Washington CTE

Construction Year 2 (2021)

Safety 1	1 Safety 1
This unit provides a general review of construction safety principles and practices covered in Core Plus Construction Year 1 as well as additional instruction on in-depth specific environment, health, and safety issues, policies, procedures, and regulations relevant to the instruction and activities throughout the course.	This unit provides a general review of construction safety principles and practices covered in Core Plus Construction Year 1 as well as additional instruction on in-depth specific environment, health, and safety issues, policies, procedures, and regulations relevant to the instruction and activities throughout the course.
Identify and understand the components of and reasons for an effective environment, health, and safety program. 1.1	1 Identify and understand the components of and reasons for an effective environment, health, and safety program. 1.1
Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA). 1.2	2 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA). 1.2
Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions. 1.3	3 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions. 1.3
Conduct a safety meeting and present a hazard analysis of the materials you will be	4 Conduct a safety meeting and present a hazard analysis of the materials you will be working with that week. 1.4

working with that week. 1.4	
Demonstrate the proper care and safe use of hand, portable and stationary power tools. 1.5	5 Demonstrate the proper care and safe use of hand, portable and stationary power tools. 1.5
Write an installation procedure for a selected construction material noting installation techniques, tools and equipment required, fastening approach, and safety procedures that must be observed. 1.6	6 Write an installation procedure for a selected construction material noting installation techniques, tools and equipment required, fastening approach, and safety procedures that must be observed. 1.6
Actively participate in developing and upholding a safety culture within the class 1.7	7 Actively participate in developing and upholding a safety culture within the class 1.7
Demonstrate and understanding of accident causes and results. 1.8	8 Demonstrate and understanding of accident causes and results. 1.8
Complete Job Hazard Analysis form to industry standard for all assigned projects 1.9	9 Complete Job Hazard Analysis form to industry standard for all assigned projects 1.9
Practice personal safety when lifting, bending, or moving equipment and supplies. 1.10	10 Practice personal safety when lifting, bending, or moving equipment and supplies. 1.10
Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics. 1.11	11 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics. 1.11

Describe and display appropriate safety behaviors for elevated work and use of fall protections. 1.12	**12** **Describe and display appropriate safety behaviors for elevated work and use of fall protections.** 1.12
Demonstrate appropriate safety practices when working on around ladders and scaffolds. 1.13	**13** **Demonstrate appropriate safety practices when working on around ladders and scaffolds.** 1.13
Explain and demonstrate emergency procedures to follow in response to workplace accidents. 1.14	**14** **Explain and demonstrate emergency procedures to follow in response to workplace accidents.** 1.14
Create a disaster and/or emergency response plan. 1.15	**15** **Create a disaster and/or emergency response plan.** 1.15
Construction Career Planning 2	**2** **Construction Career Planning** 2
Students will receive instruction on how to utilize multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.	**Students will receive instruction on how to utilize multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.**
Determine academic/training or certification requirements for transition from high school to post-secondary training program or career. 2.1	**1** **Determine academic/training or certification requirements for transition from high school to post-secondary training program or career.** 2.1
Apply knowledge gained from individual assessment to a set of	**2** **Apply knowledge gained from individual assessment to a set of goals and a career plan** 2.2

goals and a career plan 2.2	
Prepare a personal budget reflecting desired lifestyle and compare and contrast at least three careers of interest in regard to salary expectations and education/training costs. 2.3	3 Prepare a personal budget reflecting desired lifestyle and compare and contrast at least three careers of interest in regard to salary expectations and education/training costs. 2.3
Prepare a program of study for at least one career of interest 2.4	4 Prepare a program of study for at least one career of interest 2.4
Develop strategies to make an effective transition from school to career 2.5	5 Develop strategies to make an effective transition from school to career 2.5
Complete a personal career portfolio including academic, certification and technical-skill requirement, career opportunities, expected wages, skills, aptitude necessary and the impact of technology on careers of personal interest. 2.6	6 Complete a personal career portfolio including academic, certification and technical-skill requirement, career opportunities, expected wages, skills, aptitude necessary and the impact of technology on careers of personal interest. 2.6
Personal Success in the Construction Industry 3	3 Personal Success in the Construction Industry 3

This unit provides students with the opportunity to develop their communication, teamwork, leadership and time management skills as well as other key employability skills and abilities.

Lesson 1: General Tool Safety:

1 Works efficiently and accurately 3.1

2 Complete assignments and meet deadlines 3.2

3 Respect the opinions, customs, and individual differences of others 3.3

4 Interact respectfully with coworkers of different cultures, genders, and backgrounds 3.4

5 Work cooperatively with others 3.5

6 Resolve conflicts and differences to maintain a smooth workflow 3.6

7 Integrity: Display accepted social and work behaviors. 3.7

8 Apply ethical standards of the industry to workplace/jobsite conduct 3.8

9 Treat others with honesty, fairness, and respect 3.9

10 Demonstrate respect for property of customers, employer, and coworkers 3.10

11 Take responsibility for accomplishing work goals within accepted timeframes 3.11

12 Accept responsibility for one's decisions and actions 3.12

13 Professionalism: Maintain a professional demeanor 3.13

14 Take pride in one's work and the work of the group 3.14

15 Demonstrate self-control by keeping emotions in check 3.15

16 Accept criticism and deal calmly with stressful situations 3.16

17 Demonstrate a willingness to work. 3.17

18 Pursue work with energy, drive, and effort to accomplish tasks 3.18

19 Persist at a task or problem despite interruptions, obstacles, or setbacks 3.19

20 Work independently and perform effectively even with little or no supervision 3.20

21 Demonstrate the ability to change from one task to another 3.21

22 Take initiative to seek out new responsibilities 3.22

23 Establish and maintain challenging, but realistic work goals 3.23

Lessons within this unit will have students practice and expand upon the basic print reading skills developed in previous courses. Students will get hands-on experience working directly from prints as well as developing increasing complex prints for individual and group projects

Construction Prints

1 Locate the Title Block on a drawing and identify the name, purpose of a drawing, and other fields depicted. 4.1

2 Interpret geometric elements in a drawing. 4.2

3 Identify the Alphabet of Lines. 4.3

4 Identify types of views, including detail views, sectional views, auxiliary views, and be able to interpret cutting lines. 4.4

5 Interpret common drawing symbols used in industry. 4.5

6 Identify types of dimensioning: linear, progressive, typical, equally spaced, angles, arcs, cylinders, holes, size, location, baseline, and tabular. 4.6

7 Recognize different types of construction prints/drawings. 4.7

8 Explain the different sections in a set of drawings 4.8

9 Describe the details, symbols, and nomenclature in each section 4.9

Reading Print/Drawings

10 Identify lines, symbols, abbreviations, and nomenclature within prints 4.10

11 Explain the difference and significance between plan view and elevations 4.11

12 Explain scale and the mathematical concepts supporting it 4.12

13 Demonstrate correct interpretation of drawing/print information and specifications to the correct location on the plan. 4.13

14 Perform necessary mathematics to determine scale and measurements 4.14

15 Specifications 4.15

16 Components of the drawings: Title block, Border, Drawing area, Revision block, Legend 4.16

17 Orthographic and Isometric views 4.17

Construction Specifications

18 Explain the purpose of specifications in construction projects 4.18

19 Describe how specifications and construction drawings are used together on construction projects 4.19

20 Elaborate on the purpose and function of the Construction Specifications Institute (CSI) 4.20

Layout

21 Demonstrate how to layout the foundation of a project 4.21

22 Translate drawing information into operational plans 4.22

In this unit students will be introduced to digital tools commonly used in the construction industry and will be given the opportunity to develop basic familiarity of these tools through assigned projects. Students will also have the opportunity to learn the basics of MS Word, PowerPoint, and MS Excel as project management tools as well as develop a basic familiarity with an entry level Computer Aided Drafting (CAD) program

Measuring

1 Demonstrate proficiency in the use of computers and applications 5.1

2 Use technology for research, problem-solving, and communication 5.2

3 Use basic computer hardware (e.g., PCs, printers) and software (e.g., word processing software, spreadsheet software) to perform tasks 5.3

4 Understand capabilities of computers and common computer terminology (e.g., program, operating system) 5.4

5 Understand computer terminology related to the construction profession (e.g., Global Positioning Systems, Geographic Information Systems, Electronic Surveying Equipment, Computer-Aided Design) 5.5

6 Draft basic prints and plans using a CAD program. 5.6

7 Organize, store, and retrieve files 5.7

8 Use word processing programs to create simple documents and business communications 5.8

9 Use electronic mail and Internet applications 5.9

10 Use spreadsheet and database applications 5.10

11 Enter data and type materials quickly and accurately 5.11

12 Double check work to identify and correct typographical errors. 5.12

Project Management 6

6 Project Management 6

This unit will focus on the principles of project management including some areas of project management knowledge such as, time management, cost management, and risk management. This course also introduces the planning, scheduling and project control techniques. Leadership and team management and the organizational structures.

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Explain the purpose and components of contract documents and specifications. 6.1

1 Explain the purpose and components of contract documents and specifications. 6.1

Read, interpret, and apply plans, elevations, sections and details. 6.2	**2 Read, interpret, and apply plans, elevations, sections and details.** 6.2
Explain the relationships of the elements of contract documents. 6.3	**3 Explain the relationships of the elements of contract documents.** 6.3
Create lists of materials and prepare estimates. 6.4	**4 Create lists of materials and prepare estimates.** 6.4
Use architectural and engineering scales. 6.5	**5 Use architectural and engineering scales.** 6.5
Identify and locate local, state and federal codes, regulations and standards. 6.6	**6 Identify and locate local, state and federal codes, regulations and standards.** 6.6
Identify local, state and federal regulatory agencies. 6.7	**7 Identify local, state and federal regulatory agencies.** 6.7
Understand zoning requirements. 6.8	**8 Understand zoning requirements.** 6.8
Understand property lines and building setbacks. 6.9	**9 Understand property lines and building setbacks.** 6.9
Calculate material quantities and purchase cost (including sales tax). 6.10	**10 Calculate material quantities and purchase cost (including sales tax).** 6.10
Calculate labor costs including work hours, duration and cost of workers. 6.11	**11 Calculate labor costs including work hours, duration and cost of workers.** 6.11
Explain and compute federal, state and local taxes. 6.12	**12 Explain and compute federal, state and local taxes.** 6.12

Schedule various construction activities. 6.13

13 **Schedule various construction activities.** 6.13

Understand how construction project funds are allocated. 6.14

14 **Understand how construction project funds are allocated.** 6.14

Construction Measurement 7

7 **Construction Measurement** 7

The lesson includes hands-on practice with a variety of common and precision measurement tools. Instruction includes the review of geometric dimensioning and tolerances and the use, care, and calibration of precision measurement tools.

Measuring

1 Use a standard rule, metric ruler, and measuring tape and read to the 1/16th inch to measure lengths 7.1

2 Explain what the metric system is and how it is important to the construction industry 7.2

3 Add, subtract, divide, and multiply fractions 7.3

4 Add, subtract, divide, and multiply decimals 7.4

5 Convert fractions to decimals and decimals to fractions. 7.5

6 Convert decimals to feet and inches 7.6

7 Measure dimension Strings and Grids 7.7

8 Calculate area, perimeter, surface area and volume 7.8

Measuring Tools

9 Measuring tape 7.9

10 Framing square 7.10

11 Speed square 7.11

12 Simple combination square 7.12

13 Straight edges 7.13

14 Measuring wheel 7.14

15 Builder’s level 7.15

16 Surveying equipment 7.16

Level and Plumb

17 Determine vertical plumb using measurement, builder levels, and laser levels 7.17

18 Determine horizontal level using measurement, builder levels, and laser levels 7.18

Miscellaneous Measurements

19 Calculate crane radius calculations 7.19

20 Determine arcs of pipe bends for electrical conduit 7.20

21 Measure large scale dimensions and grades using string measure, laser level, surveying equipment. 7.21

Construction Materials and Fasteners 8

8 Construction Materials and Fasteners 8

Through this unit of instruction students will learn how to identify the sources, characteristics, and uses of building materials used in the different sectors of construction. Students will learn to identify the many kinds of fasteners and adhesives used in construction. Safe material storage and handling will also be covered.

Material Identification

1 Identify construction materials 8.1

2 List several common materials used in design and construction. 8.2

3 Define simple properties of materials, such as strength, flexibility, brittleness, hardness, etc. 8.3

4 Select suitable materials for making a particular object based on their properties. 8.4

5 Explain the advantages and disadvantages of common materials used in engineered structures. 8.5

6 Evaluate waste of resources/materials 8.6

7 Differentiate between compatible and incompatible substances 8.7

Material Selection

8 Evaluate and select building materials and assemblies to meet project specifications (e.g., metals, woods, ceramics, concrete, rubber, plastics, polymers, composites, etc.) 8.8

9 Understand criteria used for material selection 8.9

Material Use

10 Handle, install, position, move, and store materials properly 8.10

11 Demonstrate knowledge of various material finishing techniques 8.11

12 Understand appropriate transport methods of various construction materials 8.12

13 Use appropriate combinations of building materials and components 8.13

Fastening Systems: General

14 Identify the components of a fastening system using nuts and bolts 8.14

15 Specify the materials and style from which bolts and nuts are made 8.15

16 Distinguish between sheer and tension types of stress/load 8.16

17 List the four forces acting on installed bolts 8.17

Permanent Fasteners

18 Discuss permanent fasteners and identify features of hex-drive and lockbolts 8.18

19 Explain the limitations of lockbolts, detailing how they are used to fasten materials together 8.19

20 Demonstrate normal procedures for installation of lockbolt fasteners 8.20

Screws

21 Identify the different types of screws that are used in construction 8.21

22 Explain which screws to use in a specific application 8.22

23 Identify specific physical characteristics of screws 8.23

24 Explain the different installation methods 8.24

Nails

25 Identify the different types of nails that are used in construction 8.25

26 Explain which nails to use in a specific application 8.26

27 Identify specific physical characteristics of nails 8.27

28 Identify the different sizes of nails and their meanings 8.28

29 Explain the different installation methods 8.29

Adhesives

30 Identify the different types of adhesives that are used in construction 8.30

31 Indicate specific applications and the type of adhesives used 8.31

32 Provide a basic understanding of the physical make-up for the different adhesives 8.32

33 Explain the different techniques for applying adhesives. 8.33

This unit will learn the basic layout tasks of distance measurement, elevation/leveling, how to select and use the tools and instruments, and the correct terminology needed for effective jobsite communication. Students will perform site preparation excavation and grading tasks.

Lift Planning

1 Utilize terminology associated with site layout. 9.1

2 Describe the major responsibilities of the personnel relative to site layout (field engineer, surveyor, excavator, and carpenter). 9.2

3 Analyze lot and surrounding area for slope and drainage issues. 9.3

4 Identify survey markers and information. 9.4

5 Discuss requirements of calling in “locates” prior to excavation. 9.5

6 Excavate and finish grade for on-site project. 9.6

7 Read and interpret site / plot plans. 9.7

8 Utilize 100 ft. tape measure to determine dimensions / square footage of lot. 9.8

9 Check and/or establish 90° angles using the 3/4/5 rule. Check and/or establish square using corner to corner measurement. 9.9

10 Identify and setback requirements for structures using prints/drawings. 9.10

11 Identify and/or install drainage / erosion control requirements. 9.11

12 Identify and determine tree removal requirements. 9.12

13 Discuss soil types and compaction / density to support structure. 9.13

14 Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet, and vice versa. 9.14

15 Utilize taping and/or chaining equipment and procedures to make distance measurements and perform site layout tasks. 9.15

16 Utilize a builder’s level and/or laser level for differential leveling procedures to determine elevations. 9.16

17 Record site layout data and information in field notes 9.17

Foundations- Concrete and Reinforcement 10

10 Foundations- Concrete and Reinforcement 10

In this unit, students will learn the terminologies and process for a variety of foundations and other common concrete applications in various types of construction. Lessons will also cover the properties, characteristics, and uses for concrete and how to calculate concrete volume and mix concrete.

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Utilize terminology associated with foundations and concrete. 10.1	**1 Utilize terminology associated with foundations and concrete.** 10.1
Identify various kinds of footings (continuous, spread, stepped, pier block, grade beam) and determine their purpose. 10.2	**2 Identify various kinds of footings (continuous, spread, stepped, pier block, grade beam) and determine their purpose.** 10.2
Identify various kinds of foundations including, continuous slab-at-grade, stem wall / footing design, CMU block and ICF systems. 10.3	**3 Identify various kinds of foundations including, continuous slab-at-grade, stem wall / footing design, CMU block and ICF systems.** 10.3
String out foundation using industry standard layout methods. 10.4	**4 String out foundation using industry standard layout methods.** 10.4
Utilize builder's level or laser level to determine finish elevations for footings walls and piers. 10.5	**5 Utilize builder's level or laser level to determine finish elevations for footings walls and piers.** 10.5
Estimate materials required to build footing and/or stem wall forms. 10.6	**6 Estimate materials required to build footing and/or stem wall forms.** 10.6
Build form system/s and stake/fasten to finish position. 10.7	**7 Build form system/s and stake/fasten to finish position.** 10.7
Identify types and quantities of reinforcement bars (rebar) and welded-wire fabric (WWF) required. 10.8	**8 Identify types and quantities of reinforcement bars (rebar) and welded-wire fabric (WWF) required.** 10.8

Identify types of steel reinforcement bar supports and purposes for their uses. 10.9	**9** **Identify types of steel reinforcement bar supports and purposes for their uses.** 10.9
Identify proper size and tensile strengths for steel reinforcing bar (rebar). 10.10	**10** **Identify proper size and tensile strengths for steel reinforcing bar (rebar).** 10.10
Estimate materials required to build footing and/or stem wall forms. 10.11	**11** **Estimate materials required to build footing and/or stem wall forms.** 10.11
Identify the purpose for pocket blocks, anchor bolts and seismic hold-downs. 10.12	**12** **Identify the purpose for pocket blocks, anchor bolts and seismic hold-downs.** 10.12
Identify various types of masonry tools and determine their uses. 10.13	**13** **Identify various types of masonry tools and determine their uses.** 10.13
Discuss and identify characteristics of concrete. 10.14	**14** **Discuss and identify characteristics of concrete.** 10.14
Identify types and sizes of concrete aggregates. 10.15	**15** **Identify types and sizes of concrete aggregates.** 10.15
Identify types of concrete admixtures and determine their uses. 10.16	**16** **Identify types of concrete admixtures and determine their uses.** 10.16
Identify special types of concrete and determine their uses. 10.17	**17** **Identify special types of concrete and determine their uses.** 10.17
Identify concrete curing methods. 10.18	**18** **Identify concrete curing methods.** 10.18
Explore concrete testing methods. 10.19	**19** **Explore concrete testing methods.** 10.19

Estimate concrete volume needed to fill forms. 10.20	**20** **Estimate concrete volume needed to fill forms.** 10.20
Discuss and identify methods for placing/pouring concrete. 10.21	**21** **Discuss and identify methods for placing/pouring concrete.** 10.21
Discuss the need for inspections of forms prior to placement of concrete. 10.22	**22** **Discuss the need for inspections of forms prior to placement of concrete.** 10.22
Mix concrete and/or grout to specific requirements 10.23	**23** **Mix concrete and/or grout to specific requirements** 10.23
Demonstrate proper methods for finishing concrete. 10.24	**24** **Demonstrate proper methods for finishing concrete.** 10.24
Demonstrate methods for proper use of concrete/masonry tools. 10.25	**25** **Demonstrate methods for proper use of concrete/masonry tools.** 10.25
Clean and store masonry/concrete tools. 10.26	**26** **Clean and store masonry/concrete tools.** 10.26
Strip/remove, clean, and properly store form boards. 10.27	**27** **Strip/remove, clean, and properly store form boards.** 10.27
Identify types of concrete structures that require the construction of edge forms (slab on grade, parking lots, driveways, sidewalks). 10.28	**28** **Identify types of concrete structures that require the construction of edge forms (slab on grade, parking lots, driveways, sidewalks).** 10.28
Explore heave commercial foundation construction designs,	**29** **Explore heave commercial foundation construction designs, forming methods and placement.** 10.29

forming methods and placement. 10.29

Floor Systems 11

11 Floor Systems 11

Lessons in this unit will cover the vocabulary and basic principles of framing floors to code standard

Fastening Systems: General

1 Utilize terminology associated with floor systems. 11.1

2 Identify different types of floor systems. 11.2

3 Identify the various framing members and determine their purpose. 11.3

4 Read and understand drawings and specifications to determine floor system requirement. 11.4

5 Determine various methods and requirements to fasten floor systems to foundations. 11.5

6 Select the proper girder/beam size given specific floor load and span data. 11.6

7 Explore industry standards and code requirements related to deflection and loading of floor systems. 11.7

8 Select the proper joist size given specific floor load and span data. 11.8

9 List, recognize, and install different types of bridging. 11.9

10 List and recognize different types of sub-flooring materials. 11.10

11 Explain the purposes and types of underlayment needed for specific finish floor materials. 11.11

12 Identify fasteners used for floor framing systems. 11.12

13 Lay-out and construct a floor system using conventional lumber and methods/tools. 11.13

14 Evaluate floor system for quality: accurate joist layout, square, flush, level, gaps, and correct nailing schedule. 11.14

15 Perform pick-up framing operations required prior to wall layout and framing. 11.15

16 Estimate the amount of materials needed to frame a floor assembly 11.16

Framing - Walls and Ceilings 12

12 Framing - Walls and Ceilings 12

Students will have the opportunity to research, practice and demonstrate the techniques for layout and framing (cut and assemble) of wood frame walls and wood

Students will have the opportunity to research, practice and demonstrate the techniques for layout and framing (cut and assemble) of wood frame walls and wood frame ceilings. Unit also covers wall building materials and techniques used in the commercial and industrial construction industry.

frame ceilings. Unit also covers wall building materials and techniques used in the commercial and industrial construction industry.	
Utilize terminology associated with wall and ceiling systems. 12.1	**1 Utilize terminology associated with wall and ceiling systems.** 12.1
Identify the components in a wall and ceiling. 12.2	**2 Identify the components in a wall and ceiling.** 12.2
Layout the components in a wall and ceiling. 12.3	**3 Layout the components in a wall and ceiling.** 12.3
Describe and execute the correct procedure for assembling and erecting a wall. 12.4	**4 Describe and execute the correct procedure for assembling and erecting a wall.** 12.4
Describe the common materials and methods used for installing sheathing on walls. 12.5	**5 Describe the common materials and methods used for installing sheathing on walls.** 12.5
Delineate between different methods used for engineering of walls. 12.6	**6 Delineate between different methods used for engineering of walls.** 12.6
Determine length of plates based on plans. 12.7	**7 Determine length of plates based on plans.** 12.7
Layout plates according to specifications on plans. 12.8	**8 Layout plates according to specifications on plans.** 12.8
Cut and assemble framing members for wood frame walls. 12.9	**9 Cut and assemble framing members for wood frame walls.** 12.9

Demonstrate the ability square, sheath, and to plumb & line walls. 12.10	**10** **Demonstrate the ability square, sheath, and to plumb & line walls.** 12.10
Estimate the amount of material needed to frame a wall and ceiling assemblies 12.11	**11** **Estimate the amount of material needed to frame a wall and ceiling assemblies** 12.11
Describe the correct procedure for laying out a ceiling. 12.12	**12** **Describe the correct procedure for laying out a ceiling.** 12.12
Identify sheer wall requirements and procedures used in specified locations 12.13	**13** **Identify sheer wall requirements and procedures used in specified locations** 12.13
Explain the benefits of SIP (Structural Integrated Panels). 12.14	**14** **Explain the benefits of SIP (Structural Integrated Panels).** 12.14
Identify framing techniques that meet thermal performance (Advanced Framing). 12.15	**15** **Identify framing techniques that meet thermal performance (Advanced Framing).** 12.15
Evaluate walls and ceilings for quality: layout, square, flush, level, gaps, and correct nailing schedule. 12.16	**16** **Evaluate walls and ceilings for quality: layout, square, flush, level, gaps, and correct nailing schedule.** 12.16
Perform pick-up framing procedures required by code (backing and fire blocking). 12.17	**17** **Perform pick-up framing procedures required by code (backing and fire blocking).** 12.17
Estimate the materials required to frame walls and ceilings 12.18	**18** **Estimate the materials required to frame walls and ceilings** 12.18

Roof- Framing and Cladding 13	**13 Roof- Framing and Cladding** 13
Students will have the opportunity to research, practice and demonstrate the techniques for layout and framing (cut and assemble) various versions of wood frame roofs. Unit also covers wall building materials and techniques used in the commercial and industrial construction industry. Common roofing materials used in the various construction sectors will also be covered.	**Students will have the opportunity to research, practice and demonstrate the techniques for layout and framing (cut and assemble) various versions of wood frame roofs. Unit also covers wall building materials and techniques used in the commercial and industrial construction industry. Common roofing materials used in the various construction sectors will also be covered.**
Utilize terminology associated with roof framing. 13.1	**1 Utilize terminology associated with roof framing.** 13.1
Identify worker responsibilities and hazards when working at heights. 13.2	**2 Identify worker responsibilities and hazards when working at heights.** 13.2
Adhere to a fall protection plan. 13.3	**3 Adhere to a fall protection plan.** 13.3
Demonstrate knowledge of various roof styles (gable, hip, shed, mansard, etc.). 13.4	**4 Demonstrate knowledge of various roof styles (gable, hip, shed, mansard, etc.).** 13.4
Describe intersecting roof systems and dormers. 13.5	**5 Describe intersecting roof systems and dormers.** 13.5
Describe flat (no pitch) roof systems. 13.6	**6 Describe flat (no pitch) roof systems.** 13.6
Identify roof framing members. 13.7	**7 Identify roof framing members.** 13.7

Identify the various types of trusses used in roof framing 13.8	**8** **Identify the various types of trusses used in roof framing** 13.8
Identify the various types of rafters used in roof framing. 13.9	**9** **Identify the various types of rafters used in roof framing.** 13.9
Demonstrate methods used to calculate the length of, layout of, and cut of rafters. 13.10	**10** **Demonstrate methods used to calculate the length of, layout of, and cut of rafters.** 13.10
Identify various types of sheathing used in roof construction 13.11	**11** **Identify various types of sheathing used in roof construction** 13.11
Measure/layout top plates for rafters. 13.12	**12** **Measure/layout top plates for rafters.** 13.12
Identify truss structural members. 13.13	**13** **Identify truss structural members.** 13.13
Describe the forces and loads associated with roof truss systems. 13.14	**14** **Describe the forces and loads associated with roof truss systems.** 13.14
Describe the differences between roof truss systems and stick frame (conventional) methods. 13.15	**15** **Describe the differences between roof truss systems and stick frame (conventional) methods.** 13.15
Use terminology for steel 13.16	**16** **Use terminology for steel** 13.16
Install bird blocks. 13.17	**17** **Install bird blocks.** 13.17
Estimate materials for roof framing and sheathing. 13.18	**18** **Estimate materials for roof framing and sheathing.** 13.18

Evaluate roof system construction for quality: layout, square, flush, level, gaps, and correct nailing schedule. 13.19	19 Evaluate roof system construction for quality: layout, square, flush, level, gaps, and correct nailing schedule. 13.19
Install roof sheathing 13.20	20 Install roof sheathing 13.20
Estimate materials for roof framing and sheathing. 13.21	21 Estimate materials for roof framing and sheathing. 13.21
Evaluate roof system construction for quality: layout, square, flush, level, gaps, and correct nailing schedule. 13.22	22 Evaluate roof system construction for quality: layout, square, flush, level, gaps, and correct nailing schedule. 13.22
Perform roof framing pick-up operations required before finish roofing is installed. 13.23	23 Perform roof framing pick-up operations required before finish roofing is installed. 13.23
Openings – Windows and Doors 14	14 Openings – Windows and Doors 14
This unit will instruct students on the various types of windows and doors that are typically installed during wood frame building. Students will learn basic installation techniques of common window and exterior doors as well as weather stripping and other weather proofing techniques. Window and doors typically used in commercial and industrial building will also be covered.	This unit will instruct students on the various types of windows and doors that are typically installed during wood frame building. Students will learn basic installation techniques of common window and exterior doors as well as weather stripping and other weather proofing techniques. Window and doors typically used in commercial and industrial building will also be covered.
Utilize terminology associated with safe	1 Utilize terminology associated with safe installation of windows and doors 14.1

installation of windows and doors 14.1	
Identify different types and styles of doors and windows 14.2	2 Identify different types and styles of doors and windows 14.2
Demonstrate the proper steps to install an exterior pre-hung door 14.3	3 Demonstrate the proper steps to install an exterior pre-hung door 14.3
Demonstrate the proper steps to install a residential window 14.4	4 Demonstrate the proper steps to install a residential window 14.4
Exteriors – Sidings and Finishes 15	15 Exteriors – Sidings and Finishes 15
Students will learn the vocabulary and basic components of siding materials and finishes used in building. Students will learn basic installation techniques of common siding materials. Exterior cladding materials and styles typically used in commercial and industrial building will also be covered.	Students will learn the vocabulary and basic components of siding materials and finishes used in building. Students will learn basic installation techniques of common siding materials. Exterior cladding materials and styles typically used in commercial and industrial building will also be covered.
Utilize the correct terminology associated with safe handling and application of various types of siding 15.1	1 Utilize the correct terminology associated with safe handling and application of various types of siding 15.1
Describe the purpose of wall insulation and flashing. 15.2	2 Describe the purpose of wall insulation and flashing. 15.2
Identify the types and parts of common cornices. 15.3	3 Identify the types and parts of common cornices. 15.3

Demonstrate lap and panel siding estimating methods. 15.4	**4** Demonstrate lap and panel siding estimating methods. 15.4
Describe the types and applications of common wood siding: 15.5	**1** Beveled 15.5.1
	2 Tongue-and-groove 15.5.2
	3 Shiplap 15.5.3
	4 Board-and-batten 15.5.4
	5 Shake or shingle 15.5.5
	6 Plywood 15.5.6
	7 Hardboard and particleboard 15.5.7
	8 Concrete siding 15.5.8
Install selected types of wood siding. 15.6	**6** Install selected types of wood siding. 15.6
Describe fiber-cement siding and its uses. 15.7	**7** Describe fiber-cement siding and its uses. 15.7
Demonstrate the installation of fiber-cement siding. 15.8	**8** Demonstrate the installation of fiber-cement siding. 15.8
Describe the types and applications of vinyl or metal siding. 15.9	**9** Describe the types and applications of vinyl or metal siding. 15.9
Describe the types and applications of stucco and masonry veneer finishes. 15.10	**10** Describe the types and applications of stucco and masonry veneer finishes. 15.10
Describe the types and applications of special exterior finish systems. 15.11	**11** Describe the types and applications of special exterior finish systems. 15.11
Describe the types and styles of gutters and	**12** Describe the types and styles of gutters and downspouts and their accessories. 15.12

downspouts and their accessories. 15.12	
Install selected types of metal or vinyl gutters and downspouts. 15.13	**13** **Install selected types of metal or vinyl gutters and downspouts.** 15.13
Barriers- Moisture and Thermal 16	**16** **Barriers- Moisture and Thermal** 16
Unit will cover materials and practices used for various types of insulating materials used in the building process. Hands on experience with installation and application of common materials. Instruction will also cover various moisture control and ventilation materials and methods	**Unit will cover materials and practices used for various types of insulating materials used in the building process. Hands on experience with installation and application of common materials. Instruction will also cover various moisture control and ventilation materials and methods**
Understand how to locate local, state, and federal codes and standards for insulation and moisture control codes and standards 16.1	**1** **Understand how to locate local, state, and federal codes and standards for insulation and moisture control codes and standards** 16.1
Describe the requirements for insulation. 16.2	**2** **Describe the requirements for insulation.** 16.2
Describe the characteristics of various types of insulation material. 16.3	**3** **Describe the characteristics of various types of insulation material.** 16.3
Describe the characteristics of water-proof insulation material. 16.4	**4** **Describe the characteristics of water-proof insulation material.** 16.4

Calculate the required amounts of insulation for a structure. 16.5	**5** **Calculate the required amounts of insulation for a structure.** 16.5
Demonstrate the installation of selected insulation materials. 16.6	**6** **Demonstrate the installation of selected insulation materials.** 16.6
Describe the requirements for moisture control and ventilation. 16.7	**7** **Describe the requirements for moisture control and ventilation.** 16.7
Describe the requirements for sump pumps and water removal in flood plain construction. 16.8	**8** **Describe the requirements for sump pumps and water removal in flood plain construction.** 16.8
Install selected vapor barriers. 16.9	**9** **Install selected vapor barriers.** 16.9
Describe various methods of waterproofing. 16.10	**10** **Describe various methods of waterproofing.** 16.10
Describe air infiltration control requirements. 16.11	**11** **Describe air infiltration control requirements.** 16.11
Stair Systems 17	**17** **Stair Systems** 17
Lessons will cover the various terms and definitions relating to stairs, common stair styles and installation techniques. Students will practice building and installation of stairs and steps.	**Lessons will cover the various terms and definitions relating to stairs, common stair styles and installation techniques. Students will practice building and installation of stairs and steps.**
Identify the various types of stairs designs. 17.1	**1** **Identify the various types of stairs designs.** 17.1

Identify the various parts of stairs. 17.2	**2 Identify the various parts of stairs.** 17.2
Identify the materials used in the construction of stairs. 17.3	**3 Identify the materials used in the construction of stairs.** 17.3
Interpret construction drawings of stairs. 17.4	**4 Interpret construction drawings of stairs.** 17.4
Explain the methods of constructing various types of stairs. 17.5	**5 Explain the methods of constructing various types of stairs.** 17.5
Understand the various terms and definitions relating to stairs. 17.6	**6 Understand the various terms and definitions relating to stairs.** 17.6
Layout and cut stringers. 17.7	**7 Layout and cut stringers.** 17.7
Determine the number and sizes of risers and treads required for a stairway. 17.8	**8 Determine the number and sizes of risers and treads required for a stairway.** 17.8
Basic Electrical Installation 18	**18 Basic Electrical Installation** 18
Students will develop a working knowledge of electricity and electrical theory and demonstrate skills necessary to complete a basic electrical system	**Students will develop a working knowledge of electricity and electrical theory and demonstrate skills necessary to complete a basic electrical system**
Determine whether or not an electrical circuit is “live.” 18.1	**1 Determine whether or not an electrical circuit is “live.”** 18.1
Prepare rough framing for the installation of electrical cables and conduit. 18.2	**2 Prepare rough framing for the installation of electrical cables and conduit.** 18.2

Lay out components to the tolerances indicated on the construction drawings, specifications, and government codes. 18.3	**3** **Lay out components to the tolerances indicated on the construction drawings, specifications, and government codes.** 18.3
Install typical devices, junction boxes, and panels. 18.4	**4** **Install typical devices, junction boxes, and panels.** 18.4
Install lighting support boxes according to the National Electrical Code (NEC). 18.5	**5** **Install lighting support boxes according to the National Electrical Code (NEC).** 18.5
Install conduit typical of residential construction and pull conductors through conduit as required by the NEC. 18.6	**6** **Install conduit typical of residential construction and pull conductors through conduit as required by the NEC.** 18.6
Splice and tap conductors for the installation of fixtures and devices. 18.7	**7** **Splice and tap conductors for the installation of fixtures and devices.** 18.7
Install low voltage control and communication cables. 18.8	**8** **Install low voltage control and communication cables.** 18.8
Demonstrate grounding techniques for all electrical boxes, cabinets, and enclosures. 18.9	**9** **Demonstrate grounding techniques for all electrical boxes, cabinets, and enclosures.** 18.9
Terminate electrical connections to receptacles, switches, lighting fixtures, and other devices. 18.10	**10** **Terminate electrical connections to receptacles, switches, lighting fixtures, and other devices.** 18.10
Select receptacles and switches based on load requirements. 18.11	**11** **Select receptacles and switches based on load requirements.** 18.11

Terminate equipment grounding and neutral conductor at the electrical service. 18.12	**12** **Terminate equipment grounding and neutral conductor at the electrical service.** 18.12
Terminate communication and control wiring. 18.13	**13** **Terminate communication and control wiring.** 18.13
Basic Plumbing Installation 19	**19** **Basic Plumbing Installation** 19
Students will develop a working knowledge of and demonstrate skills necessary to complete a basic electrical system	**Students will develop a working knowledge of and demonstrate skills necessary to complete a basic electrical system**
Identify and install various pipes and tubing used in the plumbing trade. 19.1	**1** **Identify and install various pipes and tubing used in the plumbing trade.** 19.1
Explain how waste moves from a fixture through the drain system to the environment. 19.2	**2** **Explain how waste moves from a fixture through the drain system to the environment.** 19.2
Identify the major components of a drainage system and describe their functions. 19.3	**3** **Identify the major components of a drainage system and describe their functions.** 19.3
Identify the different types of traps and their components. 19.4	**4** **Identify the different types of traps and their components.** 19.4
Explain the importance of traps and identify the ways that traps can lose their seals. 19.5	**5** **Explain the importance of traps and identify the ways that traps can lose their seals.** 19.5

Identify the various types of drain/waste/vent fittings and describe their applications. 19.6	6 Identify the various types of drain/waste/vent fittings and describe their applications. 19.6
Identify significant code and health issues, violations and consequences related to drain/waste/vent systems. 19.7	7 Identify significant code and health issues, violations and consequences related to drain/waste/vent systems. 19.7
Identify types of materials and schedules of plastic piping. 19.8	8 Identify types of materials and schedules of plastic piping. 19.8
Identify proper and improper applications of plastic piping. 19.9	9 Identify proper and improper applications of plastic piping. 19.9
Identify types of fittings and valves used with plastic piping. 19.10	10 Identify types of fittings and valves used with plastic piping. 19.10
Identify and determine the kinds of hangers and supports needed for plastic piping. 19.11	11 Identify and determine the kinds of hangers and supports needed for plastic piping. 19.11
Identify the various techniques used in hanging and supporting plastic piping. 19.12	12 Identify the various techniques used in hanging and supporting plastic piping. 19.12
Explain proper procedures for the handling, storage, and protection of plastic pipes. 19.13	13 Explain proper procedures for the handling, storage, and protection of plastic pipes. 19.13
Sustainability in Construction 20	20 Sustainability in Construction 20

This unit will cover integrated green building design, review of alternative construction materials, indoor air quality, water efficiency and green building project management. Students will be introduced to the basic methods of green building design, technique, documentation, and certification.	**This unit will cover integrated green building design, review of alternative construction materials, indoor air quality, water efficiency and green building project management. Students will be introduced to the basic methods of green building design, technique, documentation, and certification.**
Define sustainability and sustainable design. 20.1	**1** **Define sustainability and sustainable design.** 20.1
Describe the characteristics of “sustainable” and “green” in the context of the human designed environment 20.2	**2** **Describe the characteristics of “sustainable” and “green” in the context of the human designed environment** 20.2
Explain how sustainability principles can be incorporated within the context of design, construction, and operation of a building. 20.3	**3** **Explain how sustainability principles can be incorporated within the context of design, construction, and operation of a building.** 20.3
Identify and implement environmental conservation strategies or energy efficiency strategies within their home or workplace. 20.4	**4** **Identify and implement environmental conservation strategies or energy efficiency strategies within their home or workplace.** 20.4
Understand how site selection and landscaping choices contribute to the environmental	**5** **Understand how site selection and landscaping choices contribute to the environmental sustainability of a building.** 20.5

sustainability of a building. 20.5	
Differentiate between energy conservation strategies and energy efficiency strategies in built spaces. 20.6	6 Differentiate between energy conservation strategies and energy efficiency strategies in built spaces. 20.6
Evaluate life cycle assessment and how material selection plays a role in creating a sustainable building. 20.7	7 Evaluate life cycle assessment and how material selection plays a role in creating a sustainable building. 20.7
Lean Construction Processes and Principles 21	21 Lean Construction Processes and Principles 21
Students will be introduced to lean construction processes and principles. Students will apply foundational lean concepts when completing assigned individual and group projects.	Students will be introduced to lean construction processes and principles. Students will apply foundational lean concepts when completing assigned individual and group projects.
Distinguish between the varying definitions for design; 21.1	1 Distinguish between the varying definitions for design; 21.1
Define value and commonly used methods to maximize it; 21.2	2 Define value and commonly used methods to maximize it; 21.2
Discuss waste and commonly used methods to minimize it; 21.3	3 Discuss waste and commonly used methods to minimize it; 21.3
Differentiate between traditional project methods and lean design 21.4	4 Differentiate between traditional project methods and lean design 21.4

Explain the various lean processes 21.5	**5 Explain the various lean processes** 21.5
Define the difference between traditional and lean problem-solving 21.6	**6 Define the difference between traditional and lean problem-solving** 21.6
Describe how to create a team environment to solve problems, reduce waste, decrease work schedule hours 21.7	**7 Describe how to create a team environment to solve problems, reduce waste, decrease work schedule hours** 21.7
Explain how to create trust to avoid problems 21.8	**8 Explain how to create trust to avoid problems** 21.8
Describe Observation Walks 21.9	**9 Describe Observation Walks** 21.9
Identify root causes of problems. 21.10	**10 Identify root causes of problems.** 21.10
Capstone Project 22	**22 Capstone Project** 22
Students will work as a team to apply the knowledge, skills and abilities gained through the previous units of instruction to complete a scaled construction project. Students will independently complete a portfolio documenting their knowledge and skill development as part of a employment traveler.	**Students will work as a team to apply the knowledge, skills and abilities gained through the previous units of instruction to complete a scaled construction project. Students will independently complete a portfolio documenting their knowledge and skill development as part of a employment traveler.**
Interact respectfully with fellow human beings of different cultures, genders, and backgrounds 22.1	**1 Interact respectfully with fellow human beings of different cultures, genders, and backgrounds** 22.1

Work cooperatively with others in the class 22.2	2 Work cooperatively with others in the class 22.2
Work cooperatively with others to complete work assignments. 22.3	3 Work cooperatively with others to complete work assignments. 22.3
Understand the roles and responsibilities of the individual as part of a team and the hierarchy of individual positions in the construction industry 22.4	4 Understand the roles and responsibilities of the individual as part of a team and the hierarchy of individual positions in the construction industry 22.4
Perform responsibly as a team member and assist other members of the work team 22.5	5 Perform responsibly as a team member and assist other members of the work team 22.5
Effectively communicate with all members of the group or team to achieve team goals 22.6	6 Effectively communicate with all members of the group or team to achieve team goals 22.6
Effectively resolve conflicts with co-workers to maintain a smooth workflow 22.7	7 Effectively resolve conflicts with co-workers to maintain a smooth workflow 22.7
Learn from other team members 22.8	8 Learn from other team members 22.8
Assist others who have less experience 22.9	9 Assist others who have less experience 22.9
Listens to other ideas and be open to opinions and ideas that are different from your own 22.10	10 Listens to other ideas and be open to opinions and ideas that are different from your own 22.10
Resolve conflicts and differences in a respectful manner to	11 Resolve conflicts and differences in a respectful manner to maintain a smooth workflow 22.11

maintain a smooth workflow 22.11	
Treat others with honesty, fairness, and respect 22.12	12 Treat others with honesty, fairness, and respect 22.12
Demonstrate respect for the property of others 22.13	13 Demonstrate respect for the property of others 22.13
Take responsibility for accomplishing work goals within accepted timeframes 22.14	14 Take responsibility for accomplishing work goals within accepted timeframes 22.14
Accept responsibility for one's decisions and actions and recognize the affect your actions have on others 22.15	15 Accept responsibility for one's decisions and actions and recognize the affect your actions have on others 22.15
Demonstrate the safe operation of hand tools. 22.16	16 Demonstrate the safe operation of hand tools. 22.16
Perform competent operation of hand tools in their intended use. 22.17	17 Perform competent operation of hand tools in their intended use. 22.17
Properly choose and consistently wear proper PPE for hand tool use. 22.18	18 Properly choose and consistently wear proper PPE for hand tool use. 22.18
Demonstrate the safe operation of the stationary equipment. 22.19	19 Demonstrate the safe operation of the stationary equipment. 22.19
Perform competent operation of stationary tools in their intended use. 22.20	20 Perform competent operation of stationary tools in their intended use. 22.20

Properly choose and consistently wear proper PPE for equipment use. 22.21	**21** **Properly choose and consistently wear proper PPE for equipment use.** 22.21
Choose the right mathematical method or formula to solve a problem 22.22	**22** **Choose the right mathematical method or formula to solve a problem** 22.22
Add, subtract, divide, and multiply fractions 22.23	**23** **Add, subtract, divide, and multiply fractions** 22.23
Add, subtract, divide, and multiply decimals 22.24	**24** **Add, subtract, divide, and multiply decimals** 22.24
Read gauges and measurement instruments accurately 22.25	**25** **Read gauges and measurement instruments accurately** 22.25
Use and report measurements correctly 22.26	**26** **Use and report measurements correctly** 22.26
Find level, plumb, and square 22.27	**27** **Find level, plumb, and square** 22.27
Identify lines, symbols, abbreviations, and nomenclature within prints 22.28	**28** **Identify lines, symbols, abbreviations, and nomenclature within prints** 22.28
Demonstrate correct interpretation of drawing/print information and specifications to the correct location on the plan. 22.29	**29** **Demonstrate correct interpretation of drawing/print information and specifications to the correct location on the plan.** 22.29
Perform necessary mathematics to determine scale and measurements 22.30	**30** **Perform necessary mathematics to determine scale and measurements** 22.30

Translate drawing information into operational plans 22.31	31 Translate drawing information into operational plans 22.31
Identify appropriate construction materials required for project per prints 22.32	32 Identify appropriate construction materials required for project per prints 22.32
Handle, install, position, move, and store materials properly 22.33	33 Handle, install, position, move, and store materials properly 22.33
Demonstrate knowledge of various material finishing techniques 22.34	34 Demonstrate knowledge of various material finishing techniques 22.34
Understand appropriate transport methods of various construction materials 22.35	35 Understand appropriate transport methods of various construction materials 22.35
Use appropriate combinations of building materials and components 22.36	36 Use appropriate combinations of building materials and components 22.36
Create a baseline project schedule 22.37	37 Create a baseline project schedule 22.37
Anticipate obstacles to project completion and develop contingency plans to address them 22.38	38 Anticipate obstacles to project completion and develop contingency plans to address them 22.38
Incorporate potential job disruptions into planning timelines 22.39	39 Incorporate potential job disruptions into planning timelines 22.39
Adjust plan/schedules to respond to unexpected	40 Adjust plan/schedules to respond to unexpected events and conditions 22.40

events and conditions 22.40	
Estimate the time required to perform activities needed to accomplish a specific task 22.41	41 Estimate the time required to perform activities needed to accomplish a specific task 22.41
Develop a timeline for sequencing the activities of a project/job 22.42	42 Develop a timeline for sequencing the activities of a project/job 22.42
Establish specific goals to accomplish work in a timely manner 22.43	43 Establish specific goals to accomplish work in a timely manner 22.43
Stay on schedule 22.44	44 Stay on schedule 22.44