:

   - **Dead loads** (the weight of the structure itself)
   - **Live loads** (occupants, furniture, and moveable items)
   - **Environmental loads:** like wind or seismic forces

   Based on this analysis, learners will reinforce frames with techniques such as adding blocking between studs, using double studs in load paths, or installing bracing to resist lateral movement. The goal is to ensure that the framed structure can withstand all expected forces over time.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Planning a Timber Frame for a Small Structure

Group Size: 4–6 participants

Materials Needed:

- Sample layout drawings of a small building (floor plan, elevation view)
- Chart paper or A3 sheets
- Scaled paper cut-outs of timber components (sill plates, joists, studs, headers, trusses)
- Pencils, rulers, markers, glue or tape

Activity Duration: 60 minutes

Activity Instructions:

1. **Introduction**

   Brief participants on common framing techniques (platform, balloon, post-and-beam) and load considerations. Provide each group with a sample layout and building type (e.g., one-story house or garden shed).

2. **Group Task**

   Each group will:

   - Identify and mark positions for key frame components like wall studs, headers, and trusses based on the drawing.
   - Decide which framing method is suitable for their assigned building type.
   - Place and arrange the cut-outs on the layout sheet to represent their framing plan.
   - Indicate where reinforcements are needed for structural stability (e.g., around openings or corners).

3. **Group Sharing**

   Each group presents their framed layout, explaining:

   - Their choice of framing method.
   - How they accounted for alignment and spacing.
   - Where and why reinforcements were added.

Activity	Duration	Resources used
Planning a Timber Frame for a Small Structure	60 minutes	Sample layout drawings of a small building (floor plan, elevation view), Chart paper or A3 sheets, Scaled paper cut-outs of timber components (sill plates, joists, studs, headers, trusses), Pencils, rulers, markers, glue or tape etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Make sure all participants understand terms like “joist,” “sill plate,” and “load-bearing wall.”
- Encourage correct spacing for studs (e.g., 16 or 24 inches) and alignment of top/bottom plates.
- Ask how their choices affect structural strength or material use.

Unit 19.3: Structural Connections, Finishing, and Quality

Unit Objectives

At the end of this unit, the participant will be able to:

1. Create strong structural junctions between foundation, wall, floor, and roof using proper joinery and anchoring.
2. Apply finishing techniques such as trimming, sanding, and edge sealing to the framed structure before cladding or closing.
3. Conduct progressive inspections to check levelness, plumb alignment, and structural compliance at each stage of installation.
4. Report any discrepancies or hazards to supervisors and document corrective actions taken.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to connect structural components like walls, floors, and roofs using proper joinery and anchoring techniques. We will also learn how to prepare the timber frame for cladding by finishing surfaces through trimming and sealing. The unit covers essential quality assurance practices, including step-by-step inspections and reporting of issues to maintain safety, stability, and workmanship standards on site.

Ask

Ask the participants the following questions:

- What is the purpose of checking level and alignment during timber frame construction?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Structural Connections, Finishing, and Quality Assurance

This session focuses on the techniques and checks required to ensure that a timber-framed structure is strong, well-finished, and built according to safety and design standards. Participants will explore how to join structural components securely, apply surface finishes before cladding, conduct inspections, and maintain quality through clear reporting.

1. **Stabilizing Workpieces During Assembly**
    - Before assembly begins, it's important to secure each part of the furniture in a stable position.
    - Participants are trained to use jigs, clamps, benches, and other holding devices to keep workpieces steady and correctly aligned.
    - These tools help prevent the components from slipping or shifting while applying fasteners or adhesives, ensuring accuracy and safety during the process.
    - Proper stabilization leads to precise joins, especially when working with large parts like cabinet sides or bed frames.
2. **Joining Components with Proper Fasteners and Sequence**
    - Participants learn the correct use of nails, screws, wood adhesives, and pneumatic tools (like nail guns) to assemble furniture securely.
    - Emphasis is placed on following a step-by-step sequence to avoid errors such as misaligned edges, twisted frames, or uneven surfaces.
    - For example, starting with the main frame before attaching drawers or shelves helps maintain squareness and strength.
    - Using appropriate fasteners based on material thickness and joint type ensures long-lasting and sturdy construction.
3. **Maintaining Aesthetic and Structural Quality**
    - Beyond just strength, good furniture must also look neat and balanced.
    - Participants are taught to match wood grains across panels so that the furniture has a consistent and appealing appearance.
    - Staggering end joints adds structural strength and prevents weak spots in long panels or extended frames.
    - Special attention is given to symmetry—making sure that sides, fronts, and openings are evenly balanced to achieve a professional and attractive finish.
4. **Aligning Panels and Parts Precisely**
    - During final assembly and installation, ensuring that each component is properly aligned is crucial.
    - Tools like spirit levels, try squares, straight edges, and alignment blocks are used to position parts both vertically and horizontally.
    - This is especially important for fitting doors, drawers, or bed slats, where even a small misalignment can affect functionality.
    - Accurate alignment results in smooth movement, balanced panels, and a polished overall look once the furniture is installed.

5. **Creating Precise Cut-Outs in Panels**
    - Participants are trained to mark and cut out accurate openings in furniture panels for electrical sockets, plumbing pipes, or built-in accessories (like cable ports or switches).
    - Tools such as jigsaws, hole saws, and plunge routers are used depending on the shape and size of the cut-out.
    - Proper measurement and careful execution are emphasized to prevent damage to surrounding surfaces and to ensure the cut-outs are clean, aligned, and properly placed.
    - These cut-outs are essential in making custom furniture compatible with site-specific features and utilities.
6. **Selecting and Applying Mounting Systems**
    - Participants understand how to choose the appropriate mounting technique based on the type of wall (brick, drywall, concrete) and the furniture load.
    - Common mounting methods taught include wall cleats (for simple load-bearing support), French cleats (for easy hanging and adjustment), and mechanical brackets (for heavier or fixed installations).
    - Emphasis is placed on safety, stability, and proper alignment when using drills, anchors, and fasteners.
    - This competency ensures that cabinets, wall units, or decorative panels are mounted securely and functionally.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Frame-Fit and Finish Practice

Objective: To help participants understand the importance of structural joinery, surface finishing, and inspection in timber frame installations.

Group Size: 4–5 participants

Duration: 60 minutes

Materials Needed:

- Miniature wooden frame kits or cardboard frame cut-outs
- Measuring tape or ruler
- Spirit level or plumb bob (model versions)
- Sandpaper or emery paper
- Sample inspection checklist (printed)
- Coloured markers or chalk
- Sample issue tags (small sticky notes or labels)

Activity Instructions:

1. **Setup**

   Distribute the frame kits or model components to each group. Explain that their task is to simulate the final stage of a timber framing project, focusing on connections, surface finish, and quality checks.

2. **Framing and Joinery Simulation**

   - Groups assemble the mock structure, ensuring junctions between walls, floor, and roof are aligned and stable.
   - Participants simulate joinery using tape or removable adhesives at key joints.
   - They use levels/rulers to check alignment and note any deviations.

3. **Finishing Task**

   - Teams simulate trimming and surface finishing using sandpaper or markers to identify areas needing smoothening or sealing.

4. **Inspection and Reporting**

   - Each team uses the inspection checklist to assess their structure.
   - Participants label any structural or finish-related issues using sticky notes.
   - They prepare a brief verbal report describing the discrepancies found and how they would address them.

5. **Group Presentations and Wrap-up**

   - Each group shares key findings and quality concerns identified during their inspection.

Activity	Duration	Resources used
Frame-Fit and Finish Practice	60 minutes	Miniature wooden frame kits or cardboard frame cut-outs,Measuring tape or ruler, Spirit level or plumb bob (model versions), Sandpaper or emery paper, Sample inspection checklist (printed), Coloured markers or chalk, Sample issue tags (small sticky notes or labels) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Help them understand how minor alignment errors or poor sealing can affect the overall safety and finish quality.
- Assign group roles such as “lead carpenter,” “quality inspector,” and “reporting officer” to simulate real-world responsibility.
- Conclude the session by relating their simulated issues to common field problems (e.g., sagging frames, gaps, or missed inspections) and how timely reporting prevents future hazards.

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following is most suitable for framing due to its high strength and dimensional stability?
   a. MDF
   b. Sal Wood
   c. Plywood
   d. Particle Board
   Answer: b. Sal Wood

2. What is the purpose of placing sill plates in framing?
   a. To connect roof trusses
   b. To act as insulation
   c. To anchor wall framing to the foundation
   d. To support floor coverings
   Answer: c. To anchor wall framing to the foundation

3. Which tool is commonly used to ensure right angles while marking timber joints?
   a. Plumb bob
   b. Chalk line
   c. Framing square
   d. Level
   Answer: c. Framing square

4. A balloon framing system is best described as:
   a. Using short walls stacked one over the other
   b. Using continuous studs from foundation to roof
   c. Using steel frames for walls
   d. Using flat slabs in wall construction
   Answer: b. Using continuous studs from foundation to roof

Fill in the Blanks

1. _____ framing uses short studs for each floor and is commonly used in modern construction.
   Answer: Platform

2. A _____ is used to measure vertical alignment in wall framing.
   Answer: Plumb bob

3. _____, OSB, and fibreboard are common sheathing materials used in wall and floor systems.
   Answer: Plywood

4. Load-bearing reinforcement is often done with _____, bracing, or metal connectors to handle additional stress.

   Answer: Extra studs

C. Match the Following

1. Match the framing component to its function:

A: Component/Tool	B: Function
1. Sill Plate	a. Allows natural light entry
2. Floor Joist	b. Used for invisible joining
3. Sheathing	c. Ensures horizontal alignment
4. Header 4	d. Prevent shutters from over-opening

Answers: 1 – c, 2 – b, 3 – a, 4 – d

2. Match the tool to its purpose:

Column A	Column B
1. Chalk Line	a. Used for invisible joining
2. Circular Saw	b. Prevent shutters from over-opening
3. Framing Square	c. Allows natural light entry
4. Moisture Meter	d. Ensures horizontal alignment

Answers: 1 – c, 2 – a, 3 – d, 4 – b

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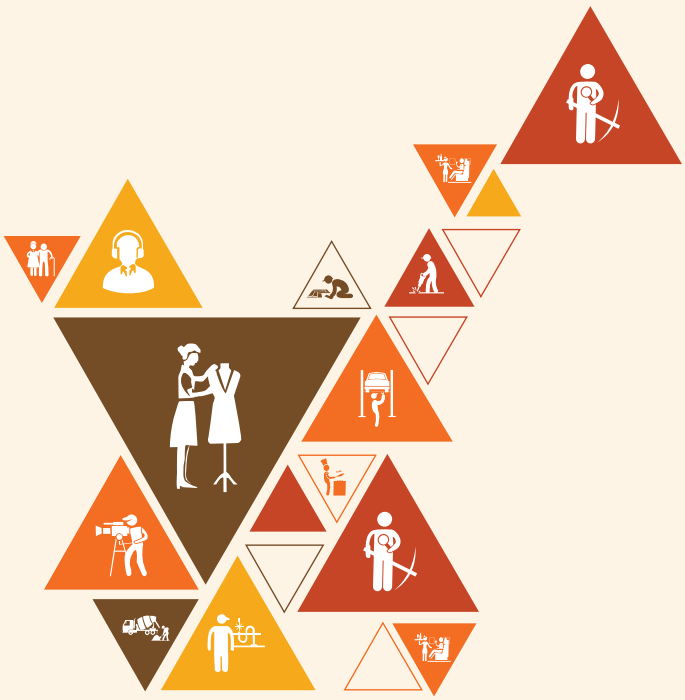
20. General Repairs and Maintenance of Furniture

Unit 20.1: Preparation, Assessment, and Safe Dismantling
Unit 20.2: Furniture Repairs, Reassembly, and Finishing
Unit 20.3: Cleaning, Maintenance, and Preventive Care



Key Learning Outcomes

At the end of this module, participants will be able to:

1. Inspect various furniture components such as legs, joints, backrests, seats, tabletops, and drawers to assess structural stability and surface condition.
2. Identify common signs of damage like loosened joints, worn-out surfaces, cracked laminates, sagging upholstery, and misaligned parts.
3. Decide whether a part should be repaired or replaced based on usage intensity, material condition, repair feasibility, and cost-effectiveness.
4. Prepare the workspace for repair by cleaning the surface, ensuring adequate lighting, ventilation, and clear movement space.
5. Gather all essential tools such as screwdrivers, clamps, adhesive applicators, sanding blocks, and upholstery tools prior to starting any repair task.
6. Use personal protective equipment (PPE) and arrange safe disposal areas for removed or damaged parts.
7. Apply systematic dismantling techniques using the correct tools to remove fasteners, separate glued joints, and disassemble parts without causing further damage.
8. Label dismantled components and hardware, photograph stages if required, and document details for accurate reassembly.
9. Select appropriate repair techniques for damaged areas — such as patching veneer chips, doweling loose joints, filling cracks, or replacing broken runners.
10. Apply adhesive and reinforcement methods using clamps, nails, corner brackets, or plugs to stabilize repaired joints and structures.
11. Reassemble repaired parts ensuring correct part orientation, proper tightening of fasteners, and smooth joint closure.
12. Match joint lines and wood grain direction during reassembly to preserve the original appearance and ensure mechanical integrity.
13. Replace foam, webbing, or springs in upholstered furniture and refit new fabric with proper stapling or tacking to achieve a secure, wrinkle-free finish.
14. Choose and apply suitable surface finishing materials — such as paste wax, spirit polish, PU coating, or lacquer — to restore shine and protection.
15. Use sanding, wiping, and buffing techniques to ensure even finish and blend repaired areas with the original surface.
16. Identify safe and suitable cleaning agents for different surfaces such as laminated, varnished, polished, or painted wood.
17. Demonstrate correct cleaning techniques for common stains, fingerprints, dust, or spill residues without damaging coatings.
18. Recognize harmful cleaning habits such as using abrasive pads, over-wetting, or ammonia-based chemicals that can degrade surfaces or adhesives.
19. Maintain repair tools by regularly cleaning, sharpening, oiling, and storing them in appropriate toolboxes or racks.
20. Explain how routine maintenance practices like tightening screws, periodic polishing, dusting, and covering unused furniture extend product life and reduce repair frequency.
21. Maintain logs for maintenance history and document recurring issues to help in decision-making for future repair or replacement needs.

Unit 20.1: Preparation, Assessment, and Safe Dismantling

Unit Objectives

At the end of this unit, the participant will be able to:

1. Identify components of furniture that require inspection and assess whether repair or replacement is needed.
2. Prepare a clean, safe, and well-organized workspace and assemble necessary tools before repair work.
3. Apply safe dismantling techniques using appropriate tools while labeling and documenting parts for reassembly.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to properly assess furniture before repair, prepare a safe and organized work area, and carry out the dismantling process without damaging reusable components. Learners will understand the importance of inspection, planning, correct tool usage, and proper labelling of parts to ensure safe and efficient reassembly after dismantling.

Ask

Ask the participants the following questions:

- Why is it important to label furniture parts during the dismantling process?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Preparation, Assessment, and Safe Dismantling

This process involves a careful and systematic approach to evaluating furniture condition, preparing the workspace, and dismantling components safely for repair, replacement, or relocation. It ensures that reusable parts are preserved, tools are used appropriately, and all actions are documented for smooth reassembly.

1. **Inspect and Assess Components**

   Begin by examining furniture parts such as joints, fasteners, panels, and support structures. Check for signs of wear like cracks, looseness, corrosion, or water damage. Decide if each component can be repaired or must be replaced based on its structural integrity.

2. **Prepare the Workspace**

   Ensure the working area is clean, well-lit, and free of unnecessary clutter. Lay down protective sheets if needed. Gather essential tools such as screwdrivers, pliers, Allen keys, safety gloves, and protective eyewear in one place to avoid delays.

3. **Use Safe Dismantling Methods**

   Dismantle the furniture piece by piece using appropriate tools. Avoid applying excessive force. Label each part systematically, and use containers to organize screws, hinges, and fittings. Take step-by-step photos or notes to make reassembly more efficient and error-free

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Furniture Repair and Safe Dismantling Challenge

Group Size: 4–6 participants

Materials:

- Whiteboard or flipchart
- Markers
- Sticky notes (different colours)
- Scenario cards (detailed below)
- Sample tools list for display reference
- Dismantling checklist (for each group)

Activity Duration: 60 minutes

Instructions:

1. **Setup**

   Divide participants into groups and explain the purpose — to simulate planning and assessment for a safe dismantling job.

2. **Scenario Distribution**

   Give each group one scenario card describing a hypothetical repair situation involving a piece of furniture.

3. **Group Discussion and Planning**

   Ask each group to discuss:

   - What components of the furniture should be inspected before dismantling?
   - What potential risks or hazards are present?
   - What safety measures and tools should be used?
   - How will the team label and document parts during dismantling?

4. **Presentation**

   Each group presents:

   - Their assessment plan
   - Key risks and how to avoid them
   - Step-by-step dismantling plan including labelling and workspace setup

5. **Debrief and Takeaways**

   As a class, reflect on:

   - How different groups approached safety and labelling
   - Why workspace setup and tool planning matter before starting
   - What common risks emerged across scenarios and how they were managed

Examples of Scenario Cards

Scenario 1:

A customer requests repair of an old wooden wardrobe with loose doors and warped panels. The group must plan the safe dismantling of doors and internal compartments, identify which parts can be reused, and ensure no screws or parts are lost.

Scenario 2:

A modular kitchen cabinet has developed water damage at the bottom and needs partial dismantling. Plan how to inspect the extent of damage, dismantle lower units safely, and protect reusable panels and fittings.

Scenario 3:

An office desk with an integrated drawer system has a jammed section and visible cracks. Plan a dismantling procedure to remove the drawers without damaging the top panel, label components properly, and recommend next steps for repair.

Activity	Duration	Resources used
Furniture Repair and Safe Dismantling Challenge	60 minutes	Whiteboard or flipchart, Markers, Sticky notes (different colours), Scenario cards (detailed below), Sample tools list for display reference, Dismantling checklist (for each group) etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Push learners to consider protective gear, tool choice, and movement space in their plans.
- Ask groups to assign roles like safety supervisor, parts labeller, and tool handler to simulate actual workplace teamwork.
- Emphasize the importance of labelling parts and maintaining dismantling logs for smooth reassembly.

Unit 20.2: Furniture Repairs, Reassembly, and Finishing

Unit Objectives

At the end of this unit, the participant will be able to:

1. Select suitable repair techniques for structural or surface-level damage in wood-based furniture.
2. Perform gluing, clamping, and reinforcement of joints and broken elements.
3. Reassemble dismantled parts with correct alignment, joint matching, and fastener application.
4. Replace padding and fabric in upholstered areas ensuring a neat and secure finish.
5. Apply appropriate finishing materials such as wax, polish, or lacquer for surface restoration.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss the essential techniques and best practices for repairing, reassembling, and finishing wood-based furniture. Learners will explore methods to fix structural damage, reinforce joints, replace upholstery, and restore surface finishes. The focus will be on selecting suitable repair materials and tools, maintaining alignment during reassembly, and achieving a polished, professional look in restored furniture items.

Ask

Ask the participants the following questions:

- What is one common method used to fix a broken wooden joint in a chair or table?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Furniture Repairs, Reassembly, and Finishing

In this session, we explore the essential skills needed to restore and extend the life of wood-based furniture. Participants learn how to identify damages, apply suitable repair techniques, reassemble parts with precision, and finish the furniture to restore its original strength and appearance. Emphasis is placed on safety, workmanship, and achieving a professional finish in both structural and surface-level restorations.

1. **Selecting Appropriate Repair Techniques for Damaged Furniture**

   Participants are trained to evaluate the type and extent of damage in furniture—whether structural (like cracked legs or broken joints) or superficial (such as scratches, dents, or stains). Based on the diagnosis, they choose the most appropriate repair method. For example, minor dents might be repaired with wood filler and sanding, while loose joints may require disassembly, gluing, and re-clamping. The goal is to restore the original strength and appearance of the furniture without compromising safety or aesthetics.

2. **Performing Gluing, Clamping, and Reinforcement of Joints**

   This step emphasizes restoring joint strength using adhesives and proper holding techniques. Learners apply wood glue to joint surfaces, use clamps to hold them together under pressure until fully cured, and may use additional reinforcements like screws, dowels, or angle brackets for added durability. Attention is given to cleaning off excess glue, ensuring that parts align properly, and maintaining structural integrity during curing.

3. **Reassembling Furniture with Correct Alignment and Fasteners**

   Once individual parts are repaired or prepared, participants practice reassembling the entire piece with precision. This includes matching joints accurately, aligning surfaces and edges, and securing them using appropriate fasteners such as nails, screws, or bolts. Techniques for avoiding over-tightening or damage to fragile areas are discussed, as well as the importance of symmetry, level surfaces, and maintaining the intended shape and function of the furniture.

4. **Replacing Padding and Upholstery Fabric**

   For furniture with padded areas (e.g., chairs or sofas), learners are introduced to the steps of safely removing worn-out fabric and damaged padding. They measure and cut new foam or cushioning materials, stretch and align new fabric coverings, and staple or secure them using appropriate tools. Care is taken to ensure smooth, wrinkle-free finishes and that seams and patterns are aligned neatly for a clean, professional appearance.

5. **Applying Surface Finishing Materials for Restoration**

   This final step involves restoring the visual and protective qualities of the furniture's surface. Participants prepare the surface by sanding, cleaning, or removing old finishes. Then, they apply the selected finish—such as wood polish, wax, lacquer, or varnish—using brushes, cloths, or sprayers. They learn about drying times, layering techniques, and buffing methods to ensure a consistent, durable, and aesthetically pleasing result.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Furniture Repair & Finishing Practice

Group Size: 4–6 participants

Materials Needed:

- A damaged or mock-up wooden chair/table (or components)
- Glue, clamps, screws, sandpaper, polish/lacquer
- Upholstery material (optional: foam, fabric, staples)
- Measuring tape, screwdriver, hammer, brush/cloth
- Labels, markers, worksheet for repair steps

Activity Duration: 60 minutes

Instructions:

1. **Briefing**

   The facilitator assigns each group a furniture item or part with mock damage (loose joints, scratches, or detached components). Explain the goal: to inspect, repair, reassemble, and refinish the item using available materials.

2. **Hands-on Repair & Reassembly**
   - Identify the type of damage (structural or surface-level).
   - Plan the repair technique: gluing, reinforcing, or replacing.
   - Reassemble the parts, ensuring proper alignment and fastening.
   - Apply basic surface finish (e.g., polish or wax).
   - Optional: Replace or simulate fabric covering on an upholstered section.

3. **Group Presentation**

   Each group presents:
   - What damage was found and how it was addressed
   - Tools and techniques used
   - Before and after result
   - Challenges faced

4. **Debrief & Discussion**

   Reflect on what worked well and what could be improved in a real repair situation.

Activity	Duration	Resources used
Furniture Repair & Finishing Practice	60 minutes	A damaged or mock-up wooden chair/table (or components), Glue, clamps, screws, sandpaper, polish/lacquer, Upholstery material (optional: foam, fabric, staples), Measuring tape, screwdriver, hammer, brush/cloth, Labels, markers, worksheet for repair steps etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Ensure that all participants handle tools and chemicals (e.g., polish or adhesives) with care. Provide gloves or masks if needed.
- Assign roles within groups—inspection, repair, reassembly, finishing—to promote collaboration.
- Circulate during the activity to offer tips (e.g., how to clamp joints properly or how much polish to apply) and ensure correct use of materials.

Unit 20.3: Cleaning, Maintenance, and Preventive Care

Unit Objectives

At the end of this unit, the participant will be able to:

1. Choose safe and effective cleaning agents and tools based on furniture surface material.
2. Identify cleaning errors that cause damage and recommend corrective practices.
3. Maintain work tools and furniture condition to ensure longevity and operational readiness.
4. Describe the role of routine inspections and basic maintenance in preventing major deterioration.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, etc.

Note

In this unit, we will discuss how to properly clean and maintain different types of furniture surfaces using safe methods and suitable tools. Learners will understand how to avoid cleaning mistakes that cause damage, take care of tools and furniture regularly, and carry out preventive inspections. These practices help keep furniture in good condition, extend its life, and prevent costly repairs in the future.

Ask

Ask the participants the following questions:

- What should you use to clean wooden furniture—harsh chemicals or mild cleaning agents?

Write down the participants' answers on a whiteboard/flipchart. Take appropriate clues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

Cleaning, Maintenance, and Preventive Care

In this session, we will study the importance of maintaining furniture through proper cleaning techniques, routine inspections, and preventive care. Participants will learn how to choose safe and suitable cleaning agents for different materials, avoid common mistakes that cause damage, maintain tools and furniture condition, and implement regular inspection schedules. These practices help extend the life of furniture and ensure its continued aesthetic and functional quality.

1. **Choosing the Right Cleaning Agents and Tools**

   Effective cleaning begins with selecting cleaning agents and tools that are suitable for the specific material of the furniture. For example, wooden furniture should be cleaned using mild, non-abrasive wood cleaners or polishes that do not strip the protective finish. Laminate surfaces may tolerate slightly stronger cleaners but still require soft cloths like microfiber to avoid scratching. Upholstered furniture requires vacuuming with appropriate attachments and, if needed, fabric-safe spot cleaners. Understanding the characteristics of each surface helps prevent accidental damage and ensures a long-lasting appearance.

2. **Avoiding Cleaning Mistakes that Cause Damage**

   Many common cleaning practices can unintentionally harm furniture. For example, excessive moisture on wooden surfaces can lead to swelling or warping, while using rough scrubbing pads can scratch laminated or painted finishes. Strong chemicals may discolour surfaces or loosen glued joints. This unit teaches participants how to identify and avoid such mistakes by using gentle wiping methods, testing any new product on a small hidden area first, and always following manufacturer-recommended cleaning guidelines. Knowing what not to do is as important as knowing what to do when it comes to furniture maintenance.

3. **Maintaining Tools and Furniture Regularly**

   Maintenance involves not just the furniture itself, but also the cleaning tools used. Dirty or worn-out cleaning equipment—like old brushes, dusty cloths, or clogged vacuum nozzles—can be ineffective or even harmful. Participants learn how to clean and store tools properly, ensuring they remain in good condition. Furniture maintenance includes tightening loose screws, lubricating hinges, checking for chips or dents, and ensuring structural stability. These small tasks, when done regularly, can prevent larger issues and keep furniture looking and functioning like new.

4. **Preventive Maintenance and Scheduled Inspections**

   Preventive care is about identifying and resolving small issues before they turn into major repairs. Regular inspections monthly or quarterly help spot early signs of damage such as insect infestation, wood cracks, surface wear, or unstable components. Participants learn how to create and use a basic inspection checklist, document findings, and schedule follow-up actions. This proactive approach saves time, money, and effort in the long term, while also improving the reliability and safety of furniture in everyday use.

Say

Let us participate in an activity to explore the unit a little more.

Activity

Group Activity: Furniture Cleaning and Maintenance Practice

Group Size: 4–6 participants

Materials Needed:

- Sample furniture items or mock surfaces (wood, laminate, upholstered panel, metal)
- Cleaning tools (soft cloths, brushes, microfiber wipes, sponges)
- Cleaning agents (mild soap solution, polish, wood wax, vinegar-water mix, upholstery cleaner)
- Labels or cards with cleaning "scenarios"
- Whiteboard or flipchart

Activity Duration: 45–60 minutes

Activity Instructions:

1. **Setup and Assignment**
   - Divide participants into small groups.
   - Assign each group a specific furniture surface (e.g., wooden table, laminated cabinet, upholstered chair, metal frame).
   - Provide a scenario card that describes the current condition of the item (e.g., dusty wood with minor stains, sticky laminated top, smudged upholstery, or rusting metal parts).
2. **Task Execution**
   - Each group must decide:
     - What tools and agents to use.
     - What cleaning process is safe and effective.
     - How to prevent damage during the cleaning process.
     - What preventive steps they would recommend (e.g., monthly waxing, regular dusting).
   - Groups will simulate the cleaning and present their maintenance plan.
3. **Presentation and Discussion**
   - Each group explains their cleaning and maintenance process and reasons behind their choices.
   - Trainer and peers give feedback and suggestions.

Activity	Duration	Resources used
Furniture Cleaning and Maintenance Practice	45–60 minutes	Sample furniture items or mock surfaces (wood, laminate, upholstered panel, metal), Cleaning tools (soft cloths, brushes, microfiber wipes, sponges), Cleaning agents (mild soap solution, polish, wood wax, vinegar-water mix, upholstery cleaner), Labels or cards with cleaning "scenarios", Whiteboard or flipchart etc.

Do

- Guide the trainees throughout the activity
- Ensure that all trainees participate in the activity

Notes for Facilitation

- Remind participants to use gloves or test cleaning agents on a small patch if working with real materials.
- Ask why a particular cleaner or tool is being chosen, to build decision-making skills.
- Ensure groups include suggestions for routine inspections and preventive care like polishing or storing away from sunlight/humidity.

Exercise

Multiple Choice Questions (MCQs)

1. Which of the following is a correct preventive maintenance practice?
   a. Leaving screws loose to avoid wood cracking
   b. Applying oil-based paint on laminated furniture
   c. Periodic tightening of fasteners and dusting
   d. Using harsh detergents for stain removal
   Answer: c. Periodic tightening of fasteners and dusting

2. Why should dismantled furniture parts be labelled or photographed?
   a. To sell them online
   b. To record defects only
   c. To track materials for resale
   d. To ensure correct reassembly
   Answer: d. To ensure correct reassembly

3. Which of the following is not suitable for cleaning varnished wood?
   a. Microfiber cloth
   b. Ammonia-based cleaner
   c. Diluted vinegar solution
   d. Dry cotton cloth
   Answer: b. Ammonia-based cleaner

4. A cracked laminate is best repaired by:
   a. Applying wax over the crack
   b. Using abrasive cleaners
   c. Filling and patching with adhesive
   d. Ignoring and continuing usage
   Answer: c. Filling and patching with adhesive

Fill in the Blanks

1. Damaged furniture joints can be reinforced using clamps, _____, or brackets.
   Answer: nails

2. Upholstered furniture is re-covered using new _____ and secured with tacks or staples.
   Answer: fabric

3. Over-wetting wooden furniture can cause _____ or adhesive failure.
   Answer: warping

4. Common signs of furniture damage include cracked laminates and _____ joints.

   Answer: loosened

Match the Following

1. Match the framing component to its function:

Column A	Column B
1. Screwdriver	a. Allows natural light entry
2. Sanding block	b. Used for invisible joining
3. Upholstery stapler	c. Ensures horizontal alignment
4. Clamp	d. Prevent shutters from over-opening

   Answers: 1 – a, 2 – b, 3 – c, 4 – d

2. Match the surface finish with its feature:

Column A	Column B
1. Paste Wax	a. Traditional finish with quick dry
2. PU Coating	b. Adds soft sheen and protection
3. Spirit Polish	c. Durable and water-resistant layer
4. Lacquer	d. Glossy finish for wood surfaces

   Answers: 1 – b, 2 – c, 3 – a, 4 – d

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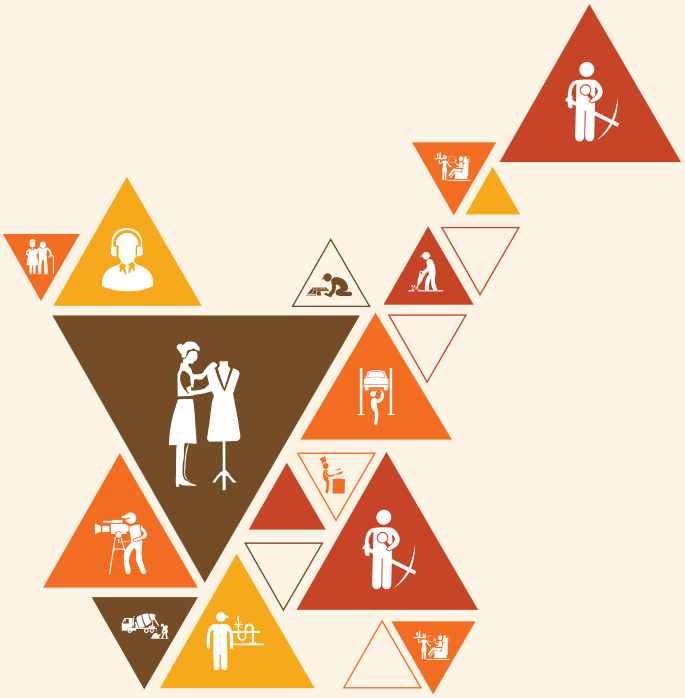

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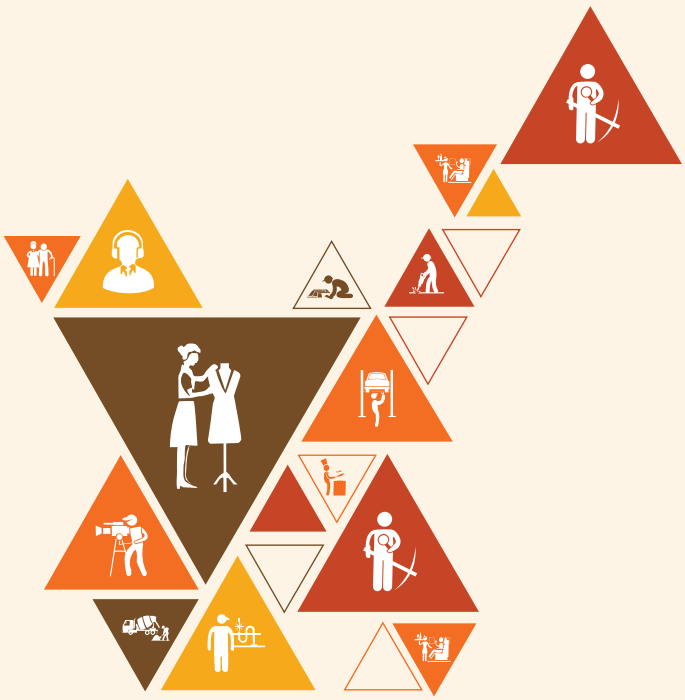
Scan the QR codes or click on the link for the e-books

https://www.skillindiadigital.gov.in/content/list

Employability Skills

22. Annexures

Annexure - I
Annexure - II
Annexure - III



Annexure - I

Training Delivery Plan

Program Name:	Carpenter		
Qualification Pack and reference ID	Carpenter-FFS/Q2203		
Version No.	3.0	**Version Update Date**	31-08-2023
Pre-Requisite License or Training:	NA		
Training Outcomes	**After completing this program, participants will be able to:** • Define different types of Architectural and Interior Projects. • Categorize and describe different raw materials and architectural hardware. • Categorize and describe different advanced power tools, equipment, and machinery. • Describe the organizational map of the Furniture Industry and highlight the importance of Furniture and Fittings Installation Occupation. • List the Key Result Areas of the Carpenter's Role. • Define client coordination and estimate product costs. • Supervise the teams as per plan and ensure the quality of output. • Conduct and monitor the site survey and recce. • Define and apply the process of workflow planning and management. • Apply principles of worksite management to ensure required performance. • Ensure worksite preparation as per execution plan. • Describe, apply, and review the pre-processing operations. • Describe, apply, and review the fabrication operations. • Describe, apply, and review the joinery related operations. • Describe, apply, and review the assembly of the products. • Describe, apply, and review the surface finishing of the products. • Describe, apply, and review the installation of the products. • Illustrate the process of Quality check and perform the same. • Follow and ensure compliance of the occupational health and safety protocols. • Explain the methods for material conservation and resources optimization. • Discuss various aspects of employability skills and employ such practices towards personal and organizational growth. • Describe the process and significance of World Skills Competitions and role played by key stakeholders. • Describe, apply, and review the process for the preparation of components for Wooden Doors and Windows. • Describe, apply, and review the process for installing flashing on the Wooden Frames for Doors and Windows.		

	• Describe, apply, and review the process for the assembly and installation of Wooden Doors and Windows with Frames. • Explain the assembly and installation processes associated with the hardware and fittings for the Wooden Doors and Windows with Frames. • Demonstrate the process of fabrication, assembly, installation, and finishing of Wooden Doors and Windows with Frames during On-the-Job Training. • Describe, apply, and review the process for the preparation of components for Wooden Cladding and Paneling. • Describe, apply, and review the process for the assembly and installation of Wooden Cladding and Paneling. • Demonstrate the process of fabrication, assembly, installation, and finishing of Wooden Cladding and Panelling during On-the-Job Training. • Describe, apply, and review the process for the preparation of components for Wooden Floorings. • Describe, apply, and review the process for the assembly and installation of Wooden Floorings. • Demonstrate the process of fabrication, assembly, installation, and finishing of Wooden Floorings during On-the-Job Training. • Describe, apply, and review the process for the preparation of components for Kitchen, Cabinets, and Beds. • Describe, apply, and review the process for the assembly and installation of Kitchen, Cabinets, and Beds. • Explain the assembly and installation processes associated with the hardware and fittings for Kitchen, Cabinets, and Beds. • Demonstrate the process of fabrication, assembly, installation, and finishing of Kitchen, Cabinets, and Beds during On-the-Job Training. • Describe, apply, and review the process for the preparation of components for Wooden House Structure. • Describe, apply, and review the process for the assembly and installation of Wooden House Structure. • Demonstrate the process of fabrication, assembly, installation, and finishing of Wooden House Structure during On-the-Job Training. • Describe, apply and review the process for performing dismantling, repair, and maintenance. • Describe the process of dismantling of furniture and perform the same • Describe the various methods of repairs and apply the same for given job. • Apply the process to re-install the furniture. • List the methods used for cleaning the furniture. • Describe and demonstrate the process for General Repairs and Maintenance.

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
1.	Advanced Understanding of the Furniture and Interiors Industry	Unit 1.1: Scope and Significance of the Furniture and Interiors Industry	1. Explain the current and emerging role of the furniture and interiors industry in India's economic and urban development. 2. Describe how furniture enhances both utility and aesthetics in modern interior environments. 3. Identify the key sectors and professions that directly or indirectly support the furniture and interior industry.	Bridge Module(s)	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Project/ Theme Based Props as required.	T: 02:00 P: 04:00
		Unit 1.2: Business Dynamics and Opportunities in the Furniture Sector	1. Identify trends that drive innovation and growth in the furniture sector, such as modular design, sustainability, and customi-zation. 2. Evaluate common business models and potential entre-preneurial opportunities in furniture manufactur-ing and services.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Project/ Theme Based Props as required.	T: 02:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 1.3: Project Planning and Interior Design Essentials	1. Interpret design briefs to identify client expectations related to layout, style, and theme. 2. Describe the importance of harmonizing furniture selection with color palettes, lighting, and spatial layout. 3. Assess interior project requirements based on quality standards, material compatibility, and user comfort.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Project/ Theme Based Props as required.	T: 02:00 P: 04:00
2.	Application of Advanced Raw Materials and Architectural Hardware	Unit 2.1: Types, Properties, and Standards of Furniture Raw Materials	1. Identify commonly used raw materials in modern furniture making, such as MDF, HDF, plywood, particle board, and solid wood. 2. Explain the structural and aesthetic properties of different materials including density, grain, moisture resistance, and texture. 3. Describe the relevance of standard sizes and specifications when selecting raw materials for project execution.	Bridge Module	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Manual Tools, Electric/ Power Tools, House-keeping-Materials, -Tools and Equipment, Project/ Theme based props -for simulation as required.	T: 04:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 2.2: Introduction to Architectural Hardware and Fittings	1. Classify types of architectural hardware such as hinges, channels, locks, brackets, and runners based on their application. 2. Describe the installation context and functional purpose of hardware fittings used in modular furniture and carpentry.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Manual Tools, Electric/ Power Tools, House-keeping-Materials, -Tools and Equipment, Project/ Theme based props -for simulation as required.	T: 04:00 P: 04:00
		Unit 2.3: Application, Trends, and Quality Practices in Materials and Hardware	1. Demonstrate basic quality checks for evaluating strength, durability, and finishing raw materials and hardware. 2. Explain current trends and technological advancements in engineered boards and hardware used in the furniture industry. 3. Describe safe practices for storing, handling, and documenting material and hardware usage at a worksite.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Manual Tools, Electric/ Power Tools, House-keeping-Materials, -Tools and Equipment, Project/ Theme based props -for simulation as required.	T: 04:00 P: 04:00
3.	Proficient Use of Power Tools, Equipment, and Workshop Machinery	Unit 3.1: Identification and Application of Furniture Workshop Tools and Equipment	1. Identify advanced tools and machines used in furniture fabrication such as table saws, routers, orbital sanders, and pneumatic tools.	Bridge Module	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables,Smart Board (Optional) Workbench, Manual Tools, Electric/	T: 04:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Explain the functional use of each tool or machine based on the stage of production or assembly.			Power Tools, House-keeping-Materials, -Tools and Equipment, Project/Theme based props -for simulation as required.	
		Unit 3.2: Safe Operation and Handling of Power Tools and Machines	1. Demonstrate safe operating procedures for power tools and machines used in carpentry tasks. 2. Identify mandatory safety guards and emergency features on power-driven equipment. 3. Follow manufacturer guidelines and workplace SOPs for tool and machine use.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Manual Tools, Electric/ Power Tools, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 04:00 P: 04:00
		Unit 3.3: Maintenance, Safety Checks, and Workshop Upkeep	1. Perform periodic inspections to ensure functional readiness of tools and machines. 2. Develop a routine for cleaning, lubricating, and safely storing workshop equipment. 3. Maintain a clean, organized, and hazard-free workspace in compliance with safety standards. 4. Record maintenance activities and report faults or incidents to supervisors.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Manual Tools, Electric/ Power Tools, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 04:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
4.	Supervisory Communi-cation, Team Coordination, and Employability Tools	Unit 4.1: Organizational Structure, Task Reporting, and Documen-tation	1. Explain how typical carpentry project teams are structured, including roles and reporting lines. 2. Identify the use and components of basic documentation such as job cards, inspection sheets, and checklists. 3. Describe the escalation process when encountering work-related delays or quality concerns.	Bridge Module	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Manual Tools, Electric/ Power Tools, House-keeping-Materials, -Tools and Equipment, Project/Theme based props -for simulation as required.	T: 02:00 P: 04:00
		Unit 4.2: Team Coordination, Professional Conduct, and Conflict Resolution	1. Demonstrate ways to coordinate with peers and junior workers for smooth execution of interdependent tasks. 2. Identify common causes of team conflict in carpentry settings and describe steps to resolve them effectively.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Manual Tools, Electric/ Power Tools, House-keeping-Materials, -Tools and Equipment, Project/Theme based props -for simulation as required.	T: 02:00 P: 04:00
		Unit 4.3: Digital and Employability Tools for Workplace Productivity	1. Use digital tools like messaging apps, QR scanners, and mobile calculators for site communication and documentation.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Manual Tools, Electric/ Power Tools,	T: 02:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Perform basic digital transactions such as online material ordering or payment tracking via mobile platforms. 3. Demonstrate the use of internet-based research for identifying carpentry material alternatives or design references.			House-keeping-Materials, -Tools and Equipment, Project/Theme based props -for simulation as required.	
5.	Project Planning, Cost Estima-tion, and Client Communi-cation	Unit 5.1: Understanding Project Requirements and Documen-tation	1. Read and interpret project drawings, work instructions, and client briefs for scope clarity. 2. Identify types of documents used in furniture projects such as layout plans, bill of quantities, and timelines.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) N.A	T: 02:00 P: 00:00
		Unit 5.2: Client Interaction and Workplace Communica-tion Etiquette	1. Demonstrate appropriate verbal and non-verbal behavior during site visits or client meetings. 2. Coordinate effectively with external agencies, designers, and clients to communicate progress and clarify specifications. 3. Record feedback from client or supervisor interactions and incorporate changes into execution planning.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) N.A	T: 02:00 P: 00:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 5.3: Cost Estimation, Budgeting, and Execution Planning	1. Prepare a basic cost estimate for material, hardware, transport, and labor based on a given design. 2. Use simple techniques to plan budgets and calculate profitability for small-scale projects. 3. Define steps to create an execution plan aligned with timelines, dependencies, and available resources. 4. Identify resource gaps and possible risks that could impact cost or delivery in carpentry projects.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) N.A	T: 02:00 P: 00:00
6.	Site Survey and Pre-Execution Planning	Unit 6.1: Process of Site Survey and Recce as per Project Requirement	1. Describe the standard steps involved in conducting a professional site survey and recce. 2. Identify reasons why site surveys are conducted before fabrication and installation work begins. 3. Document site observations accurately to support planning, feasibility, and layout design.	FFS/N2210: Assist in client coordination, team supervision, and quality check of the project	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Sample of budget and cost estimate forms	T: 04:00 P: 08:00
		Unit 6.2: Technical Infrastructure, Logistics, and Material Planning	1. List essential site infrastructure needs including power access, ventilation, work zones, and unloading paths.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional)	T: 04:00 P: 08:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Describe how to plan material movement and worker flow based on site access and layout.			Sample of budget and cost estimate forms	
		Unit 6.3: Measurement, Marking, and Survey Documentation	1. Measure site dimensions using tapes, laser tools, and levels and record them in structured formats. 2. Interpret layout drawings and mark worksite areas accordingly for accurate installation preparation. 3. Prepare a complete measurement sheet and basic sketch layout to assist in execution planning.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Sample of budget and cost estimate forms	T: 04:00 P: 08:00
7.	Quality Control, Ergonomics, and Team Supervision	Unit 7.1: Quality Control Procedures and Safety Practices	1. Identify standard parameters to assess workmanship, finish quality, and structural fit in furniture projects. 2. Perform visual and physical quality checks during intermediate and final stages of product execution. 3. List mandatory site safety measures to be followed while inspecting or handling finished components.	FFS/N2210: Assist in client coordination, team supervision, and quality check of the project	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Sample of job cards.	T: 04:00 P: 06:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			4. Report any deviations or quality issues using appropriate formats and communication protocols.				
		Unit 7.2: Ergonomic Standards and Furniture Specification Guidelines	1. Define ergonomic factors that influence furniture design for comfort, safety, and functionality. 2. Apply ergonomic measurements and reference standards to check compliance of seating, tables, and beds.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Sample of job cards.	T: 04:00 P: 06:00
		Unit 7.3: Team Supervision, Task Allocation, and On-the-Job Training	1. Plan and assign daily or weekly tasks to team members as per skill levels and job requirements. 2. Demonstrate techniques to train junior workers while maintaining pace and safety on site. 3. Monitor productivity and ensure assigned work is completed as per job card timelines.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Sample of job cards.	
8.	Project Execution and Resource Monitoring	Unit 8.1: Planning and Preparation for Project Execution	1. Interpret project execution plans including job cards, schedules, and dependencies.	FFS/N2210: Assist in client coordination, team supervision, and quality check of the project	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional).	T: 04:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. List the types of tools, equipment, and materials required for executing different stages of a carpentry project.			Measurement and Marking Tools, Project/ Theme based props for simulation as required.	
		Unit 8.2: On-Site Execution and Documentation Practices	1. Execute installation tasks following approved project layout and design documents. 2. Record daily and weekly progress using appropriate documentation formats. 3. Perform operational checks and maintain records for project components delivered and installed.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Measurement and Marking Tools, Project/ Theme based props for simulation as required.	T: 04:00 P: 04:00
		Unit 8.3: Resource Optimization, Reporting, and Productivity Monitoring	1. Identify opportunities to reduce material wastage and optimize labor effort during on-site execution. 2. Explain how to monitor the usage of tools, consumables, and time for each major task. 3. Prepare and submit progress updates, delay reports, or issue logs to supervisors or clients. 4. Suggest minor adjustments in work sequence or material handling to improve overall productivity.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Measurement and Marking Tools, Project/ Theme based props for simulation as required.	T: 04:00 P: 04:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
9.	Worksite Operations and Storage Management	Unit 9.1: Coordination and Instruction Planning for Loading and Unloading	1. Prepare a clear loading/ unloading instruction sheet that includes item details, handling sequence, and destination. 2. Coordinate across departments to minimize communication gaps during dispatch and receipt of furniture components.	FFS/N2211: Ensure proper material management and preparation of the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Sample of job card.	T: 08:00 P: 12:00
		Unit 9.2: Safe Handling, Equipment Use, and Material Stacking	1. Demonstrate the correct use of material handling equipment such as trolleys, forklifts, and lifters. 2. Perform safety checks on handling equipment to identify wear, malfunction, or hazards. 3. Apply techniques for smart stacking of boards, parts, and packaged products to ensure safety and space efficiency.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Sample of job card.	T: 08:00 P: 12:00
10.	Worksite Preparation, Safety Checks, and Maintenance	Unit 10.1: Worksite Setup and Tool Organization	1. List the tools, materials, and equipment required for different carpentry tasks. 2. Organize a workbench and site storage layout to support smooth operations and reduce search time.	FFS/N2211: Ensure proper material management and preparation of the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Project/Theme based props for simulation as required.	T: 06:00 P: 16:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 10.2: Safety Equipment, Signs, and Risk Awareness	1. Identify safety signs and hand signals used on furniture installation sites and explain their meaning. 2. Verify installation and functionality of safety guards on machines and floor areas. 3. Spot common worksite hazards and describe control measures to minimize risks.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Project/Theme based props for simulation as required.	T: 06:00 P: 16:00
		Unit 10.3: Site Maintenance, Inspection, and Hazard Reporting	1. Establish a routine for cleaning and inspecting the worksite before and after daily operations. 2. Check the site for misplaced tools, unsecured materials, and unsafe conditions. 3. Report hazards, unsafe incidents, or non-compliance to supervisors using workplace reporting formats. 4. Explain how proactive maintenance contributes to safety, efficiency, and tool longevity.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Project/Theme based props for simulation as required.	T: 06:00 P: 16:00
11.	Preparing Components and Fabricating Product Parts	Unit 11.1: Interpretation of Drawings for Component Fabrication	1. Identify symbols, scales, and views commonly used in technical drawings for furniture components.	FFS/N2211: Ensure proper material management and preparation of the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional).	T: 06:00 P: 12:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Extract dimensional and material data from 2D and 3D drawings for accurate production planning. 3. Explain how to correlate different drawing sections to understand assembly order and joinery placement. 4. Highlight critical details such as tolerances, fit, and grain direction from a given fabrication drawing.			Workbench, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	
		Unit 11.2: Understanding Materials, Tools, and Pre-Work Planning	1. Classify various timber types and engineered boards used for fabrication, citing their advantages. 2. Select appropriate hand and power tools based on the material type and job requirement.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 06:00 P: 12:00
		Unit 11.3: Measurement Techniques, Cutting Lists, and Documentation	1. Prepare cutting lists and measurement sheets based on design inputs and material availability. 2. Perform accurate measuring and marking using standard carpentry tools. 3. Record material consumption data and optimize layout to reduce wastage.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional) Workbench, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 06:00 P: 12:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 11.4: Tool Operation and Component Fabrication	1. Operate machines and tools such as panel saws, jointers, and edge banders for precise part making. 2. Fabricate different product components according to specified dimensions and joinery design. 3. Ensure material grain, surface finish, and edges meet the required specifications. 4. Stack and label fabricated components for easy tracking during assembly.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 06:00 P: 12:00
		Unit 11.5: Quality Checks, Surface Treatment, and Finishing	1. Conduct visual and dimensional checks to verify cut part accuracy and symmetry. 2. Sand surfaces and edges as per project finish level using manual and mechanical tools. 3. Apply laminates or veneers neatly and check for adhesion quality. 4. Report fabrication defects such as cracks, chipping, or incorrect joinery for corrective action. 5. Maintain a checklist of finished parts ready for assembly or dispatch.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 06:00 P: 12:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
12.	Joinery, Assembly, and Surface Finishing	Unit 12.1: Joinery Types, Fit, and Functionality	1. Identify major types of wood joints used in furniture such as butt, lap, mortise and tenon, and dovetail. 2. Explain how different joints distribute load and enhance structural integrity. 3. Choose appropriate joint types based on material, function, and design details.	FFS/N2212: Set-out, mark and fabricate the various components of the products at worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 08:00 P: 16:00
		Unit 12.2: Tools, Adhesives, and Product Assembly	1. Select appropriate tools for cutting, assembling, and reinforcing joints during furniture construction. 2. Use glues, screws, pins, and fasteners correctly during the assembly of panels and frames. 3. Demonstrate safe use of clamps, jigs, and alignment tools to stabilize parts during fixing. 4. Match wood grains and ensure seamless assembly for both visual appeal and strength.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 08:00 P: 16:00
		Unit 12.3: Surface Preparation and Finishing Techniques	1. Identify tools and materials used for surface preparation including abrasives, fillers, and cleaners.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables,	T: 08:00 P: 16:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Apply sanding, puttying, and grain sealing techniques based on finishing requirements. 3. Ensure smooth, defect-free surfaces for further finishing or lamination.			Smart Board (Optional). Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	
		Unit 12.4: Quality Control and Process Planning	1. Prepare a checklist to monitor joint fit, alignment, assembly sequence, and surface quality. 2. Explain the importance of process control and how to detect errors early during assembly. 3. Document production and finishing data for traceability and workflow review. 4. Suggest workflow improvements to increase consistency and reduce rework.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 08:00 P: 16:00
13.	Installation, Handover, and Post-Work Reporting	Unit 13.1: Installation Planning and Execution	1. Read and interpret installation blueprints, layout plans, and mounting instructions. 2. Select and set up appropriate tools and safety equipment required for site installation.	FFS/N2212: Set-out, mark and fabricate the various components of the products at worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Marking Tools, Manual Tools, Electric/ Power Tools.	T: 12:00 P: 26:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			3. Install panels, shutters, or furniture components following accurate measurements and alignment protocols. 4. Make necessary cut-outs for electrical, plumbing, or fixture integrations without compromising product strength.				
		Unit 13.2: Defect Identification, Correction, and Post-Installation Clean-Up	1. Identify surface and structural defects such as misalignment, scratches, or loose hardware during or after installation. 2. Perform necessary adjustments and minor rework to ensure functional and visual correctness. 3. Plan and supervise post-installation site cleaning including removal of waste, adhesives, and packaging.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Marking Tools, Manual Tools, Electric/ Power Tools.	T: 12:00 P: 26:00
		Unit 13.3: Documentation, Handover, and Feedback Process	1. Record installation details, defect resolutions, and material usage in the project documentation. 2. Prepare handover files including inspection sheets, product manuals, and warranty terms.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Marking Tools, Manual Tools, Electric/ Power Tools.	T: 12:00 P: 26:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			3. Communicate completion status and final checklist with clients or supervisors. 4. Capture feedback and suggestions from clients to improve future installation procedures. 5. Ensure proper client acknowledgment and sign-off on the completed job.				
14.	Health, Safety, and Green Practices	Unit 14.1: Worksite Safety and Emergency Preparedness	1. List common on-site hazards including fire, electrical faults, and sharp tools, and describe steps to prevent accidents. 2. Explain procedures to be followed in case of fire, injury, or evacuation using workplace emergency plans. 3. Identify the location and use of safety equipment such as fire extinguishers, first aid kits, and emergency alarms. 4. Demonstrate how to administer basic first aid for cuts, sprains, and minor burns.	FFS/N2212: Set-out, mark and fabricate the various components of the products at worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Marking Tools, Manual Tools, Electric/ Power Tools.	T: 12:00 P: 26:00
		Unit 14.2: Personal Health and Protective Equipment (PPE)	1. Identify different types of PPE (helmets, gloves, goggles, safety shoes) required for carpentry tasks.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables,	T: 10:00 P: 18:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Demonstrate the correct method to wear, maintain, and store PPE.			Chairs, Tables, Smart Board (Optional). Manual Tools, Electric/ Power Tools.	
		Unit 14.3: Documentation, Handover, and Feedback Process	1. Explain the concept of green practices in carpentry, including low-waste production, energy efficiency, and responsible material use. 2. Identify recyclable materials and describe safe methods for separating and disposing of wood waste, adhesives, and finishes. 3. Describe how sustainable practices can reduce cost and improve the environmental impact in furniture manufacturing. 4. Suggest practical steps to reduce electricity, water, and material consumption during project execution.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Manual Tools, Electric/ Power Tools.	T: 10:00 P: 18:00
15.	Fabrication and Installation of Wooden Doors and Windows with Frames	Unit 15.1: Types of Wooden Doors with Frames and Types of Wooden Windows with Frames	1. Identify major types of wooden doors with frames such as panel doors, flush doors, louvered doors, and glazed doors, and describe their suitable use cases.	FFS/N2213: Perform assembly, finishing and installation of different components of the product at the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional).	T: 06:00 P: 20:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Identify common types of wooden windows with frames such as casement, sliding, fixed, and bay windows, and explain where they are typically installed. 3. Differentiate doors and windows based on design, ventilation, privacy, and structural considerations.			Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	
		Unit 15.2: Material Selection, Planning, and Preparation	1. Select appropriate timber or boards by evaluating strength, grain direction, moisture content, and visual finish. 2. Interpret door and window layout drawings to plan the sequence of fabrication and assembly.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00
		Unit 15.3: Frame and Shutter Fabrication Techniques	1. Measure, mark, and cut frame components using power tools with accuracy. 2. Assemble door and window frames using joinery techniques such as mortise and tenon or dowels.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			3. Perform surface inspection and sanding to prepare shutters for finishing or hardware installation. 4. Fabricate and align shutter components ensuring gap allowances and grain matching.				
		Unit 15.4: Installation, Hardware Fitting, and Quality Checks	1. Install frames in masonry openings using levelling tools and appropriate anchors. 2. Fix doors and window shutter into the frames with correct functional clearances. 3. Fit hardware such as hinges, locks, and handles with accurate placement and alignment. 4. Perform final inspection to ensure proper functioning, sealing, and surface finishing of the installed unit. 5. Report defects and take corrective actions before final handover to the client or supervisor.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00
16.	Fabrication and Installation of Wooden Cladding and Panelling	Unit 16.1: Types of Wooden Cladding and Panelling	1. Identify types of wooden cladding such as tongue and groove, shiplap, and board-and-batten, and explain their typical applications.	FFS/N2213: Perform assembly, finishing and installation of different components of the product at the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional).	T: 06:00 P: 20:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Identify types of wooden panelling such as raised panel, beadboard, and flat panel, and describe their interior use cases. 3. Compare cladding and panelling based on placement, purpose, and design intent.			Workbench, Project/Theme based props for simulation as required.	
		Unit 16.2: Material Selection, Planning, and Preparation	1. Select suitable timber and engineered panels based on strength, moisture resistance, and indoor/outdoor applicability. 2. Prepare the work area, tools, and safety setup before beginning fabrication tasks.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00
		Unit 16.3: Fabrication of Cladding and Panelling Components	1. Measure and cut timber components according to layout drawings and material lists. 2. Perform grooving, shaping, and joining operations using suitable woodworking tools. 3. Prepare surfaces for installation by sanding and applying sealants as required.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 16.4: Installation, Alignment, and Finishing	1. Install cladding or paneling components using clamps, guides, and appropriate adhesives or fasteners. 2. Align and level panels for horizontal or vertical layouts using installation references. 3. Apply edge sealing and finishing techniques to ensure durability and appearance. 4. Identify and address typical on-site challenges such as uneven walls or panel expansion.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00
17.	Fabrication and Installation of Wooden Flooring	Unit 17.1: Flooring Types, Material Selection, and Sub-Floor Preparation	1. Identify types of wooden flooring systems including hardwood, laminate, and engineered boards, and explain their usage based on foot traffic and room function. 2. Select flooring material based on wear resistance, appearance, moisture content, and dimensional stability. 3. Inspect and prepare sub-floors by checking for levelness, cracks, and moisture, and install vapor barriers where required.	FFS/N2213: Perform assembly, finishing and installation of different components of the product at the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 06:00 P: 20:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			4. Estimate panel quantities and cutting allowances using floor plans and room measurements.				
		Unit 17.2: Fabrication and Customization of Floorboards	1. Cut, shape, and sand flooring panels as per design and edge profile requirements. 2. Perform necessary grooves, tongues, or joint detailing for secure installation. 3. Inspect floorboards for defects and select matching grains for seamless appearance.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 08:00 P: 20:00
		Unit 17.3: Installation Techniques and Alignment	1. Install flooring using appropriate methods such as glue-down, nail-down, or floating technique. 2. Use clamps, spacers, and nail guns to position and secure floorboards during installation. 3. Align boards for even layout and fit cut-outs precisely around utilities like ducts and outlets.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	T: 08:00 P: 20:00
		Unit 17.4: Sealing, Finishing, and Quality Checks	1. Apply sealants to joints and perimeters for moisture resistance and durability.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional).	

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Sand and buff the installed surface to enhance appearance and smoothness. 3. Conduct final inspection for alignment, defects, and movement, and clean the site for handover.			Workbench, Measurement and Marking Tools, Manual Tools, Electric/ Power Tools, Project/Theme based props for simulation as required.	
18.	Fabrication and Installation of Kitchens, Cabinets, and Beds	Unit 18.1: Types of Cabinets and Their Functional Applications	1. Identify major cabinet types such as base cabinets, wall cabinets, tall units, and modular drawer units and describe their uses. 2. Distinguish between kitchen, wardrobe, and multipurpose storage cabinets based on structure and fitting needs. 3. Explain how cabinet selection affects layout planning, accessibility, and user experience.	FFS/N2213: Perform assembly, finishing and installation of different components of the product at the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). N.A.	T: 04:00 P: 06:00
		Unit 18.2: Material Selection, Workshop Setup, and Component Fabrication	1. Select appropriate timber and engineered wood-based boards for manufacturing kitchen units, cabinets, and beds based on design, strength, moisture content, and application.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). N.A.	T: 04:00 P: 06:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Identify key timber properties such as durability, dimensional stability, and suitability for different functional furniture elements. 3. Plan and organize a safe and efficient workshop setup for furniture fabrication and installation, including layout, ventilation, and space utilization. 4. Select, test, and maintain hand tools and woodworking machinery used for cutting, shaping, finishing, and assembly. 5. Interpret cabinet and bed designs and develop cutting lists to estimate and organize required components. 6. Perform accurate measurement and marking using tapes, measuring squares, scribers, and layout pencils. 7. Use woodworking machines and tools (saws, planers, drills, routers) to fabricate furniture parts with precision and smooth finish.				

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			8. Inspect each fabricated component for correct dimensions, surface finish, and fit against design standards.				
		Unit 18.3: Furniture Assembly, Cut-Outs, and Installation Techniques	1. Use jigs, clamps, benches, and holding devices to center and stabilize workpieces during assembly. 2. Assemble furniture components such as cabinet bodies and bed frames using nails, screws, adhesives, and pneumatic tools with correct sequence and alignment. 3. Ensure neat matching of wood grain, staggered end joints, and symmetrical construction for both aesthetic and structural quality. 4. Align panels and components in vertical and horizontal planes using levels, squares, and alignment tools. 5. Create precise cut-outs in panels for electrical outlets, plumbing fixtures, and integrated accessories.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). N.A.	T: 04:00 P: 06:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			6. Select and apply mounting systems such as wall cleats, French cleats, or mechanical brackets based on wall and fixture type.				
		Unit 18.4: Hardware Fitting, Adjustment, and Final Quality Assurance	1. Read and interpret hardware specifications for hinges, handles, knobs, drawer runners, locks, and other accessories. 2. Identify, gather, and check tools for accurate and safe installation of hardware components. 3. Measure and mark positions for hinges and accessories on cabinet doors, panels, and drawers according to design templates. 4. Cut or drill neat slots and holes to accommodate hardware fittings securely and without damaging surrounding material. 5. Fix and fasten hinges, handles, knobs, and locks to functional furniture units, ensuring strength and alignment. 6. Adjust doors and drawers after hardware installation to ensure smooth opening, closing, and gap clearance.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). N.A.	T: 04:00 P: 06:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			7. Identify and resolve common installation problems such as misalignment, jamming, or improper fitting. 8. Perform final quality checks, surface cleaning, and ensure a professional finish upon completion of installation.				
19.	Fabrication and Installation of Wooden House Structures	Unit 19.1: Timber Selection, Framing Concepts, and Site Preparation	1. Select suitable timber or board material for walls, floors, and roofing frames based on moisture content, load-bearing strength, and dimensional stability. 2. Explain key timber properties that affect framing, such as grain orientation, density, and resistance to warping. 3. Read building layout drawings and extract frame component dimensions such as studs, joists, plates, and rafters. 4. Prepare the workshop and construction site for framing tasks by organizing tools, safety arrangements, and workflow areas.	FFS/N8203: Maintain health, safety, and greening practices at the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Personal Protective Equipment, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 08:00 P: 12:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 19.2: Structural Framing and Installation Techniques	1. Differentiate between platform, balloon, and post-and-beam framing methods and select the appropriate one for a given structure. 2. Accurately measure, cut, and join timber components using standard power tools and manual layout techniques. 3. Lay sill plates, install floor joists, wall studs, headers, and roof trusses with alignment and spacing as per structural drawings. 4. Install sheathing materials for walls and floors using adhesives and mechanical fasteners to ensure stability and insulation compatibility. 5. Calculate and integrate load-bearing considerations (live, dead, wind loads) and provide reinforcement where necessary.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Personal Protective Equipment, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 08:00 P: 12:00
		Unit 19.3: Structural Connections, Finishing, and Quality Assurance	1. Create strong structural junctions between foundation, wall, floor, and roof using proper joinery and anchoring.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional).	T: 08:00 P: 12:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			2. Apply finishing techniques such as trimming, sanding, and edge sealing to the framed structure before cladding or closing. 3. Conduct progressive inspections to check levelness, plumb alignment, and structural compliance at each stage of installation. 4. Report any discrepancies or hazards to supervisors and document corrective actions taken.			Personal Protective Equipment, Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required	
20.	General Repairs and Maintenance of Furniture	Unit 20.1: Preparation, Assessment, and Safe Dismantling	1. Identify components of furniture that require inspection and assess whether repair or replacement is needed. 2. Prepare a clean, safe, and well-organized workspace and assemble necessary tools before repair work. 3. Apply safe dismantling techniques using appropriate tools while labelling and documenting parts for reassembly.	FFS/N8203: Maintain health, safety, and greening practices at the worksite	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 04:00 P: 06:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
		Unit 20.2: Furniture Repairs, Reassembly, and Finishing	1. Select suitable repair techniques for structural or surface-level damages in wood-based furniture. 2. Perform gluing, clamping, and reinforcement of joints and broken elements. 3. Reassemble dismantled parts with correct alignment, joint matching, and fastener application. 4. Replace padding and fabric in upholstered areas ensuring a neat and secure finish. 5. Apply appropriate finishing materials such as wax, polish, or lacquer for surface restoration.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 04:00 P: 06:00
		Unit 20.3: Cleaning, Maintenance, and Preventive Care	1. Choose safe and effective cleaning agents and tools based on furniture surface material. 2. Identify cleaning errors that cause damage and recommend corrective practices. 3. Maintain work tools and furniture condition to ensure longevity and operational readiness.		Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Housekeeping-Materials, Tools and Equipment, Project/Theme based props for simulation as required.	T: 04:00 P: 06:00

S. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools Aids	Duration
			4. Describe the role of routine inspections and basic maintenance in preventing major deterioration.				
21.	Employability Skills	Employability Skills		DGT/VSQ/ N0102: Employability Skills	Interactive Lecture in the Class	White Board, Board Marker, Duster, Projector, Tablet, Chairs, Tables, Smart Board (Optional). Sample CV and Biodata, Payment Gateway Devices, Sample Business Plan, Sample formats for English communication.	T: 30:00 P: 30:00
22.	On-the-Job Training						60 Hours

Annexure - II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role	Carpenter
Qualification Pack	Carpenter-FFS/Q2203
Sector Skill Council	Furniture and Fittings Skill Council

S No.	Assessment Guidelines
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also laydown the proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on the knowledge bank of questions created by the SSC.
3	Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4	Individual assessment agencies will create unique question papers for the theory part for each candidate at each examination/training centre (as per assessment criteria below).
5	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training centre based on these criteria.
6	To pass the Qualification Pack assessment, every trainee should score a minimum of 70% of % aggregate marks to successfully clear the assessment.
7	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
FFS/N2210: Assist in client coordination, team supervision, and quality check of the project	*Assist in coordinating with the client POCs and other agencies*	**1**	**8**	**16**	-
	PC1. interpret the supervisor's instructions about the project requirement correctly regarding quality, style, material preference, etc.	1	2	4	-
	PC2. interact with the client POC and other agencies for coordination of assigned tasks	-	-	-	-
	PC3. prepare and maintain the required documents for project execution purposes	-	2	4	-
	PC4. assist in the preparation of cost estimates and delivery timelines	-	2	4	-
	Assist in the supervision of teams and quality check during the project execution	**5**	**8**	**16**	**2**
	PC5. ensure that the assigned team understands the job cards and address their issues	1	2	4	-
	PC6. ensure that the team follows all the health and safety guidelines	1	2	-	1
	PC7. conduct a timely quality check of the work done by the team	1	2	4	-
	PC8. ensure that the dimensions and ergonomics of the products are within the specified requirements	1	2	4	1
	PC9. assist in training and mentoring of the team on various operations as required during project execution	1	-	4	-
	Conduct site survey and recce	**5**	**12**	**24**	**3**
	PC10. assist in planning for recce based on project requirements with supervisor	-	2	4	-
	PC11. ensure proper logistics arrangements for conducting recce at the worksite	1	2	4	1
	PC12. ensure the worksite is appropriately prepared and material required for survey/recce gets arranged timely	1	2	4	1
	PC13. conduct the site survey as per the layout with assistance from the team	**1**	**2**	**4**	**-**
	PC14. mark the worksite as per the layout and collaborate with teams to take measurements	1	2	4	1
	PC15. analyze the measurement sheets and prepare the layouts and recce reports	1	2	4	-
	NOS Total	**11**	**28**	**56**	**5**

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
FFS/N2211: Ensure proper material management and preparation of the worksite	*Interpret project requirements*	**2**	**6**	**6**	**1**
	PC1. interpret given drawings, optimizing the potential for efficient project execution with the supervisor	1	2	2	-
	PC2. ensure selection of appropriate materials to comply with drawing and specifications	1	2	2	1
	PC3. ensure daily filling and timely submission of job cards to the supervisor	-	2	2	-
	Assist in planning and prioritizing work activities	**5**	-	**10**	-
	PC4. assist in defining the process flow as per client/ project needs during project execution	1	-	2	-
	PC5. assist in the proper demarcation of people and resources with the supervisor	**1**	**-**	**2**	-
	PC6. assist in creating schedules and rosters for the team to ensure they understand individual work requirements	**1**	**-**	**2**	-
	PC7. maintain all the required documentation for project execution	**1**	**-**	**2**	-
	PC8. maintain efficiency and productivity while performing role/responsibility	**1**	**-**	**2**	-
	Ensure proper resource management at the worksite	**5**	**14**	**12**	**6**
	PC9. plan and organize the loading/ unloading/ handling of the materials as per the instruction sheet	=	2	2	-
	PC10. ensure coordination with the various departments for material movement at multiple intervals	-	-	2	1
	PC11. ensure the proper functioning of the handling equipment for material movement	1	2	2	1
	PC12. select appropriate stacking method for easy identification and traceability	1	2	2	1
	PC13. ensure the proper segregation and storage of materials, tools, and equipment at the worksite	1	2	2	1
	PC14. ensure the use of suitable mediums to store or carry rivets, bolts, drift pins, etc.	-	2	-	-
	PC15. comply with relevant health and safety legislation, regulations, and obligations	1	2	-	1
	PC16. check the quality of the materials before loading and unloading at regular intervals	1	2	2	1
	Ensure worksite preparation for fabrication, assembly, finishing, and installation purposes	**5**	**12**	**12**	**4**
	PC17. ensure organization of all the necessary tools, materials, and equipment for the specified operations	1	2	2	1

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC18. ensure that the appropriate floor and machine guards are in place	1	2	2	1
	PC19. install signage and barriers, as required, to maximize protection of public health and safety during project execution according to company requirements	1	2	2	1
	PC20. implement security measures to control unauthorized access to the worksite	-	2	2	-
	PC21. ensure the use of appropriate methods for worksite cleaning and maintenance of the tools and equipment at regular intervals	1	2	2	-
	PC22. identify and prevent hazards and control risks at work site according to company requirements	1	2	2	1
	NOS Total	**17**	**32**	**40**	**11**
FFS/N2212: Set-out, mark and fabricate the various components of the products at worksite	*Mark and measure various timber and timber-based materials*	**4**	**14**	**14**	**4**
	PC1. check all tools and machines are in good working order and available/are on site	1	2	2	1
	PC2. ensure proper selection of appropriate timber and timber-based materials	1	2	2	1
	PC3. identify different components of the products as per the given specifications	-	2	2	-
	PC4. prepare a cutting list of various components of the product based on materials and design specifications	-	2	2	-
	PC5. perform the measurement and marking on timber and timber-based materials based on layout plan and cutting list	1	2	2	1
	PC6. use geometric methods to determine complex angles, joints, and intersections from product drawings	1	2	2	1
	PC7. ensure timely preparation and handover of the measurement sheet	-	2	2	-
	Perform woodworking operations on different components of the product	**2**	**14**	**16**	**2**
	PC8. select and safely use hand and power tools to cut and shape various components of the product	1	2	2	-
	PC9. perform cutting of the wood/panels as per cutting list	-	2	2	-
	PC10. ensure that the cut components are in line with the design specifications	-	2	2	-
	PC11. prepare the wood/panels into the required shape as per the specified measurements	-	2	2	-
	PC12. prepare jigs or fixtures of required specifications to shape the various components of the product	1	-	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC13. ensure that all the measurements of the components meet specifications	-	2	2	-
	PC14. perform cutting of laminate/veneer sheet to specified specifications and paste using adhesives on the surface of product components	-	2	2	1
	PC15. mark and drill the required holes and grooves for product assembly	-	2	2	1
	Fabricate internal and external joints for product assembly	**3**	**12**	**12**	**3**
	PC16. check and confirm the joint geometry conforms with the product drawing	1	2	2	1
	PC17. undertake the preparation of accurate joints and intersections with no gaps	-	2	2	-
	PC18. use appropriate hand tools and machines for joint preparation, e.g., traditional tenon saws, Japanese pull saws, band saw, powered hand router, and miter saw	1	2	2	1
	PC19. prepare joints that are parallel, clean, and correct in size to the drawing	1	2	2	-
	PC20. ensure faces, edges, and all shoulders are square straight and to the drawing	1			
	PC21. ensure proper checking of joints for strength and durability	-	2	2	-
	NOS Total	**9**	**40**	**42**	**9**
FFS/N2213: Perform assembly, finishing and installation of different components of the product at the worksite	*Assemble the various components of the product*	**4**	**12**	**12**	**2**
	PC1. interpret the assembly drawings and use the appropriate method for assembly	-	2	2	-
	PC2. measure the dimensions of various components of the product and perform marking operations to facilitate the assembly of components	1	2	2	1
	PC3. ensure that the product components are assembled as per instruction using appropriate fasteners or/ add adhesives as applicable	1	2	2	1
	PC4. ensure that the structures are assembled and erected accurately without damage to components	-	2	2	-
	PC5. check the assembled components functioning as per the control plan, work instructions	1	2	2	-
	PC6. ensure quality checks at regular intervals during assembly to avoid any defects/ error detection at a later stage	1	2	2	-
	Finish the surface of the product	**3**	**4**	**6**	**3**
	PC7. identify and select the appropriate wood fillers to finish the product to a specified standard	1	2	2	1

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC8. use appropriate tools to smoothen the surface (curves, edges, molds, etc.) of the product through sanding by machine and/or by hand to a specified standard	1	2	2	1
	PC9. maintain the quality of the surface during assembly and installation, e.g., free from glue and any defects or chips	1	-	2	1
	Install the product along with hardware fittings	**5**	**8**	**12**	**2**
	PC10. check the location of the installation to prepare requisite cut-outs for electrical outlets, plumbing points, wiring, and other arrangements in the assembled product	1	-	2	-
	PC11. identify and select the appropriate tools and equipment for installation of components/parts and sub-assemblies of the product	1	2	2	1
	PC12. install the moldings/ finish accessories (crown molding, decorative panels, etc.) in accordance with the manual/instructions provided	-	2	2	-
	PC13. install the furniture fittings (like locks, latch, closure, handles, etc.) in the finished product	1	2	2	-
	PC14. ensure quality checks at regular intervals during installation to avoid any defects/ error detection at a later stage	1	2	2	-
	PC15. supervise the cleaning of the installed product thoroughly before handover	1	-	2	1
	Perform quality check of the product before handover	**3**	**12**	**10**	**2**
	PC16. conduct post-completion quality check of the furniture and fitting in line with the organization practice	1	2	2	1
	PC17. check and ensure that the final finish of the product is as per client requirement and design specification	-	2	-	-
	PC18. inspect and mark the defects, if any, such as in paint, dents, grooves, cracks, rough edges, etc. on the physical body of the product	1	2	2	1
	PC19. take appropriate action for fault rectification in consultation with supervisors	1	2	2	-
	PC20. take note of inputs/ feedback received by supervisor /client to incorporate at the work	-	2	2	-
	PC21. maintain all the requisite documents post completion of project in compliance with organization policies	-	2	2	-
	NOS Total	**15**	**36**	**40**	**9**

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
FFS/N2214: Perform fabrication, assembly, and installation of Wooden Doors and Windows with Frames	*Prepare the resources for wooden doors and windows assemblage*	**8**	**10**	**8**	**7**
	PC1. identify and select the timber based on design specifications of the given door/ window	1	1	1	1
	PC2. maintain the moisture content of the timber within specified limits	1	1	1	1
	PC3. plan and organize required materials, tools, and equipment for door/window fabrication and installation	1	1	1	1
	PC4. check that the selected tools and equipment are in safe working condition and ready for use	1	1	-	1
	PC5. verify dimensions and type of the opening are as per the size of the frame	1	1	-	-
	PC6. perform the required woodworking operation on the materials as per design specifications	1	1	1	1
	PC7. measure the dimensions of the door/window panel to ensure the correct size of the frame	1	1	1	1
	PC8. prepare the material pieces into the required shape as per the specified measurements	-	1	1	1
	PC9. check visually for any surface damage on the components before assembly and installation processes	1	1	1	1
	PC10. ensure that the work area is free of clutters to carry out installation work smoothly	-	1	1	1
	Install flashings for door and window frames	**4**	**6**	**6**	**3**
	PC11. identify suitable flashing materials to be used with frame installation	1	1	1	-
	PC12. plan out the installation of flashing with suitable overlapping of sides to avoid water spillage	-	1	1	-
	PC13. mark the measurement on the flashing for frame installation and trim the extra pieces	1	1	1	1
	PC14. make use of the bottom to top approach while installing flashings	1	1	1	1
	PC15. ensure proper pasting of flashing using small flat block, tapping, and running down on the frame	1			
	PC16. apply sealants at the exposed edges and corners once the flashings get installed on the frame	-	1	1	-
	Perform assembly and installation of wooden doors, windows, and frames	**5**	**8**	**8**	**4**
	PC17. ensure correct methods of holding and centering the work piece	1	1	1	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC18. ensure the use of appropriate lifting devices for lifting doors/ windows	1	1	1	1
	PC19. grout the gap between the wall and the door frame, if required, perform chipping and chiseling of the masonry structure	-	1	1	1
	PC20. ensure proper alignment of the door frame against the setting out the lines	1	1	1	1
	PC21. install the door/window frame and sub- frame as per specification	-	1	1	-
	PC22. install the door/window panels as per the given design specifications	-	1	1	-
	PC23. ensure a consistent gap between door/ window panel and door/window frame	1	1	1	-
	PC24. ensure the miter joints are flat and square at corners for a seamless finish	1	1	1	1
	Install architectural hardware, fittings, and accessories	**5**	**6**	**6**	**6**
	PC25. interpret the product drawing and identify the type of hardware and accessories required for the doors and windows installation	1	1	1	1
	PC26. identify and use required tools and equipment for installation of hardware and accessories	1	1	1	1
	PC27. measure and mark the dimensions on the product to determine hardware positioning	1	1	1	1
	PC28. make provisions for the installation of fittings by preparing slots and cut-outs	-	1	1	1
	PC29. install hardware and accessories in accordance with the job and manufacturer specifications	1	1	1	1
	PC30. ensure the proper functioning of the hardware after installation and make necessary adjustments as required	1	1	1	1
	NOS Total	**15**	**36**	**40**	**9**
FFS/N2215: Perform fabrication, assembly, and installation of Wooden Cladding and Panelling	*Prepare the resources for cladding/ panelling assemblage*	**11**	**22**	**20**	**8**
	PC1. identify and select the timber based on design specifications	1	2	2	1
	PC2. maintain the moisture content of the timber within specified limits	1	2	2	1
	PC3. plan and organize required materials, tools, and equipment for cladding/ panelling fabrication and installation	1	2	2	1

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC4. check that the selected tools and equipment are in safe working condition and ready for use	1	2	2	1
	PC5. interpret the quantity of the panels required for the room based on design specifications	1	2	2	1
	PC6. ensure proper measurement of every length, opening, bulge, and recess of the room/area	1	2	2	1
	PC7. identify the types of adhesives to be used based on the condition of the wall and area of installation	1	2	-	1
	PC8. perform the required woodworking operation on the materials as per design specifications	1	2	2	-
	PC9. prepare the material pieces into the required shape as per the specified measurements	1	2	2	-
	PC10. check visually for any surface damage on the components before assembly and installation	1	2	2	1
	PC11. ensure that the work area is free of clutters to carry out installation work smoothly	1	2	2	-
	Perform assembly and installation of cladding/ panelling	**4**	**16**	**18**	**1**
	PC12. measure and mark the dimension of the panels on the wall to determine the installation position	1	2	2	1
	PC13. ensure proper joinery of panels to avoid gaps and loose pieces while accommodating the natural seasonal movement of the timber	-	2	2	-
	PC14. make provision for drained and ventilated cavities open at the top and bottom to prevent moisture into the panels	-	2	2	-
	PC15. ensure correct methods of holding and centering the workpiece	1	2	2	-
	PC16. check the vertical and horizontal alignment of panels using appropriate tools	1	2	2	-
	PC17. undertake requisite cut-outs for electrical outlets, plumbing points, and other arrangements	-	2	2	-
	PC18. ensure removal of masking tape after installation of panels	1	-	2	-
	PC19. apply sealants at the exposed edges and corners once the panels get installed	-	2	2	-
	PC20. ensure a final sanding of panels and edges to get a finished look	-	2	2	-
	NOS Total	**15**	**38**	**38**	**9**

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
FFS/N2216: Perform fabrication, assembly, and installation of Wooden Flooring	*Prepare the resources for flooring assemblage*	**8**	**11**	**22**	**6**
	PC1. identify and select the timber based on design specifications	1	1	2	1
	PC2. maintain the moisture content of the timber within specified limits	1	1	2	1
	PC3. plan and organize required materials, tools, and equipment for flooring fabrication and installation	1	1	2	1
	PC4. check that the selected tools and equipment are in safe working condition and ready for use	1	1	2	1
	PC5. interpret the quantity of the panels required for the room based on design specifications	1	1	2	1
	PC6. ensure proper measurement of every length, opening, bulge, and recess of the room/area	1	1	2	1
	PC7. identify the types of adhesives to be used based on the condition of the wall and area of installation	1	1	2	-
	PC8. perform the required woodworking operation on the materials as per design specifications	-	1	2	-
	PC9. prepare the material pieces into the required shape as per the specified measurements	-	1	2	-
	PC10. check visually for any surface damage on the components before assembly and installation processes	1	1	2	-
	PC11. ensure that the work area is free of clutters to carry out installation work smoothly	-	1	2	-
	Perform assembly and installation of flooring	**5**	**14**	**28**	**6**
	PC12. check the sub-floor to make sure that there are no squeaks in the floor and make necessary arrangements, if required	1	1	2	1
	PC13. roll out the strips of vapor barrier paper and staple securely to the sub-floor	-	1	2	1
	PC14. make use of the installation approach, which focuses on the largest unobstructed wall	1	1	2	-
	PC15. ensure correct methods of holding and centering the workpiece	1	1	2	-
	PC16. ensure the alignment of the board edge with the guiding line and drill holes as per specified measurements	-	1	2	1
	PC17. make use of the pneumatic nail gun, placing the gun lip over the edge of the board and driving the staple into the tongue of the hardwood plank	1	1	2	1
	PC18. install the panels of the flooring as per drawing specification	-	1	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC19. ensure proper grain matching while installation of panels	-	1	2	-
	PC20. check for the end matching of the panels while assembling of panels	-	1	2	-
	PC21. check the vertical and horizontal alignment of panels using appropriate tools	-	1	2	-
	PC22. undertake requisite cut-outs for electrical outlets, plumbing points, and other arrangements	-	1	2	-
	PC23. ensure removal of masking tape after installation of panels	-	1	2	-
	PC24. apply sealants at the exposed edges and corners once the panels get installed	-	1	2	1
	PC25. ensure a final sanding of panels and edges to get a finished look	1	1	2	1
	NOS Total	**13**	**25**	**50**	**12**
FFS/N2217: Perform fabrication, assembly, and installation of Kitchen, Cabinets, and Beds	*Prepare the resources for cabinets assemblage*	**6**	**10**	**20**	**4**
	PC1. identify and select the timber and panels based on design specifications	1	1	2	1
	PC2. maintain the moisture content of the timber within specified limits	1	1	2	1
	PC3. plan and organize required materials, tools, and equipment for cabinets fabrication and installation	1	1	2	1
	PC4. check that the selected tools and equipment are in safe working condition and ready for use	1	1	2	1
	PC5. identify different components of the products as per the given specifications	-	1	2	-
	PC6. prepare a cutting list of various components of the product based on materials and design specifications	1	1	2	-
	PC7. perform the required woodworking operation on the materials as per design specifications	-	1	2	-
	PC8. prepare the material pieces into the required shape as per the specified measurements	-	1	2	-
	PC9. check visually for any surface damage on the components before assembly and installation	1	1	2	-
	PC10. ensure that the work area is free of clutters to carry out installation work smoothly	-	1	2	-
	Perform assembly and installation of kitchen, cabinets, and beds	**3**	**10**	**22**	**2**
	PC11. ensure correct methods of holding and centering the workpiece	-	1	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC12. ensure all parts are in desired sizes and thickness as per design requirements	1	1	2	1
	PC13. measure and mark the position of cabinet installation on the wall	1	1	2	1
	PC14. assemble and install the panels of the cabinets as per drawing specification	-	1	2	-
	PC15. make use of the pneumatic nail gun, placing the gun lip over the edge of the board and driving the staple into the tongue of the panel	-	1	2	-
	PC16. ensure proper grain matching while installation of panels	-	1	2	-
	PC17. check for the end matching of the panels while assembling of panels	-	1	2	-
	PC18. check the vertical and horizontal alignment of panels using appropriate tools	-	1	2	-
	PC19. undertake requisite cut-outs for electrical outlets, plumbing points, and other arrangements	-	1	2	-
	PC20. ensure removal of masking tape after installation of panels	1	-	2	-
	PC21. prepare the necessary mounting for furniture to be installed	-	1	2	-
	Install architectural hardware, fittings, and accessories	**3**	**6**	**12**	**2**
	PC22. interpret the product drawing and identify the type of hardware and accessories required for cabinets installation	-	1	2	-
	PC23. identify and use required tools and equipment for installation of hardware and accessories	1	1	2	1
	PC24. measure and mark the dimensions on the product to determine hardware positioning	1	1	2	1
	PC25. make provisions for the installation of fittings by preparing slots and cut-outs	-	1	2	-
	PC26. install hardware and accessories in accordance with the job and manufacturer specifications	-	1	2	-
	PC27. ensure the proper functioning of the hardware after installation and make necessary adjustments as required	1	1	2	-
	NOS Total	**13**	**25**	**50**	**12**

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
FFS/N2218: Perform fabrication, assembly, and installation of a Wooden House Structure	*Prepare the resources for house frame structure assemblage*	**6**	**10**	**20**	**4**
	PC1. identify and select the timber and panels based on design specifications	1	1	2	1
	PC2. maintain the moisture content of the timber within specified limits	1	1	2	1
	PC3. plan and organize required materials, tools, and equipment for wooden structure fabrication and installation	1	1	2	1
	PC4. identify different components of the products as per the given specifications	1	1	2	1
	PC5. prepare a cutting list of various components of the product based on materials and design specifications	-	1	2	-
	PC6. apply woodwork skills to measure, mark out, cut, joint, fit the pieces of the structure	1	1	2	-
	PC7. prepare the material pieces into the required shape as per the specified measurements	-	1	2	-
	PC8. design the repetitive framing members to withstand the load of the occupants	-	1	2	-
	PC9. select the framing type of structure based on required design specifications	1	1	2	-
	PC10. plan house layouts and room sizes for efficient use of space and to avoid excessive building area and heated volume	-	1	2	-
	PC11. identify and select the framing method, depth, and spacing of members based on insulation levels of the structure	3	10	22	2
	PC12. check visually for any surface damage on the components before assembly and installation processes	-	1	2	-
	PC13. ensure that the work area is free of clutters to carry out installation work smoothly	1	1	2	1
	Perform assembly and installation of house frame structure	**8**	**11**	**22**	**5**
	PC14. ensure that the repetitive framing members such as trusses or wood I-joists spaced as per standard sizes	1	1	2	1
	PC15. perform laying of the sill plate based on the level of the foundation top	-	1	2	-
	PC16. prepare the thickness of the sheathing panels based on the amount of structural strength requirement	1	1	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC17. prepare a connection between the roof/ floor, wall, and foundation to provide a continuous and complete load path	-	1	2	-
	PC18. factor the loads on the subfloor and floor by placing the joist with a bow edgewise in a crown on top position	1	1	2	1
	PC19. install the joists based on the clearance under the wood beam	-	1	2	-
	PC20. select and install the sub-floor based on floor stiffness and vibration requirement	1	1	2	-
	PC21. apply appropriate adhesives to reduce the deflection between adjacent joists	1	1	2	1
	PC22. install insulation carefully on top of the soffit finish preventing air leakage through the cantilevered floor assembly	1	1	2	1
	PC23. follow the code-acceptable practices that use fewer framing materials such as advanced framing techniques	1	1	2	1
	PC24. ensure a final sanding of panels and edges to get a finished look	1	1	2	-
	NOS Total	**16**	**24**	**48**	**12**
FFS/N2219: Perform General Repairs and Maintenance of the furniture at the worksite	*Prepare the resources for dismantling, repair, and maintenance of furniture*	**2**	**5**	**10**	**2**
	PC1. examine and identify the various components of the existing furniture to determine the scope of repair and maintenance	-	1	2	-
	PC2. plan and organize required materials, tools, and equipment for furniture repair and restoration	1	1	2	1
	PC3. check that the selected tools and equipment are in safe working condition and ready for use	1	1	2	1
	PC4. measure the various components of the furniture to determine the product specifications	-	1	2	-
	PC5. ensure that the work area is free of clutters to carry out work smoothly	-	1	2	-
	Dismantling and movement of various components of furniture	**5**	**11**	**14**	**-**
	PC6. ensure that the furniture should be emptied from inside before dismantling	-	1	-	-
	PC7. follow the approach of dismantling the parts in order of assembling them at last at the end of the process	-	1	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC8. dismantle and detach sofa legs, bookcase shelves, beds, and anything else that needs repair or maintenance	-	1	2	-
	PC9. ensure proper stacking of all the labeled parts neatly to avoid scratches and other types of damages	1	1	2	-
	PC10. ensure proper arrangement of small parts like screws and other fasteners after dismantling of furniture	1	1	-	-
	PC11. plan and organize the movement/ displacement of the furniture and its parts	-	1	2	-
	PC12. examine the surroundings and the route whereby the furniture is to be moved	1	1	2	-
	PC13. identify potential troubles like light fixtures which can be damaged during moving or detaching the furniture	1	1	2	-
	PC14. clear the route by moving or removing fragile or obstructive items	-	1	-	-
	PC15. make use of soft padding or wrap the furniture in a blanket pad to protect it while moving	-	1	-	-
	PC16. perform lifting and movement based on the type of furniture and its compositions to avoid any mishaps	1	1	2	-
	Maintain, repair, and re-install the furniture	**7**	**16**	**24**	**4**
	PC17. plan out the repair and maintenance process in accordance with the scope of the work	-	1	2	-
	PC18. perform stripping of the old and damaged layer of the furniture using a scrapper based on repair requirements	-	1	2	-
	PC19. repair the joints or cracks in furniture using appropriate adhesives and clamp the joints, if required	1	1	2	1
	PC20. prepare the material pieces into the required shape as per the specified measurements	-	1	2	-
	PC21. perform sanding on the surface of the components to remove small scratches and marks	1	1	2	-
	PC22. tighten the various components of furniture together using appropriate steel brackets and screws	-	1	2	-
	PC23. perform reupholstering of the furniture using suitable padding and fabric as per requirement	1	1	2	1
	PC24. assemble and install the panels of the furniture as per product specification	-	1	2	-
	PC25. ensure proper grain matching while installation of panels	-	1	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC26. check the vertical and horizontal alignment of panels using appropriate tools	-	1	2	-
	PC27. identify and select appropriate polishes and waxes on furniture based on the type of wood/ panels	1	1	2	1
	PC28. ensure the proper functioning of the hardware after furniture assembly and make necessary adjustments as required.	1	1	2	1
	PC29. evaluate if surface or coating is not susceptible to be damaged by the contact required in cleaning and polishing	-	1	-	-
	PC30. perform dusting and cleaning carefully using appropriate tools and equipment	1	1	-	-
	PC31. ensure that only unfinished wood, painted wood, or wood with a sturdy finish should cleaned using appropriate water-soluble solutions	1	1	-	-
	PC32. carefully wipe off the dust on the furniture using a damp cloth	-	1	-	-
	NOS Total	**14**	**32**	**48**	**6**
FFS/N8203: Maintain health, safety, and greening practices at the worksite	*Maintain health and hygiene protocols*	**6**	**8**	**16**	**5**
	PC1. comply with health and personal hygiene-related protocols	1	1	2	1
	PC2. maintain adequate inventory of cleaning materials and consumables	1	1	2	1
	PC3. identify and report poor organizational practices concerning hygiene, food handling, cleaning	1	1	2	-
	PC4. ensure that the trash cans or waste collection points are cleared every day	1	1	2	1
	PC5. maintain records for cleanliness and maintenance schedule	-	1	2	-
	PC6. use appropriate personal protective equipment compatible with the work and compliant with relevant Occupational Health and Safety (OHS) guidelines: masks, safety glasses, head protection, ear muffs, safety footwear, gloves, aprons, etc.	1	1	2	1
	PC7. wear clean clothes as per the dress code of the worksite	-	1	2	-
	PC8. wash hands regularly using suggested material such as soap, one-use disposable tissue, warm water, etc.	1	1	2	1
	Dealing with emergencies	**2**	**4**	**8**	**1**
	PC9. use emergency equipment in accordance with manufacturers' specifications as per requirement	-	1	2	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC10. follow emergency and evacuation procedures in case of accidents, fires, natural calamities	1	1	2	-
	PC11. respond promptly and appropriately to an accident situation or medical emergency	-	1	2	-
	PC12. undertake first aid activities in case of an accident, if required and asked to do so	1	1	2	1
	Precautionary measures to avoid work hazards	**3**	**5**	**10**	**2**
	PC13. ensure that safety instructions applicable to the workplace are being followed	-	1	2	-
	PC14. monitor the usage of harmful chemicals inside the work area as per the specified guidelines only	1	1	2	-
	PC15. plan out the routine cleaning of tools, machines, and equipment	-	1	2	-
	PC16. employ an effective process to dispose off the hazardous material and wastage	1	1	2	1
	PC17. employ safe working practices to perform a lift, carry or move heavy wooden furniture and accessories from one place to another	1	1	2	1
	Ensure material conservation and optimization of resources	**5**	**7**	**14**	**4**
	PC18. plan out the process to ensure optimal material utilization	1	1	2	1
	PC19. collect information on the pattern of electricity and fuel consumption	-	1	2	-
	PC20. identify possibilities of using renewable energy and environment-friendly fuels	1	1	2	-
	PC21. plan the implementation of energy-efficient systems in a phased manner	-	1	2	1
	PC22. plan and utilize the reusable materials and wastage in the process	1	1	2	1
	PC23. perform segregation of waste based on the type of material	1	1	2	1
	PC24. ensure to keep the electrical appliances in OFF position when not in use	1	1	2	-
	NOS Total	**16**	**24**	**48**	**12**
DGT/VSQ/ N0102: Employability Skills (60 Hours)	*Introduction to Employability Skills*	**1**	**1**	**-**	**-**
	PC1. identify employability skills required for jobs in various industries	-	-	-	-
	PC2. identify and explore learning and employability portals	-	-	-	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	Constitutional values – Citizenship	**1**	**1**	**-**	**-**
	PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
	PC4. follow environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
	PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
	PC6. practice the 21st Century Skills such as Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
	Basic English Skills	**2**	**3**	**-**	**-**
	PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
	PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
	PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
	Career Development & Goal Setting	**1**	**2**	**-**	**-**
	PC10. understand the difference between job and career	-	-	-	-
	PC11. prepare a career development plan with short- and long-term goals, based on aptitude	1	2	-	-
	Communication Skills	**2**	**2**	**-**	**-**
	PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
	PC13. work collaboratively with others in a team	-	-	-	-
	Diversity & Inclusion	**1**	**2**	**-**	**-**
	PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
	Financial and Legal Literacy	**2**	**3**	**-**	**-**

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC16. select financial institutions, products and services as per requirement	-	-	-	-
	PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
	PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
	PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
	Essential Digital Skills	**3**	**4**	**-**	**-**
	PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
	PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
	PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
	Entrepreneurship	**2**	**3**	**-**	**-**
	PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
	PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
	PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
	Customer Service	**1**	**2**	**-**	**-**
	PC26. identify different types of customers	-	-	-	-
	PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
	PC28. follow appropriate hygiene and grooming standards	2	3	-	-
	Getting ready for apprenticeship & Jobs	**2**	**3**	**-**	**-**
	PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
	PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
	PC31. apply to identified job openings using offline / online methods as per requirement	-	-	-	-

NOS	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
	NOS Total	**20**	**30**	**-**	**-**

Annexure - III

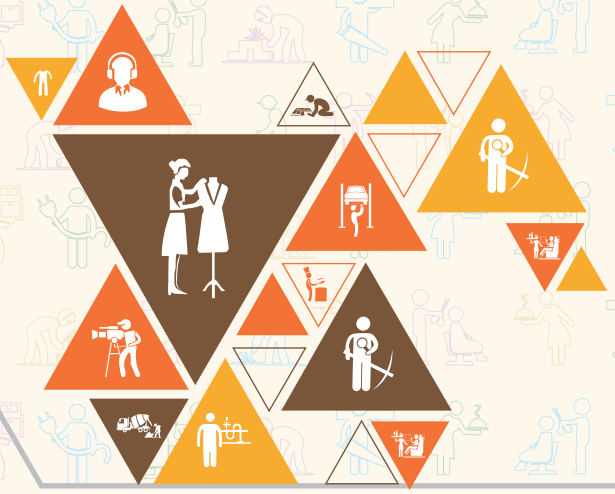
Chapter Name	Unit No.	Topic Name	Page No.	Link to QR code	QR code
Module 1: Advanced Understanding of the Furniture and Interiors Industry	Unit 1.1: Scope and Significance of the Furniture and Interiors Industry	1.1.1. the current and emerging role of the furniture and interiors industry in India's economic and urban development.	23	https://youtu.be/HTXLop_7utY?si=Vs-5suu5TjXXK49LB	Future of interiors industry
	Unit 1.3: Project Planning and Interior Design Essentials	1.3.1. design briefs to identify client expectations related to layout, style, and theme.	23	https://youtu.be/NMaJbA5ivbI?si=iMV-ClvSOCrEMwbWq	Types of Layouts
Module 2: Application of Advanced Raw Materials and Architectural Hardware	Unit 2.1: Types, Properties, and Standards of Furniture Raw Materials	2.1.1. commonly used raw materials in modern furniture making, such as MDF, HDF, plywood, particle board, and solid wood	48	https://youtu.be/tjxeclheEkA?si=t_xHn-zLvNSyNWADI	Types of Boards (Ply, Block board, Particle board, MDF, HDF)
	Unit 2.2: Introduction to Architectural Hardware and Fittings	2.2.1. types of architectural hardware such as hinges, channels, locks, brackets, and runners based on their application.	48	https://youtu.be/Qh-hTeLblto?si=XzjX-MdYhpSbsXPrF	Various types of hinges
Module 3: Proficient Use of Power Tools, Equipment, and Workshop Machinery	Unit 3.1: Identification and Application of Furniture Workshop Tools and Equipment	3.1.1. advanced tools and machines used in furniture fabrication such as table saws, routers, orbital sanders, and pneumatic tools.	70	https://youtu.be/Umysbbx1HCI?si=mfE-JqWjSZe-fXFBv	Table saw wood cutting machine

Chapter Name	Unit No.	Topic Name	Page No.	Link to QR code	QR code
Module 4: Supervisory Communication, Team Coordination, and Employability Tools	Unit 4.1: Organizational Structure, Task Reporting, and Documentation	4.1.1. how typical carpentry project teams are structured, including roles and reporting lines.	84	https://youtu.be/pxHu3KDM-9ww?si=3Mi7f-BUY12lZzfrn	carpentry project team
	Unit 4.3: Digital and Employability Tools for Workplace Productivity	4.3.1. digital tools like messaging apps, QR scanners, and mobile calculators for site communication and documentation.	84	https://youtu.be/2w-jSn7Oabzo?si=U5Dk-My-FgZC1A_1x	QR scanners
Module 5: Project Planning, Cost Estimation, and Client Communication	Unit 5.1: Understanding Project Requirements and Documentation	5.1.1. project drawings, work instructions, and client briefs for scope clarity	109	https://youtu.be/wEwWiS-9cxwM?si=LK-J6ZF0TYRUNoXSR	project drawings
Module 6: Site Survey and Pre-Execution Planning	Unit 6.1: Process of Site Survey and Recce as per Project Requirement	6.1.1. the standard steps involved in conducting a professional site survey and recce.	127	https://youtu.be/9V7ibWLklvc?si=y-j8mE-3Jc7adQs1K	site survey
Module 7: Quality Control, Ergonomics, and Team Supervision	Unit 7.1: Quality Control Procedures and Safety Practices	7.1.2. visual and physical quality checks during intermediate and final stages of product execution.	146	https://youtu.be/Prh9JXD-9cwQ?si=17vO4fK-va9AvRPsa	Visual inspection
	Unit 7.3: Team Supervision, Task Allocation, and On-the-Job Training	7.3.3. Monitor productivity and ensure assigned work is completed as per job card timelines.	146	https://youtu.be/ay_KLb-g3xDs?si=26-2U2Vcw-goyjm1w	Monitor productivity

Chapter Name	Unit No.	Topic Name	Page No.	Link to QR code	QR code
Module 8: Project Execution and Resource Monitoring	Unit 8.1: Planning and Preparation for Project Execution	8.1.1. project execution plans including job cards, schedules, and dependencies.	164	https://youtu.be/ACjTnkTT7v4?si=2Oyhr-JrWGQyDHNKZ	project execution plans
Module 9: Worksite Operations and Storage Management	Unit 9.1: Coordination and Instruction Planning for Loading and Unloading	9.1.1. a clear loading/unloading instruction sheet that includes item details, handling sequence, and destination.	184	https://youtu.be/qcAhahIy-RE?si=-niE-3Ihv5OX5oiZ7	Safety Precautions for Loading & Unloading
Module 10: Worksite Preparation, Safety Checks, and Maintenance	Unit 10.1: Worksite Setup and Tool Organization	10.1.1. the tools, materials, and equipment required for different carpentry tasks.	204	https://youtu.be/hQA0dd_0rq8?si=-DETP7X-QYxNOrP57	tools and equipment in carpentry tasks
Module 11: Preparing Components and Fabricating Product Parts	Unit 11.1: Interpretation of Drawings for Component Fabrication	11.1. symbols, scales, and views commonly used in technical drawings for furniture components.	234	https://youtu.be/dKNnTx-wSS-Q?si=9UnTiQG-C75u1ij4c	symbols, scales, and views commonly used in technical drawings
	Unit 11.3: Measurement Techniques, Cutting Lists, and Documentation	11.3.2. accurate measuring and marking using standard carpentry tools.	234	https://youtu.be/Ne84nfiA0fM?si=mC-lIIWxylBU8ECWW	measuring and marking using standard carpentry tools

Chapter Name	Unit No.	Topic Name	Page No.	Link to QR code	QR code
Module 12: Joinery, Assembly, and Surface Finishing	Unit 12.1: Joinery Types, Fit, and Functionality	12.1.1. major types of wood joints used in furniture such as butt, lap, mortise and tenon, and dovetail.	258	https://youtu.be/TN7Hfwa3YW8?si=RX-lMkLk1CR-MeP-W	types of wood joints
Module 13: Installation, Handover, and Post-Work Reporting	Unit 13.1: Installation Planning and Execution	13.1.1. installation blueprints, layout plans, and mounting instructions.	274	https://youtu.be/PvzPeZsy7cI?si=8T-f4JSX7eiiY-mR2	layout plans
Module 14: Health, Safety, and Green Practices	Unit 14.1: Worksite Safety and Emergency Preparedness	14.1.1. common on-site hazards including fire, electrical faults, and sharp tools, and describe steps to prevent accidents.	292	https://youtu.be/RIZ-pZ3aO7Kk?si=5N0io-N0UGfOld_cD	Electrical Hazards and precautions
Module 15: Fabrication and Installation of Wooden Doors and Windows with Frames	Unit 15.1: Types of Wooden Doors with Frames and Types of Wooden Windows with Frames	15.1.1. major types of wooden doors with frames such as panel doors, flush doors, louvered doors, and glazed doors, and describe their suitable use cases.	325	https://youtu.be/IfF38vOqcxM?si=6LZ-JgdqevQxJqsfp	Flush Door vs Panel Door
Module 16: Fabrication and Installation of Wooden Cladding and Panelling	Unit 16.1: Types of Wooden Cladding and Panelling	16.1.1. types of wooden cladding such as tongue and groove, shiplap, and board-and-batten, and explain their typical applications	346	https://youtu.be/TUFCj5BTt-bU?si=cRJo_7SeGs83ZAwT	Types Of Cladding?
Module 17: Fabrication and Installation of Wooden Flooring	Unit 17.1: Flooring Types, Material Selection, and Sub-Floor Preparation	17.1.1. types of wooden flooring systems including hardwood, laminate, and engineered boards, and explain their usage based on foot traffic and room function	368	https://youtu.be/8lLF-WxvAnpE?si=Sw-FRC-dWBT2t9-5X	Solid Wood Flooring, Engineered Wood Flooring & Laminate Wood Flooring

Chapter Name	Unit No.	Topic Name	Page No.	Link to QR code	QR code
Module 18: Fabrication and Installation of Kitchens, Cabinets, and Beds	Unit 18.1: Types of Cabinets and Their Functional Applications	18.1.1. major cabinet types such as base cabinets, wall cabinets, tall units, and modular drawer units and describe their uses.	442	https://youtu.be/taEQ50Z_H4A?si=HOVD7FZBTUxQ-ESD	Cabinet Types & Standard Measurements
Module 19: Fabrication and Installation of Wooden House Structures	Unit 19.1: Timber Selection, Framing Concepts, and Site Preparation	19.1.1. suitable timber or board material for walls, floors, and roofing frames based on moisture content, load-bearing strength, and dimensional stability.	477	https://youtu.be/Aq2t37Glfy-w?si=8a0KpBhaLZs-GIEoX	Load bearing Structure
Module 20: General Repairs and Maintenance of Furniture	Unit 20.1: Preparation, Assessment, and Safe Dismantling	20.1.1. components of furniture that require inspection and assess whether repair or replacement is needed.	503	https://youtu.be/uiU2_iw7xWI?si=QId-kYprk7vTfJX-	Inspection and Types of Inspection



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