Western Technical College

31410333 Framing Techniques

Course Outcome Summary

Course Information

Description	This course introduces the theory, materials, methods, and procedures used to construct floor, wall, roof systems, and staircases for wood-framed structures. Students will build a full-size structure in the framing lab using the proper tools, layout techniques, and appropriate materials.
Career Cluster	Architecture and Construction
Instructional Level	Technical Diploma Courses
Total Credits	5
Total Hours	180

Textbooks

No textbook required.

Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Live Responsibly: Develop Resilience
3. Live Responsibly: Foster Accountability
4. Refine Professionalism: Improve Critical Thinking
5. Refine Professionalism: Participate Collaboratively
6. Refine Professionalism: Practice Effective Communication

High Impact Practices

1. Learning Community: these courses are designed to enhance your learning experience in which a

cohort of peers complete two or more courses that are linked through projects, themes, or program emphasis.

Program Outcomes

1. Use hand and power tools and equipment
2. Apply industry recognized safety practices and procedures
3. Analyze sustainable building practices
4. Interpret construction drawings
5. Interpret building codes
6. Demonstrate industry building practices and material application

Course Competencies

1. Use hand and power tools.

Assessment Strategies

1.1. Skill Demonstration
1.2. Written Objective Test (score 70% or higher)

Criteria

You will know you are successful when

1.1. you select the correct power tool to use.
1.2. you demonstrate safe and accurate use of hand and power tools.

Learning Objectives

1.a. Use a circular saw in a safe and effective manner
1.b. Use a jig saw in a safe and effective manner
1.c. Use a drill in a safe and effective manner
1.d. Use a tape measure to perform basic measuring operations
1.e. Use different squaring devices to draw a square corner

2. Identify different types of framing systems.

Assessment Strategies

2.1. Demonstration
2.2. Written Objective Test (score 70% or higher)

Criteria

You will know you are successful when:

2.1. you identify framing systems from an architectural drawing.

Learning Objectives

2.a. Identify platform frame construction.
2.b. Identify balloon frame construction.
2.c. Identify post and beam frame construction.
2.d. Identify SIP construction.

3. Identify the components used in floor framing.

Assessment Strategies

3.1. Written Objective Test (score 70% or higher)

Criteria

You will know you are successful when:

3.1. you describe the location and components within the box sill.
3.2. you label the floor framing components from an architectural drawing.

Learning Objectives

3.a. Define a box sill.
3.b. Identify the sill plate.
3.c. Identify the sill sealer.
3.d. Identify a floor joist.
3.e. Identify the sub-floor.
3.f. Identify anchor bolts.

4. Install a floor system

Assessment Strategies

4.1. Skill Demonstration

Criteria

You will know you are successful when:

4.1. You will complete an on-center layout of the floor joists
4.2. You will locate the position of a stairwell opening and its components
4.3. You will install floor joists in accordance with the manufacturers specifications
4.4. You will install subfloor materials according to manufacturers specifications

Learning Objectives

4.a. Locate position of floor joists in a floor system
4.b. Locate the position of stairwell opening components
4.c. Install floor joists
4.d. install subfloor

5. Identify the components used in wall framing.

Assessment Strategies

5.1. Written Objective Test (score 70% or higher)
5.2. Skill Demonstration

Criteria

You will know you are successful when:

5.1. you label plate material from section and elevation view of a wall.
5.2. you label the vertical components used within a wall from an architectural drawing.
5.3. you locate and describe the construction of wall headers from an architectural drawing.
5.4. you identify the location and state the dimensions of a rough opening.

Learning Objectives

5.a. Identify wall plate material including bottom plate, top plate, and double top plate.
5.b. Identify vertical framing members including common studs, king studs, trimmers, cripples, corner posts, and energy corners.
5.c. Identify headers.
5.d. Identify window and door openings in a wall.

6. Prepare plates for wall construction.

Assessment Strategies

6.1. Skill Demonstration

Criteria

You will know you are successful when:

6.1. you identify designated walls from a floor plan.
6.2. you cut wall plates to proper length as stated on a floor plan.
6.3. you mark correct location and size of rough openings on the plates.
6.4. you mark correct location of intersecting wall partition backing and energy corners where applicable.
6.5. you accurately mark a 16" on center stud lay-out.

Learning Objectives

6.a. Interpret a floor plan to position walls within a structure.
6.b. Determine proper lengths of walls within a structure.

6.c. Draw rough openings, partitions, corner posts, and studs on wall plates.

7. Construct a wall.

Assessment Strategies

7.1. Activity
7.2. Written Objective Test

Criteria

You will know you are successful when:

7.1. you properly size and assemble rough opening headers.
7.2. you assemble intersecting wall partition backing and energy corners.
7.3. you cut rough opening trimmers, sills, and cripples to proper length.
7.4. you assemble trimmers and king studs, headers, rough sills, cripples, backing and energy corners, and common studs in the correct sequence and location as marked on wall plates.
7.5. you minimize waste by consuming framing materials in the most efficient manner.

Learning Objectives

7.a. Select framing materials to be used for wall construction in the most efficient manner.
7.b. Prepare wall framing components for assembly.
7.c. Connect wall framing components within the wall assembly.

8. Interpret terminology used in roof construction.

Assessment Strategies

8.1. Activity

Criteria

You will know you are successful when:

8.1. you identify the framing members used in a hand framed gable roof.
8.2. you identify the framing members used in a hand framed hip roof.
8.3. you interpret the span, total run, total rise, and slope of a roof.
8.4. you interpret the rafter table found on a framing square.

Learning Objectives

8.a. Identify a roof's span, total run, and total rise.
8.b. Identify the slope of a roof (unit rise).
8.c. Identify a ridge board, common rafters, valley rafters, valley jack rafters, hip rafters, hip jack rafters, and roof sheathing.
8.d. Identify the plumb cut, level cut, bird's mouth, and tail of a rafter.
8.e. Interpret the rafter table on a framing square.

9. Calculate the dimensions of framing members used in a hand-framed gable roof.

Assessment Strategies

9.1. Scenario Response

Criteria

Performance will be satisfactory when:

9.1. you identify the run of a roof.
9.2. you explain the roof slope as inches of rise per foot of run.
9.3. you determine the theoretical and actual length of a ridge board.
9.4. you determine the theoretical and actual length of a common rafter using the rafter table found on the framing square.

Learning Objectives

9.a. Determine the run of a roof and roof slope from an architectural drawing.
9.b. Interpret the rafter table found on a framing square.
9.c. Calculate the length of a ridge board used in a gable roof from an achitectural drawing.
9.d. Calculate the length of a common rafter.

10. Calculate the dimensions of framing members used in a hand-framed hip roof.

Assessment Strategies

10.1. Scenario Response

Criteria

You will know you are successful when:

10.1. you identify the run of the roof.
10.2. you explain the roof slope as inches of rise per foot of run.
10.3. you determine the theoretical and actual length of a hip rafter using the rafter table found on the framing square.
10.4. you determine the theoretical and actual length of multiple hip-jack rafters using the rafter table found on the framing square.

Learning Objectives

10.a. Determine the run of a roof and roof slope from an architectural drawing.
10.b. Interpret the rafter table found on a framing square.
10.c. Calculate the length of a hip rafter.
10.d. Calculate the length of a hip jack rafter.

11. Construct a hand-framed gable roof.

Assessment Strategies

11.1. Activity

Criteria

You will know you are successful when:

11.1. you cut common rafters to their actual length.
11.2. you cut the ridge board to the proper length and support it in the center of the building.
11.3. you fasten common rafters to the ridge board and exterior walls.
11.4. you straighten and level the ridge board to complete the framing of a gable roof.
11.5. you cut the rafter tails to the proper length to ensure the correct roof projection at the eaves.
11.6. you install sub fascia.

Learning Objectives

11.a. Install a ridge board.
11.b. Install common rafters.
11.c. Install sub fascia.

12. Construct a hand-framed hip roof.

Assessment Strategies

12.1. Activity

Criteria

You will know you are successful when:

12.1. you cut the hip rafter to the actual length.
12.2. you "drop" the hip correctly.
12.3. you fasten the hip rafter to the ridge board and exterior walls.
12.4. you cut the hip-jack rafters to their actual lengths.
12.5. you fasten the hip-jack rafters to the hip rafter and exterior walls.
12.6. you straighten the hip to complete the hip roof installation.

Learning Objectives

12.a. Install hip rafters.
12.b. Install hip-jack rafters.

13. Construct an intersecting roof.

Assessment Strategies

13.1. Activity

Criteria

You will know you are successful when:

13.1. you install a ridge board to rest on the intersecting roof
13.2. you align a 24" on-center layout on the ridge board with the lay-out on the intersecting roof
13.3. you measure and cut the valley jack rafters to the proper length with a compound cut on one end to match the slope of the roof.
13.4. you install the valley jack rafters securely, maintaining proper rafter spacing on the intersecting roof.

Learning Objectives

13.a. Install a ridge board on an intersecting roof
13.b. Position a 24" on center lay-out on the double top plate and ridge board for an intersecting roof.
13.c. Install common and valley jack rafters for an intersecting roof.

14. Construct a staircase.

Assessment Strategies

14.1. Skill Demonstration
14.2. Written Objective Test

Criteria

You will know you are successful when

14.1. you identify the framing components of a closed stringer staircase
14.2. you identify the unit rise and run of a staircase in compliance with the uniform dwelling code while maintaining the 17" - 18" rule of thumb
14.3. you build an intermediate landing at the correct height to maintain proper rise and run of the staircase.
14.4. you lay out the unit rise and run and accurately cut the stringers as specified.
14.5. you install the stair stringers maintaining proper unit rise at the landing.
14.6. you fasten the stringers securely to the landing and wall maintaining proper clearance for drywall and skirt boards at the wall.
14.7. you build a knee wall adjacent to the staircase to match the angle of the assembly maintaining proper height to accept a knee wall cap and sufficient length to allow for proper termination of first step tread.

Learning Objectives

14.a. Identify the framing components of a closed stringer staircase.
14.b. Build an intermediate landing.
14.c. Lay out stair stringers that depict proper unit rise and run.
14.d. Cut and install stair stringers.
14.e. Build a knee wall to match the angle of the staircase.