

Equipment List

Drafting and Design Technology

CIP No. 15.1300

Please note: This list of recommended items does not necessarily need to be supported financially by CTE state/federal funding sources. In many cases, local school district funds are used to purchase items on a regular basis.

EQUIPMENT/HARDWARE

Workstations large enough for CAD and Technical Sketching Work

Desk lamps

CAD stations: CPU, Two 24" Flat Screen monitors for each station, keyboard, mouse

Computers with sufficient memory and removable storage

Recommended rd

CAD Plotter

Large Format Graphics Printer

Digitizer

Scanner

Paper/Vellum

Paper Cutter/Trimmer

Layout Table

Light Table

Flat File Storage

Storage cabinets

Vertical files

Odorless Blue-Line Machine

CadCard

CAD/CAM/CAE SOFTWARE

Highly Recommended:

SoftPlan13 Architectural Design® Software

ESRI ArcView 9.1 GIS Software

Navisworks 4D Software

SDS/2 Structural Steel Detailing and Modeling Software

AutoCAD 2006® ADT (Autodesk, Inc.)

Revit Building 8

SolidEdge 18

AutoCAD 2004® (Autodesk, Inc.)

Architectural Desktop® (Autodesk, Inc.)

Civil Design® (Autodesk, Inc.)

Mechanical Desktop® (Autodesk, Inc.)

Catia® (Dassault Systems/IBM)

L-edit Pro® (Tanner Research

MicroStation® (Bentley Systems)

Pro/Engineer® (Parametric Technology Corporation (PTC))

Career Preparation

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SketchUp
SolidWorks® (Solidworks)
SolidBuilder 15 Architectural Software

CAD/CAM/CAE SOFTWARE (con't)

Recommended:

ArchiCAD® (Graphisoft)
CADRA® (SofTech)
Electrical® (Autodesk, Inc.)
IGrafx Designer® (Micrografx)
Land Development Desktop® (Autodesk, Inc.)
Map® (Autodesk, Inc.)
InRoads® (Bentley Systems)
Unigraphics® (Unigraphics Solutions)
3D Studio Max® (Discreet)
3D Studio Vis® (Discreet)

GRAPHICS/DESIGN/IMAGING SOFTWARE

Designer® (Corel)
Bryce® (Corel)
Photoshop® (Adobe)

MANUAL EQUIPMENT

Drafting board (portable preferred) with T-square, parallel edge or drafting machine
Mechanical Scale
Architectural Scale
Engineering (Civil) Scale
Metric Scale
45/45/90 Triangle
30/60/90 Triangle
Protractor
Compass
Calculator
Curves (assorted, irregular)
Templates (assorted)
Electric eraser, erasing shield, brush, dry cleaning pad, powder or dust rag
Drafting tape
Lead holders with leads
Lead sharpening device

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March, 2004

The Role of Manual Drafting in Drafting/Design Technology:

When asked whether a manual drafting standard was necessary for the Drafting and Design Technology programs, 10 of 15 industry members on the Design Team rejected it. The primary reason for not requiring manual drafting skills was that drafters in the industry no longer use them. Sample comments included:

“Requirement for this talent is progressively declining. CAD tools will be the equipment of the future...manual skills will become obsolete.

Manager, Mechanical Design, Tucson aircraft manufacturer

“Manual equipment is going the way of slide rules. Certainly don’t require investment in purchasing it.”

Principal, Phoenix Architectural firm

“Hand drawing not necessary in civil arena.”

Senior Project Manager, Chandler Engineering Firm

“I believe board drafting may play a minor role in “how” a drawing is set up. In all honesty, I haven’t drawn on the board in 15 years now. I learned board drafting and board drafting only. All of the skills I have as far as board work I no longer use.”

Engineer, Yuma Civil and Architectural Engineering Firm

“Since you pointed out in the initial description of this review assignment that we were to avoid “nice to have” skills, I went ahead and marked the manual drafting and detail oriented drafting for deletion, being that our company looks more for math, CAD, and computer skills.”

Mapper/Drafter, Phoenix Public Utility

“I think a review of the drafting industry in the past and an understanding of how the geometry was created on the board is all that is required. Practicing lettering and line weights is not an efficient use of time today. Believe me, I would like to be able to create a drawing by hand that looks great but it is of no value in today’s drafting environment.”

Engineering Manager, Glendale mechanical engineering company

“Most all organizations have gone to CAD-CAM equipment. Don’t spend too much time here.”

Coordinator, Engineering, Education and Training, Mesa aircraft manufacturer

Should all manual drafting be eliminated from Drafting and Design Technology Programs based on comments such as these? According to the American Design and Drafting Association (ADDA) guidelines for Curriculum Certification of drafting programs, programs for DRAFTER (Community College or Vo Tech) and APPRENTICE DRAFTER (High School or Vocational High School) should offer some manual drafting practice:

The curriculum for DRAFTER and APPRENTICE DRAFTER should contain not only basic but advanced drawing courses in one or more specialized fields. The courses should provide the student with a complete foundation in the theory and technique of drafting. They should offer training to develop manual skill in the use of instruments, the ability to do neat, legible, free-hand lettering and sketching in the area of specialization and computer-aided drafting (CAD) systems.

ADDA Curriculum Certification Program Description and Application

In discussion with representatives of the ADDA, a reasonable division of time dedicated to manual versus CAD drafting skills was suggested at 80% CAD and 20% manual for a 4-year program. Less time would be allocated for a 2-year program:

“In a two year drafting program students would benefit from CAD training primarily with some basic sketching. Because four-year students are more advanced and serious about drafting they need to develop a broader range of drafting/CAD skills and would benefit from developing basic manual skills, as well as, CAD - probably 80 CAD/20 Manual. The reasoning would be to prepare them for professions requiring them to have more diverse design related skills that are both computer and manual oriented.”

ADDA Director of Curriculum Certification and Director, Phoenix technical school program.

How this is implemented in other states can be seen in the State of New York. New York has recommended only 10 Unit Hours of a total 725 Unit Hours (1%) of class time be used for Introduction to Basic Tools and Materials. It is not specified whether a teacher should use manual or CAD equipment for any particular technical drawing areas covered in the remaining 715 Unit Hours.