Arizona CTE

Construction Technologies

MAINTAIN A SAFE WORK ENVIRONMENT [in accordance with OSHA (Occupational Safety and Health Administration)] 1.0	**1** Explain the content and the purpose of SDSs (Safety Data Sheets) 1.1
	2 Use basic PPE (Protective Equipment) appropriate for the job (i.e., hard hats, gloves, safety vests, work boots, etc.) 1.2
	3 Explain types of fires and the appropriate use of fire extinguishers 1.3
	4 Maintain worksite safety and housekeeping (i.e., lighting, safety, etc.), including a safety plan for emergency situations 1.4
	5 Describe situations requiring first-aid and emergency care; Apply basic first-aid techniques 1.5
	6 Practice appropriate procedures for lifting heavy objects 1.6
	7 Recognize common fall hazards and employer requirements to protect workers from falls 1.7
	8 Recognize caught-in or caught-between hazards and employer requirements to protect workers from caught-in or caught-between hazards 1.8
	9 Demonstrate safe work procedures around electrical hazards 1.9
	10 Recognize correct procedures for lockout/tagout 1.10
	11 Identify procedures for reporting safety hazards 1.11
RECOGNIZE HAND AND POWER TOOLS AND EQUIPMENT 2.0	**1** Identify and inspect hand tools 2.1
	2 Identify and inspect portable power tools, powder-actuated tools, pneumatic tools, and extension cords 2.2
	3 Refer to user manuals and manufacturer's guidelines for how to use and maintain hand and power tools and equipment 2.3
USE APPLIED MATHEMATICS AND MEASUREMENTS 3.0	**1** Perform measurements (e.g., read tape measure to 1/16" and convert from tenths of a foot to feet and inches) 3.1
	2 Explain conversion from metric to imperial (e.g., length, area, volume, and mass) 3.2

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	3 Perform calculations (e.g., add and subtract fractions in feet and inches and convert fractions to decimals and decimals to fractions) 3.3
USE CONSTRUCTION DOCUMENTS 4.0	1 Identify terms relating to plans and drawings (i.e., O.C., “,’, Scale, AFF, WxHxL, DISP, DW, WD, etc.) 4.1
	2 Identify symbols relating to plans and drawings [i.e., single gang receptacle, single pole switch, 2x4 studs, 2x6 studs), line types (i.e., extension, cut, dimension, etc.) 4.2
	3 Identify plans and drawings scales (i.e., ½”=1’.0”, ¾”=1”.0”, N.T.S., etc.) 4.3
	4 Recognize notes and material schedules [(i.e., key notes, GSN (General Structural Notes), etc.] 4.4
	5 Relate information on plans and drawings to actual locations 4.5
	6 Identify and use drawing dimensions 4.6
	7 Explain the importance of and resources for building codes (i.e., National Electric, IBC, Plumbing, etc.) 4.7
	8 Describe types of technology used in construction management (i.e., smartphones and mobile apps to drones and robots, etc.) 4.8
RECOGNIZE SITE AND BUILDING LAYOUT 5.0	1 Describe the use and care of standard measuring instruments (i.e., tape measure, laser, total station, builder’s level, Theodolite, etc.) 5.1
	2 Explain building lines and recognize trade-specific layout 5.2
	3 Explain a builder’s level or transit and differential leveling procedures to determine site and building elevations 5.3
PERFORM MASONRY WORK 6.0	1 Describe basic masonry units [i.e., concrete masonry unit, Bond Beam concrete masonry unit, Rebar, Mortar, Grout, etc.] 6.1
	2 Describe the components/accessories of a masonry wall (i.e., wall ties, horizontal ladders, rebar positioners, etc.) 6.2
	3 Describe the components of mortar and grout and how to properly mix mortar and grout 6.3
	4 Demonstrate proper use of tools for masonry (e.g., trowel, sled runner, soft brush, brick hammer, tape measure, mason line, line block, line trigs, marking crayons, chalk line, mason level, margin trowel, wire cutters, sharpie, saw wrench, construction calculator, folding rule, and saw) 6.4
	5 Use a level to evaluate masonry work 6.5

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	6	Lay brick/block to specification 6.6
LAY OUT AND INSTALL FLOOR AND CEILING FRAMING 7.0	1	Identify components of floor systems (i.e., wood, steel metal deck, etc.) 7.1
	2	Explain Ceiling components and accessories for a frame building 7.2
	3	Describe the procedure for setting posts 7.3
	4	Describe the correct fasteners used in construction of floor systems 7.4
	5	Calculate the amount of material needed to frame a floor assembly 7.5
	6	Lay out and construct floor systems 7.6
DEMONSTRATE WALL FRAMING 8.0	1	Lay out wall lines including plates, corner posts, door and window openings, partitionT's 8.1
	2	Assemble wood and metal stud walls 8.2
	3	Assemble, erect, and brace exterior walls for a frame building 8.3
	4	Calculate the materials required to frame walls 8.4
DEFINE ROOF FRAME AND FINISH 9.0	1	Recognize components of roof framing and finishing (i.e., crickets, scuppers, penetrations, truss, etc.) 9.1
	2	Recognize types and styles of sheathing and coverings (i.e., flat, tile, shingles, etc.) 9.2
	3	Estimate the materials used in framing and sheathing a roof (i.e., spans, materials, sizing, etc.) 9.3
	4	Illustrate a roof opening Define parapet 9.4
	5	Estimate the materials used in framing and sheathing a roof (i.e., spans, materials, sizing, etc.) 9.5
IDENTIFY ENVIRONMENTAL COMPONENTS IN BUILDING ENVELOPE AND OCCUPIED SPACES 10.0	1	Identify types and use of thermal insulation, vapor barriers, R-values, and U-values 10.1
	2	Describe the function of an HVAC system 10.2
	3	Describe various types of energy efficient systems [e.g., solar electricity, solar water heating, cocoon insulation systems, gray water systems, turbines, economization, VRF (Variable Refrigerant Flow), and multi-speed and variable speed motors] 10.3

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	4	Identify conditioned occupied spaces and explain how they relate to overall building performance and energy efficiency 10.4
	6	Describe the purpose and components of door and window systems 10.6
	7	Describe correct installation methods to eliminate water intrusion and heat transfer (i.e., flashing, caulking, insulated door, weather stripping, thermally broken windows, relief vents, etc.) 10.7
APPLY EXTERIOR FINISHES 11.0	1	Identify frieze boards or soffit 11.1
	2	Identify exterior moldings and trim 11.2
	3	Identify various types of siding 11.3
	4	Explain installation of various finishes (i.e., stucco, siding, soffits, etc.) 11.4
APPLY INTERIOR TRIM AND STAIRS 12.0	1	Determine the number and sizes of risers and treads required for a stairway 12.1
	2	Build a small stair unit 12.2
	3	Explain and identify types of millwork (i.e., cabinets, moldings, casings, baseboards, etc.) 12.3
ASSEMBLE PIPING, WASTE, AND VENT DISTRIBUTION SYSTEMS 13.0	1	Identify the major components of a drainage and water distribution system 13.1
	2	Assemble a soil, waste, and vent system 13.2
	3	Assemble a water distribution system 13.3
	4	Explain the function of plumbing fixtures and equipment (i.e., boilers, water heaters, etc.) 13.4
	5	Measure, cut, and join plastic and copper piping 13.5
	6	Describe the functions of a drainage and water distribution system and how they malfunction 13.6
	7	Identify how an efficient system affects water usage 13.7
INSTALL ELECTRICAL COMPONENT/SYSTEM(S) 14.0	1	Recognize basic electrical theory [i.e., Ohm's law (the relationship among voltage resistance and amperage in a circuit), etc.] 14.1
	2	Reference the NFPA 70E standards (i.e., minimum approach distance, arc flash boundaries, lockout/tagout, appropriate PPE, etc.) 14.2
	3	Identify materials (i.e., enclosures, wiring systems, devices, overcurrent protection, raceways, etc.) 14.3

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	4 Rough in electrical enclosures (e.g., switch boxes, outlet boxes, conduit fabrication, wire pulling, raceway, and box capacity) and cable 14.4
	5 Define conductor properties (e.g., aluminum, copper, conductor sizing, and insulation types) 14.5
	6 Demonstrate the termination of electrical devices, appliances, light fixtures (luminaires), and ceiling fans 14.6
	7 Recognize various types of electrical systems (i.e., three-phase, single-phase, medium voltage, low voltage, etc.) 14.7
INSTALL INTERIOR WALL AND CEILING FINISH 15.0	1 15.1 Identify types of wall and ceiling finishes [i.e., drywall, ACT (Acoustical Ceiling Tile), etc.] 15.1
	2 Identify finishing tools (i.e., hand trowel, silica, sanders, screw guns, etc.) 15.2
	3 Recognize the proper techniques for handling, staging, storing, and cutting drywall and drywall materials (i.e., silica awareness, etc.) 15.3
	4 Fasten drywall to walls (i.e., screws, nails, etc.) 15.4
	5 Demonstrate proper finishing techniques (i.e., apply joint compound, use tape/mesh appropriately, install corner bead, etc.) 15.5
	6 Demonstrate proper material use and methods of paint application 15.6
PERFORM CONCRETE WORK 16.0	1 16.1 Review the history and uses of concrete and tools (i.e., footings, flatwork, post-tensions, walls, tilt-ups, bull float, darby float, etc.) 16.1
	2 Describe the components of concrete (i.e., formwork, aggregates, grading, rebar, wire mesh, admixtures, slump, etc.) 16.2
	3 Describe types of finishes (i.e., broom, troweled, stamped, mag, etc.) 16.3
	4 Prepare, place, and finish concrete 16.4