YOSEMITE REGIONAL OCCUPATIONAL PROGRAM

COMPUTER ASSISTED DRAFTING

CBEDS Code: 5631

JOB TITLES	DOT NO.
Drafter, Commercial	017.261-014
Drafter, Detail	017.261-030
Drafter, Apprentice	017.281-014
Drafter, Assistant	017.281-018

Course description:

This course is an instructional program that generally prepares individuals to use computer technology to plan, prepare, and interpret mechanical, architectural, structural, and other sketches; to use reproduction materials, equipment and processes, to develop, plan, and process charts and drawings; to develop models; and to prepare reports and data sheets for writing specifications.

Recommended Prerequisites:

DURATION: 360 total hours

CREDIT: 5-10 units

MEETS GRADUATION REQUIREMENTS IN:

REQUIRED FOR GRADUATION: No

SCHOOLS OFFERED: Oakdale, Ceres

MEETS UNIVERSITY OF CALIFORNIA ENTRANCE REQUIREMENTS: No

MEETS CALIFORNIA STATE UNIVERSITY REQUIREMENTS: No

ARTICULATED WITH POSTSECONDARY INSTITUTIONS: No

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:	**Hours** CL=Classroom CC=Comm. Class			
1. Drafting-Career Orientation. 1. Review history of drafting. 2. Identifying personal traits. 3. Identifying personal interests to discuss with an employer. 4. Transferability of skills. 5. Review types of careers related to drafting. 6. VICA. 7. Encourage representation in the VICA club or at the VICA State Conference as a voting delegate or observer. 8. Non-discrimination in drafting. 9. Identifying types of companies that employ drafters.	***Goal: The student will understand the development of drafting careers in the field, & be able to demonstrate competency in lifelong career planning skills, develop leadership abilities, & develop an awareness of programs offered in higher education without regard to race, sex, national origin, or handicap as they relate to drafting.*** A. Understand the historical events that have lead to today's graphic language. B. Identify personal traits. C. Identify personal interests to discuss with an employer. C. Write five skills learned in drafting technology, which transfer to a job. E. Identify at least three possible career choices in the drafting field. F. Describe the opportunities that exist within their chapter of Skills USA G. Explore participation in the Skills USA club or at the Skills USA State Conference as a voting delegate or observer. H. Understand that opportunities in drafting are available without regard to race, sex, national origin or handicap. I. Name types of companies that employ drafters.	**CTE** E & A C1.1 C1.2 MPD D1.1 D1.2	**Anchor/ CR** A1.0 A3.0 CR1 CR3 CR12	**CL** 5-10	**CC**
2. Characteristics Valued by employers. 1. Observe student attitudes, behaviors, & personal characteristics valued by employers.	***Goal: The student will demonstrate attitudes, behaviors, & personal characteristics valued by employers.*** A. The student will demonstrate the following: - Responsibility - Dependability - Promptness - Willingness to learn new skills - Attentiveness during instruction - Getting along with others - Respect for others - Honesty & integrity - Pride in work - Flexibility - Not being defensive when corrected - Working up to capacity - Being pleasant & cheerful - Showing strong motivation to succeed. - Good personal appearance - Organized - Constructively assisting others		A7.0 A9.0 CR1 CR3 CR7 CR8	Infused & integrated into the course	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
3. Lettering 1. Lettering worksheets, using different styles. 2. The value of good quality lettering on drawings. 3. Lettering title block information.	***Goal: The student will know the importance of quality lettering, the variety of lettering fonts, & will apply appropriate lettering techniques & fonts when creating drawings.*** A. Produce lettering worksheets using various styles of lettering. B. Orally discuss the value of good quality lettering on drawings. C. Neatly letter title block information & general notes on drawings.	**CTE** E&A C10.1-4	**Anchor /CR** 10.0 CR1	**CL** 1-2	**CC**
4. Freehand Sketching. 1. Making single view & multi-view sketches of basic geometric shapes. 2. Sketching one & two point perspectives. 3. Sketching isometric & oblique drawing.	***Goal: The student will understand the reason for applying various types of sketching & will produce well-proportioned & easily understood sketches.*** A. Make single view & multi-view sketches of basic geometric shapes. B. Sketch a series of one & two point perspectives. C. Sketch isometric & oblique drawing using appropriate drafting techniques.	E&A C5.1-5 MPD D5.1	CR1	1-2	
5. Care & Use of Tools & Equipment. 1. Review various drafting equipment used in the course. 2. Compare different drawing mediums. 3. Care & safe use of drafting equipment. 4. Testing safety rules. 5. Appropriate personal conduct in the classroom.	***Goal: The student will understand various tools, equipment, media, & materials used in the field, will understand methods & techniques for employing them appropriately, & will correctly refer to, use, & care for drafting equipment.*** A. Be able to identify & use various drafting equipment. B. List the differences in drawing mediums, & when each would be used. C. List & describe the care & safe use of drafting equipment to be used in this course. D. Orally & in writing successfully test knowledge of safety rules. E. Describe appropriate personal conduct in the classroom.	E&A C2.1-3	10.0 CR1	1-2	
6. Drafting Measurement & Scaling. 1. Measuring whole numbers with an architectural/engineering & metric scale. 2. Making drawings using both scales. 3. How to complete math problems. 4. Creating a drawing using the scales.	***Goal: The student will understand measuring systems & how measuring instruments are used in the field.*** A. Use an architectural/engineering & metric scale to measure whole numbers & fractions of an inch on a given drawing. B. Describe, in writing, how an architectural/engineering & metric scale is used to measure & create drawings to scale. C. Make scaled drawings or do exercises using both the architectural/engineering & metric scales. D. Complete math problems dealing with whole numbers, fractions, decimals, division, multiplication, addition & subtraction. E. Create a drawing to the appropriate scale as assigned by the instructor or selected by the student.	E&A C4.1&2 C8.1&2	A10.0 CR1 CR4	1-2	

E&A= Engineering and Architecture
MPD= Manufacturing/Product Development

A= Anchor
CR= Career Readines

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
7. Drafting Geometry. 1. Using a straight edge & compass to bisect a line, an arc, & an angle. 2. Using a straight edge to layout arcs tangent to arcs & straight lines, as well as other arcs & circles. 3. Using a straight edge, a compass, & a triangle to layout geometric shapes.	***Goal: The student will be able to visualize & calculate a variety of geometric forms, & demonstrate competency in drafting geometry.*** A. Produce drawings using a straight edge & a compass to bisect a line, and arc, & an angle. B. Produce drawings using a straight edge & a compass to layout arcs tangent to arcs & straight lines, as well as other arcs & circles. C. Produce drawings using a straight edge, a compass, & a triangle to layout geometric shapes, such as pentagon, hexagon, octagon, ellipse.	**CTE** E&A C5.0-C5.5 MPD D4.1 D5.1	**Anchor/ CR** A10.0 CR1	**CL** 1-2	**CC**
8. Multi-View (Orthographic) Drawing. 1. Sketching the top, front & right side view of a simple object. 2. Replicating an orthographic drawing. 3. Creating an orthographic drawing from an isometric drawing. 4. Selecting the proper view of an object & creating an orthographic drawing.	***Goal: The student will understand, identify, & correctly use the alphabet of lines & develop an object graphically.*** A. Sketch the top, front & right side view of a simple object. B. Replicate an orthographic drawing supplied by the instructor. C. Create an orthographic drawing from an isometric drawing supplied by the instructor. D. Given an object, select the proper view & create an orthographic drawing.	E&A C3.3 C5.2 C6.1 C7.1	A10.0 CR1	1-2	
9. Computer-Aided Drafting (CAD). 1. Booting a computer. 2. Loading the CAD menu. 3. Initializing a diskette. 4. Review basic principles & vocabulary of the 2-D CAD drafting program. 5. Use of function keys. 6. Recovering previously created workfiles. 7. Techniques for establishing the mouse or digitizer pad as an input device. 8. Commands for drawing lines & other geometric shapes. 9. How to specify or revise an object's line style. 10. How to enlarge portions of the drawing on the screen for evaluation. 11. Locating objects for modification or deletion. 12. Commands to save, retrieve, begin, or plot a drawing. 13. Creating & using symbols.	***Goal: The student will understand how to use hardware & software to create drawings in a general 2-D drafting program.*** A. Properly warm or cold boot a computer. B. Successfully load the CAD main menu & make system set-up selections. C. Demonstrate the ability to initialize a diskette. D. Demonstrate a working knowledge of the basic principles & vocabulary of the 2-D CAD drafting program. E. Demonstrate an understanding of the role of certain function keys & the method for accessing a given function from anywhere in the program. F. Demonstrate an understanding of how to recover a previously created workfile. G. Use the appropriate commands to establish the use of either a mouse or digitizer pad as an input device. H. Draw lines, create polygons, rectangles, points or circles, add text, & place guidelines, using the appropriate commands. I. Use appropriate command to specify or revise an object's line style. J. Use the required command to enlarge portions of the drawing on the screen for evaluation.	E&A C10.4 MPD D4.1 D6.1 D6.3	A10.0 CR1 CR2 CR4 CR5	10-20	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
9. Computer-Aided Drafting (CAD) [cont.] 14. Using symbol libraries. 15. Assigning attributes to symbols. 16. How to develop solid model drawings of simple mechanical parts & calculate physical properties of the solid model.	K. Use the required command to locate objects for modification or objects to be deleted from the drawing. L. Use the proper command to save, retrieve, begin, or plot a drawing. M. Use appropriate commands to create & use symbols in a drawing. N. Use symbol libraries in the creation of a drawing. O. Assign attributes to symbols in a drawing & extract attributes to form a bill of materials. P. Develop solid model drawings of simple mechanical parts & calculate physical properties of the solid model.	**CTE**	**Anchor/ CR** CR10 CR12	**CL**	**CC**
10. Dimensioning & Tolerancing. 1. Location & size dimensioning. 2. Adding views & dimensions. 3. Dimensioning an orthographic drawing. 4. Applying metric dimensions to drawings. 5. Meanings & application of geometric dimensioning & tolerancing symbols	***Goal: The student will understand & apply dimensioning practices to drawings, & will understand tolerance relationships between functional mating parts.*** A. Replicate a drawing containing both location & size dimensioning. B. Modify an orthographic drawing by adding necessary views & dimensions. C. Properly dimension an orthographic drawing adding dimensions to each part, using the appropriate scale, all appropriate tolerances to holes & shafts, & all notes concerning threads & fasteners. D. Apply metric dimensions to drawings in accordance to international standards. E. Interpret the meanings of geometric dimensioning & tolerancing symbols on completed drawings. F. Replicate drawings with complete geometric dimensioning & tolerancing symbols.	E&A C8.1 C8.2 C9.1-3	A10.0 CR1 CR4 CR5	10-20	
11. Manufacturing Processes. 1. Standards for threaded fasteners. 2. Thread representations in drawings. 3. Thread tolerancing. 4. Depicting welds in drawings. 5. The importance of manufacturing processes in the design of objects.	***Goal: The student will be able to understand the representation of threads, welds, common methods of fastening objects together, & other manufacturing processes.*** A. Demonstrate awareness of standards now being used for threaded fasteners. B. Produce drawings using simplified, schematic & detailed thread representations. C. Demonstrate an awareness of thread tolerancing. D. Create drawings accurately depicting several types of welds. E. Understand the importance of manufacturing processes in the design of objects.	MPD C1.1. C1.3 C1.4 B7.3 B7.4	A10.1-4 CR 1 CR4 CR5	5-10	
12. Assembly Drawings. 1. Techniques to create an assembly drawing. 2. Drawing an exploded view of an assembly drawing. 3. Grouping information on the assembly drawing.	***Goal: The student will understand, organize & complete assembly drawings, using information collected from detail drawings.*** A. Create an assembly drawing of a given tool having three or more parts, including a parts list. B. Draw an exploded view of an assembly drawing to show how the parts fit together. C. Properly group information on the assembly drawing with identification numbering.	E&A C5.4 C10.4 MPD D4.2 D5.1	A10.0 CR1	4-8	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
13. Sectional Views & Revolutions of Parts. 1. Drawings that show longitudinal & cross-sectional views. 2. Dimensioning an orthographic drawing. 3. Creating sectional drawings. 4. Drawing a revolved view.	***Goal: The student will understand section view applications & functions & demonstrate competency in drawing sectional views & revolutions of parts.*** A. Replicate a drawing showing both longitudinal & cross-sectional views with all necessary dimensioning. B. Properly dimension an orthographic drawing with sections. C. Create sectional drawings as necessary to completely describe an object. D. Draw a properly revolved view of a drawing complete with dimensions.	**CTE** E&A C5.5 C6.1 C6.2 C8.1 C8.2	**Anchor/ CR** A10.0 CR1	**CL** 4-8	**CC**
14. Auxiliary Views. 1. Creating an auxiliary view of an oblique surface. 2. Use of true length lines in producing an auxiliary view. 3. Ascertaining a missing auxiliary view.	***Goal: The student will understand how auxiliary views are projected & used to clarify a drawing.*** A. Replicate an auxiliary view of an oblique surface. B. Create a drawing & identify true length lines & how they are used to produce an auxiliary view. C. Add the missing auxiliary view of an object on a given drawing.	E&A C7.1 C7.2 C5.4 C5.5 C8.1 C8.2	A10.0 CR1	4-8	
15. Reprographics. 1. Techniques to reproduce orthographic prints from hand-drawn originals. 2. Producing duplicate prints from hand-drawn originals. 3. Methods & materials available for drafting reproduction.	***Goal: The student will know the accepted methods & materials used in reprographics select & use the appropriate materials & methods to reproduce original drawings.*** A. Reproduce a set of orthographic prints from hand-drawn originals. B. Produce duplicate prints from hand-drawn originals using available equipment. C. List the methods & materials available for drafting reproduction.	E&A B2.1 B2.2 B2.3 C10.4 C11.1 MPD D9.1 D9.2 D9.3 D9.4 D10.1	A10.0 CR1	4-8	
16. Pictorial Drawing. 1. Techniques to replicate isometric, oblique, & perspective drawings. 2. Creating an isometric drawing from an orthographic drawing. 3. Creating an exploded isometric drawing. 4. Creating a single-point perspective drawing.	***Goal: The student will understand the structure, components, types, sequential construction methods, & applications of pictorial assemblies.*** A. Replicate an isometric, oblique, & perspective drawings supplied by the instructor. B. Given an orthographic drawing of an object, create an isometric drawing of the same object. C. Create an exploded isometric drawing to show how all parts interrelate or connect to each other. D. Create a single-point perspective drawing as assigned by the instructor.	E&A B1.1. B1.2 B1.3 B1.4M PD D5.1	A10.1 A10.2 CR1 CR5 CR10	5-10	
17. Technical Illustration. 1. Inked drawings. 2. Shading. 3. Airbrushed shapes. 4. Developing a computer rendered drawing from a solid model.	***Goal: The student will understand & apply illustration techniques in pictorial format consistent with current industry standards.*** A. Produce inked drawings that conform to industrial standards. B. Apply shading to pictorial drawings. C. Produce simple airbrushed shapes with appropriate shading techniques. D. Produce a computer rendered drawing from a solid model.	MPD A1.1. A1.2 A.1.3 A1.4 A2.1 A2.2 A2.3 A3.3	A10.0 CR1 CR4	5-10	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
18. Geometric Tolerancing: Cams, Gears. 1. Review dimensioning & tolerancing standards. 2. Techniques for drawing cams. 3. Techniques for drawing gears.	***Goal: The student will understand current industrial standards of geometric symbology, & apply geometric & related symbols on drawings with respect to cams & gears & their function with regard to design intent, in accordance with dimensioning & tolerancing standards.*** A. Demonstrate awareness of the standards now being used for dimensioning & tolerancing. B. Create accurate & complete drawings of cams. C. Create accurate & complete drawings of gears.	**CTE** E&A B1.1 B7.5 B7.6 C4.1 C4.2 C5.0-4 C8.0-2 C9.0-3	**Anchor/ CR** E&A A10.1-3 CR1	**CL** 5-10	**CC**
19. Electronic Drafting. 1. Review types of drawings used in electronic drafting. 2. Creating a drawing using appropriate items used in electronic drafting. 3. Creating an electrical diagram. 4. Electronic terminology. 5. Use of electronic symbols on block diagrams. 6. Creating an electronic schematic diagram from a sketch.	***Goal: The student will understand & use various electronic components, symbols, abbreviations, media, standards & will understand & use appropriate block, schematic, wire & cable, & logic diagrams, using current industry standards.*** A. Demonstrate an understanding of the types of drawings used in the field of electronic drafting. B. Create a drawing using the appropriate lettering, tools, materials, & symbols relative to electronic drafting. C. Create an electrical diagram using the common electronic components & their function in a given electronic circuit. D. Demonstrate & understand electronic terminology in the creation of electronic diagrams. E. Recognize & properly implement electronic symbols on the given block diagrams. F. Create an electronic schematic diagram from a given sketch.	E&A B3.6 C1.1. C1.2 C5.1 C5.2 C5.3 C5.4	E&A A4.0 A4.1 CR1 CR4 CR5 CR10	5-10	
20. Welding Processes. 1. Review common welding processes. 2. Drawing welding representations using proper welding symbols. 3. Drawing weldments from sketches & layouts.	***Goal: The student will demonstrate the ability to produce drawings showing the types, sizes, & locations of welds, using welding symbols in accordance with current industry standards.*** A. Be able to identify common welding processes. B. Draw welding representations & provide proper welding symbols & notes in accordance with current industrial standards. C. Draw weldments from engineering sketches & actual industrial layouts.	MPD C1.1. C1.2 C1.3 C1.4	A10.0 CR1	10-20	
21. Architectural Design & Drafting Orientation. 1. Definitions of basic architectural design/drafting. 2. Technological changes in drafting this century. 3. Review different styles of architectural design / drafting.	***Goal: The student will be able to demonstrate an understanding of professional architectural design & drafting procedures.*** A. Define, in writing, basic architectural design/drafting & specialty areas. B. Explain technological changes that have occurred since 1900. C. List at least three styles of architectural design/drafting that have had an influence on the student.	E&A A1.1 A1.2	A10.0 CR1	5-10	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
22. Measurement, Scaling & Equipment Orientation. 1. Measuring with an architectural scale. 2. Making scale drawings using an architectural scale. 3. Use of math concepts in drawings. 4. Selecting proper lead. 5. Care & safe use of drafting equipment. 6. Classroom conduct.	***Goal: The student will be able to demonstrate competency in measurement, scaling, & equipment orientation.*** A. Use an architectural scale to properly measure whole numbers & fractions of an inch on a determined drawing & worksheets. B. Demonstrate ability in the use of the architectural scale by making scale drawings or doing exercises using the architectural scale. C. Complete required drawings while calculating math concepts dealing with whole numbers, fractions, division, multiplication, addition & subtraction. D. Demonstrate the proper choice of pencil lead on a given drawing. E. List & describe the care & safe use of drafting equipment to be used in architectural drafting. F. Demonstrate appropriate personal conduct in the drafting classroom.	**CTE** E&A B1.1 B1.2 B1.3 B1.4 B1.5	**Anchor /CR** A10.0 CR1	**CL** 10-20	**CC**
23. Room Design & Floor Plans. 1. Review factors to be considered when planning a room. 2. Relationship between dining room, kitchen, & family room. 3. Defining small, medium, & large rooms according to volume. 4. The "work triangle" in a kitchen. 5. Creating a building & placement of windows & doors. 6. Requirements for the disabled in a commercial building.	***Goal: The student will be able to apply design principles when planning areas & designing rooms by comparing the minimum accepted standards allowed by various codes with desirable design criteria, while utilizing various catalogs, manuals, & code books as a resource for information.*** A. Explain what must be considered as a room is being planned. B. Explain the relationship between the dining room, kitchen, & family room in a floor plan. C. Demonstrate an understanding of small, medium, & large room sizes, relative to volumes. D. Explain what is meant by a work triangle in the kitchen. E. Create a building using design principles & demonstrate the proper location for doors & the way they swing, & window sizes & their locations relative to general code requirements. F. Demonstrate an understanding of requirements for the disabled when creating a commercial building.	E&A A2.1-4 A3.2 A4.1 A4.2 A8.3 A8.4	A10.0 CR1 CR5	10-20	
24. Drawing a Floor Plan. 1. Students will draw a floor plan incorporating the following elements: - Area planning & room design; - Location of plumbing fixtures; - Location of cabinets; - Using appropriate symbols for doors, windows, & special finishes; - Raised or lowered floor areas.	***Goal: The student will define the problem & proceed in a logical manner to make judgments that will incorporate knowledge of the building codes, utilization of accepted drafting practices, application of space planning techniques, an understanding of traffic patterns, knowledge of construction procedures, & create a door, window, & room finish schedule while drawing a floor plan.*** A. Create a final complete floor plan to appropriate scale, while utilizing proper area planning & room design. B. Illustrate the appropriate location for all plumbing fixtures. C. Draw all cabinets in their proper location on the floor plan. D. Indicate all doors, windows, & special finishes by using appropriate symbols on the floor plan, & then create a door, window, & finish schedule as well. E. Demonstrate an awareness for raised or lowered floor areas in the building design & illustrate them properly.	E&A A2.1-4 A4.1 A4.2 A5.1-3 A8.3 A8.4	A10.0 CR10	5-10	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
25. Site Plans. 1. Code requirements for building setbacks, drainage, & other information required on site plans. 2. How to layout property lines & dimension a site plan. 3. Student will draw a site plan to a suitable scale.	***Goal: The student will understand the importance of the site plan as part of the complete set of plans & demonstrate the ability to draw this plan.*** A. Understand code requirements for building setbacks, drainage, & other information required on site plans. B. Know how to properly layout property lines & dimension a site plan. C. Draw a site plan to a suitable scale with all required information, including a drawing index.	**CTE** E&A A2.1 A5.0 A8.6 A8.7	**Anchor/ CR** A10.0 CR1 CR5	**CL** 10-20	**CC**
26. Sectioning & Building Details. 1. Creating building part details on a detail drawing. 2. Situations that require a detail. 3. Dividing the detail sheet. 4. Proper dimensioning	***Goal: The student will understand & incorporate section plans & cutting planes to clarify hidden features of objects while incorporating various construction methods in the creation of both foundation & interior detail drawings.*** A. Accurately create proper foundation, wall, roof, & any other building part detail on a detail drawing of proper scale. B. Understand where & when a detail is required. C. Properly divide the detail sheet to encompass all details with appropriate spacing. D. Properly dimension all details drawn.	E&A A7.1 A7.3 A8.3 A8.4 C6.1 C6.2 C8.1 C8.2	A10.0 CR1 CR5	10-20	
27. Cabinet Details. 1. Creating sets of interior cabinet details for a wide variety of household cabinets. 2. Labeling items on a cabinet detail drawing. 3. Dividing the detail sheet to encompass all details. 4. Dimensioning details. 5, Incorporating this drawing in a set of plans.	***Goal: The student will be able to draw interior wall elevations to provide information required to build cabinets & other interior parts of a building, which may need clarification.*** A. Create a set of interior cabinet details to include: kitchen, bath, utility, linen, & any other cabinetry desired in a single level building. B. Label all items on the cabinet detail drawing to indicate countertop type, receptacle location, special appliances, medicine cabinets, etc.; & materials from which cabinets are to be constructed. C. Properly divide the detail sheet to encompass all details with appropriate spacing. D. Adequately dimension all details drawn. E. Incorporate this drawing of cabinet details in a set of plans.	E&A A8.4 C5.1 C5.3 C5.4 C8.1 C8.2	A10.0 CR1 CR5	5-10	
28. Plumbing Details. 1. Review plumbing symbols. 2. Planning a waste & drainage disposal system for a building. 3. Planning a fresh water system for a building. 4. Calculating pipe sizes for fresh water & drainage systems.	***Goal: The student will be able to understand the need for plumbing in a single level building & be able to construct a plumbing diagram & drawing.*** A. Recognize & use appropriate plumbing symbols when making a drawing. B. Plan a waste & drainage disposal system for a building. C. Plan a fresh water system for a building. D. Calculate pipe sizes for both the fresh water & the drainage systems to include venting of waste lines.	E&A D2.1 D2.3 D13.0 D13.1 D13.3-5 D14.0 D14.3	A10.0 CR1 CR5	5-10	

Instructional Content Instruction will include:	**Student Outcomes** At the end of instruction, the student will be able to:			**Hours** CL=Classroom CC=Comm. Class	
29. Roof Plans. 1. Review frequently used roof shapes. 2. Use of ceiling joists & rafters to frame a roof. 3. How roof trusses frame a roof. 4. Determining appropriate pitch for a building. 5. Review terminology used in the creation of a roof truss. 6. Review & analyze different roof coverings. 7. Review & analyze differences between a ridge, a valley, fascia, barge, & a hip.	***Goal: The student will understand the importance of a roof & its type as it pertains to its overall design & function.*** A. Identify frequently used roof shapes. B. Demonstrate an understanding of how conventional framing of ceiling joists & rafters are used to frame the roof. C. Demonstrate an understanding of how roof trusses are used to frame a roof & implement them into a drawing. D. Determine the appropriate pitch for a building as it relates to its exterior design. E. Identify terms used in the creation of a roof truss. F. Demonstrate an understanding for the need of different roof coverings & where each would be appropriate to use. G. Understand & discuss the difference between a ridge, a valley, fascia, barge, & a hip.	**CTE** A&E A6.0-4 A.8.4 C5.3 C5.4 D2.2 D2.3	**Anchor /CR** A10.0 CR1 CR2 CR5	**CL** 5-10	**CC**
30. Architectural Rendering & Model Construction. 1. Using shading techniques & color in rendering a drawing. 2. Making perspective drawings of building exteriors & room interiors. 3. Building a scale model from plans.	***Goal: The student will be able to demonstrate skills to render a building elevation, along with the creation of a three-dimensional model, both utilizing color, to help in the visual representation of viewing the building prior to construction.*** A. Create a series of renderings using shading techniques & color. B. Make perspective drawings of building exteriors & room interiors to help depict the final outcome. C. Build a scale model from a set of plans.	A&E A3.0-2 B2.1 C3.1 C3.2 D2.6 D2.7 MPD D4.0 D4.1	A10.0 CR1 CR5 CR10	10-20	
31. Architectural Computer Assisted Drafting. 1. Using automated CAD commands to create a floor plan. 2. Using CAD to dimension a floor plan. 3. Extracting & enhancing elevation views. 4. Inserting door, window, & electrical systems symbols. 5. Assigning attributes to symbols. 6. Creating a database from attributes. 7. Creating a door & window schedule from the database. 8. Calculating room areas. 9. Plotting floor plan, elevation, & schedules to appropriate scale.	***Goal: The student will use a CAD system to create a complete floor plan, & elevation plan, & schedule of a simple, single level building.*** A. Accurately create a floor plan using automated CAD commands. B. Properly dimension a floor plan using CAD. C. Extract & enhance elevation views from a three dimension house plan. D. Insert symbols for doors, windows, & electrical systems from a supplied library of standard symbols. E. Assign attributes to appropriate symbols on the floor plan. F. Create a database from attributes assigned to symbols used on the floor plan. G. Create a door & window schedule from this database. H. Use proper command to calculate room areas. I. Plot floor plan, elevations, & schedules to appropriate scale.	A&E A4.0 A4.1 A8.4 C8.0-2 C10.0-4 D1.1 D1.2	A10.0 CR1 CR4 CR5	10-20	