

careertech

Engineering Computer Aided Drafting and Design

Career Cluster: Manufacturing

ODCTE
Division: Trade and Industrial Education

Course Number: TBA

Locations: Oklahoma *CareerTech* locations

Length: 120 Hours

Course Description: This course is an engineering focused drafting course utilizing Computer-Aided Drafting and Design (CADD) software that develops computer skills and electronic skills and applications within engineering applications of drafting within manufacturing. Topics covered are advanced computer operations, CAD application software, and principles of Structural Drafting, Process Pipe Drawings, Electronic/Electrical Drafting, and Civil Drafting.

Knowledge and Skills:

Advanced Computer Operations – 35 hrs	
Advanced Computer Configuration	Advanced Computer Properties
Desktop and Taskbar Customization	Plot parameters
Advanced Hardware	Integrate other software with CAD applications
Networking	Advanced Media Reproduction
Configure CAD workstation	Customize application software
Utilities Development	Online Development
Storage devices	Media Reproduction
System Configuration	Software Customization
Drawing management standards	CAD system variables
Fonts	Symbols, text based information, and libraries

Manipulate CAD drawings	
Computerized Structural Drafting – 30 hrs	
Application software for structural drafting	Types of drawings
Measuring instruments	English and Metric Conversion
Site Conditions	Lettering and Tools
Preliminary sketches	Calibration
Structural AISC standards	Bill of materials
Sections	Blueprints
Interpret drawings	Interpret symbols
Revision drawings	Structural Systems
Commercial roof framing drawings	AISC component dimensioning and tolerancing
Structural steel members	Welding symbols
Beam connections	Trusses/girders
Column connections	Steel columns
Reinforced concrete columns	Reinforced concrete piers/foundations
For structural symbols	Structural sectional symbols
Steel fabrication Material list	Steel erection drawings
Concrete and reinforcing materials list	Anchor bolt layout and detail
Prepare intersections	
Computerized Pipe Drafting – 20 hrs	
Application software for pipe drafting	Bill of materials
Bill of materials	Dimensions and elevations
Process/utility flow diagram	Prepare mechanical flow diagram
Plot plan and equipment layout	Manufacturer's equipment layout
Schedule of openings charts	Orthographic views of valves
Bearings/azimuths	Screwed and socket weld pipe fittings
Welded pipe fittings	Single line assembly
Double line assembly	Ladder and platform detail drawings
Piping plans and elevations	Vessel trim drawings
Computerized Electronic/Electrical Drafting – 20 hrs	
Application software for electronic/electrical drafting	Bill of materials
Electronic/electrical components sketches	Pin configurations and gate location sketches
a finished schematic	Wiring diagrams
Analog and digital symbols	Electronic/electrical sectional

and IC packages	symbols
Block diagram	Board size
Tolerances for PCB fabrication	Single-sided PCB layout drawing
Double-sided to multi-layered PCB layouts	Integrated circuits
Type layout for a PCB	Assembly drawing
Ladder diagrams	Harness layout
Computerized Civil Drafting – 15 hrs	
Application software for civil drafting	United States Geodetic Survey (U.S.G.S.) and National Geodetic Survey (N.G.S.) map features
Azimuths to bearings	Bearings, distances, and coordinates
Legal land descriptions	Plat Components and final plat
Acreage	Boundary survey
Road survey	Cross-sections
Contours on site plans from survey data	Earth volume
Appropriate dimensions	Surveying instruments
Civil sectional symbols	Plan and profile from survey data
GIS/GPS	Site plans

Required
Certifications: None

Course Standards: American Design Drafting Association (ADDA) Standards—
<http://www.adda.org/>
American Institute of Steel Construction Standards (AISC)
<http://www.aisc.org>
American Institute of Architects <http://www.aia.org>

Resources: Software
AutoCAD
Solidworks
Architectural Desktop
AutoCAD and its Applications-Basics and Advanced by Terence M. Shumaker and David A. Madison
Practical Problems in Mathematics by Larkin
Basic Technical Drafting by Dygdon
Solidworks Training Manual
Engineering, Drawing, and Design by Cecil Jensen, Jay D. Helsel, and Dennis Short