

# Drafting

## Drafting and Design Technician

### Program Description

This program is designed to provide students with entry level skills in the fields of mechanical, electrical, civil and architectural drafting and/or design.

### Certificate of Achievement and Associate in Science Degree

A Certificate of Achievement can be obtained upon completion of the 30-unit major listed below. The Associate in Science Degree can be obtained by completing a total of 60 units, including the major, general education requirements, and electives. All courses in the major must be completed with a grade of C or better or a P if the course is taken on a Pass/No Pass basis.

### Program Outcomes

Students who complete the Drafting and Design Technician Certificate of Achievement/ Associate Degree will be able to:

1. Demonstrate proficiency using industry standard computer aided drafting/ design CAD (AutoCAD) software program.
2. Demonstrate proficiency at reading, drawing, and dimensioning industry standard mechanical drawings.
3. Demonstrate proficiency at reading, drawing, and dimensioning industry standard civil drawings.
4. Demonstrate proficiency at reading, drawing, and dimensioning industry standard electronic drawings.
5. Demonstrate proficiency at reading, drawing, and dimensioning industry standard architectural drawings.

<b>REQUIRED COURSES</b> .....	<b>Units</b>	DRFT 065 Architectural Drafting II .....	3
DRFT 045 Introduction to Computer-Aided Drafting (CAD) .....	3	DRFT 079 Blueprint Reading.....	3
DRFT 046 Advanced CAD .....	3	DRFT 085 Civil Drafting II .....	3
DRFT 055 Mechanical Drafting - Level I .....	3	DRFT 092 Special Problems.....	1 - 3
DRFT 058 Solid Modeling with Solidworks.....	3	DRFT 130 Advanced Printed Circuit Board Design.....	3
DRFT 060 Architectural Drafting I.....	3	DRFT 140 Surveying.....	3
DRFT 075 Electronic Drafting.....	3	ENGR 001 Introduction to Engineering.....	1
DRFT 080 Civil Drafting I.....	3	HORT 030 Landscape Design .....	3
IT 140 Industrial Materials.....	3	OCED 070 Occupational Soft Skills.....	1.5
IT 151 Vocational Mathematics .....	3	OCED 071 Occupational Soft Skills.....	1.5
Select 3 units from Recommended Electives.....	3	OCED 090 Occupational Work Experience .....	1 - 8
<b>Total Units</b> .....	<b>30</b>	OCED 091 General Work Experience .....	1 - 6
<b>Recommended Electives</b> (Select 3 units).....	<b>Units</b>		
ART 014 Introduction to Drawing .....	3		
DRFT 050 Basic Drafting.....	1.5		
DRFT 057 Mechanical Drafting - Level II .....	3		

**NOTE: Many of the advanced courses will require CAD. It is important to take DRFT 045 (Intro. to CAD) as early in your program as possible. College credit may be obtained with credit by examination in DRFT 045, 050, and 060 or they may be waived.**

This is a Gainful Employment Program. For additional information, please visit [http://www.solano.edu/gainful\\_employment/](http://www.solano.edu/gainful_employment/) and select "Drafting Technician."

# Drafting

## Survey and Civil Drafting Technician

### Program Description

This program is designed to provide students with entry-level skills in the fields of Surveying Technician, Civil Drafting Technician, and/or mapping technician.

### Certificate of Achievement and Associate Degree

A Certificate of Achievement can be obtained upon completion of 27 core requirement units. An Associate in Science degree may be obtained by completing 60 units, including the required courses in the major, the general education requirements, and electives. All courses for this major must be completed with a grade of C or better or a P if the course is taken on a Pass/No Pass basis.

### Program Outcomes

Students who complete the Survey and Civil Drafting Technician Certificate of Achievement/ Associate Degree will be able to:

1. Demonstrate proficiency using industry standard computer aided drafting/ design CAD (AutoCAD) software program.
2. Demonstrate proficiency at reading, drawing and dimensioning industry standard civil drawings.
3. Demonstrate basic understanding in using industry standard survey equipment including Transit, Theodolite, and Level.

REQUIRED COURSES .....	Units	Recommended Electives (Select 3 units) .....	Units
DRFT 045 Introduction to Computer-Aided Drafting (CAD) .....	3	DRFT 050 Basic Drafting .....	1.5
DRFT 046 Advanced CAD .....	3	DRFT 065 Architectural Drafting II .....	3
DRFT 060 Architectural Drafting I .....	3	DRFT 079 Blueprint Reading .....	3
DRFT 080 Civil Drafting I .....	3	DRFT 092 Special Problems .....	1 – 3
DRFT 085 Civil Drafting II .....	3	ENGR 001 Introduction to Engineering .....	1
DRFT 140 Surveying .....	3	GEOL 001 Physical Geology .....	3
GEOL 010 Introduction to Geographic Information Systems .....	3	GEOL 002 Geology Laboratory .....	1
OR		GEOL 005 Geology of California .....	3
GEOG 010 Introduction to Geographic Information Systems .....	3	IT 050 Alternative Energy Technologies .....	3
IT 151 Vocational Mathematics .....	3	OCED 070 Occupational Soft Skills .....	1.5
3 units from Recommended Electives .....	3	OCED 071 Occupational Portfolio Development .....	1.5
<b>Total Units .....</b>	<b>27</b>	OCED 090 Occupational Work Experience .....	1 – 8
		OCED 091 Occupational Work Experience .....	1 – 6

This is a Gainful Employment Program. For additional information, please visit  
[http://www.solano.edu/gainful\\_employment/](http://www.solano.edu/gainful_employment/) and select "Survey Technician / Civil Drafting Technician."

# Drafting

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## *Computer Aided Drafting (CAD) Technician Job-Direct Certificate*

<b>REQUIRED COURSES .....</b>	<b>Units</b>
DRFT 045 Introduction to Computer-Aided Drafting (CAD) .....	3
DRFT 046 Advanced Computer Aided Drafting (CAD).....	3
DRFT 079 Blueprint Reading.....	3
DRFT 125 Solid Modeling with Solidworks.....	3
<b>Total Units .....</b>	<b>12</b>

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**DRFT 045 3.0 Units**  
**Introduction to Computer-Aided Drafting (CAD)**

*Course Advisory: SCC minimum English and Math standards.* Designed to introduce the drafting student to CAD (AutoCAD) technology and terminology. The student shall complete a series of related drawing problems using a CAD work station. Fundamentals of creating and modifying engineering and architectural related drawings. *Two hours lecture, three hours lab.*

**DRFT 046 3.0 Units**  
**Advanced Computer Aided Drafting (CAD)**

*Prerequisite: DRFT 045 with a minimum grade of C. Course Advisory: SCC minimum English and Math standards.* Designed to develop advanced proficiency in CAD. Covers symbol libraries, isometrics, external references (XREFS), 3-D drawing, basic solid modeling, tables and customization techniques. *Two hours lecture, three hours lab.*

**DRFT 050 1.5 Units**  
**Basic Drafting**

*Course Advisory: SCC minimum English and Math standards.* This course presents the fundamentals of drafting using hand drafting tools--pencil, paper, triangles, scales, compass, etc. Students will use traditional methods of construction for polygons, orthographic views, pictorial drawings, simple architectural floor plans and other technical drafting constructions and will be given hands on training in technical sketching. This course is intended to give additional training in visualization and object manipulation without the aid of a computer and is a recommended elective for drafting students, or for non-drafting students (in fields such as welding, mechatronics, engineering, etc) who may need to create technical drawings without a computer. *One-half hour lecture, three hours lab.*

**DRFT 055 3.0 Units**  
**Mechanical Drafting - Level I**

*Prerequisite: Minimum grade of C in DRFT 045; Minimum grade of C in DRFT 058 (may be take concurrently).* Course Advisory: SCC minimum English and Math standards. This course teaches techniques and standards of mechanical drafting. Main topics include orthographic drawings, sections, pictorials, threads, fasteners, basic tolerance concepts, ANSI standards and working drawings. Basic mechanical design principles, with a special emphasis on electro-mechanical packaging, are introduced. *Two hours lecture, three hours lab.*

**DRFT 057 3.0 Units**  
**Mechanical Drafting - Level II**

*Prerequisite: DRFT 055 with a minimum grade of C. Course Advisory: IT 151 (may be taken concurrently); SCC minimum English and Math standards.* A continuation of Drafting 055, with special emphasis on advanced electro-mechanical packaging and design, Geometric Dimension and Tolerancing (GD&T) terminology and drawing standards, gears, and advanced working drawings. Students will create designs using electronic components (Printed Circuit Boards, connectors, LEDs, etc) and 3D printed models. *Two hours lecture, three hours lab.*

**DRFT 058 3.0 Units**  
**Solid Modeling with Solidworks**

*Course Advisory: SCC minimum English standards; knowledge of drafting concepts.* This course is designed to teach the basic concepts and skills necessary to create, view, and manipulate objects and engineering drawings in three dimensional space using Solidworks software. Student will create models in 3D printer, output support documentation and drawings, and incorporate design process concepts in designs. *Two hours lecture, three hours lab.*

**DRFT 60 3.0 Units**  
**Architectural Drafting I**

*Prerequisite: DRFT 045 with a minimum grade of C. Course Advisory: SCC minimum English and Math standards.* Covers basic methods and practices of architectural drafting and design. Students will design a complete set of plans for a single family dwelling in accordance with local building regulations. Course includes an introduction to the Title 24 energy requirements and standards. Recommended for non-majors and drafting majors. *Two hours lecture, three hours lab.*

**DRFT 65 3.0 Units**  
**Architectural Drafting II**

*Prerequisite: DRFT 060 with a minimum grade of C. Course Advisory: IT 151 (may be taken concurrently); SCC minimum English and Math standards.* A continuation of Drafting 60 with special emphasis multiple story residential design. Students will create an industry standard, two-story house design on a 12-14 sheet plan set. This course also exposes students to famous architects, past and present. *Two hours lecture, three hours lab.*

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**DRFT 75 3.0 Units****Electronic Drafting**

*Prerequisite:* DRFT 045 with a minimum grade of C. *Course Advisory:* SCC minimum English and Math standards. Designed for drafters to develop skill in reading and drawing plans related to electronics. Topics include, terminology, component identification, schematic symbols, cable drawings, electro-mechanical design from the electronic perspective. Special emphasis is placed on basic printed circuit board design. Students will design through-hole and surface mount printed circuit boards. Two hours lecture, three hours lab.

**DRFT 079 3.0 Units****Blueprint Reading**

*Course Advisory:* SCC minimum English and Math standards. Designed to provide an understanding and interpretation of a variety of blueprints. Emphasizes the ability to recognize and identify features of mechanical blueprints and architectural blueprints. Also includes basic development of freehand sketching abilities. *Two and one-half hours lecture, one and one-half hours lab.*

**DRFT 080 3.0 Units****Civil Drafting I**

*Prerequisite:* DRFT 045 with a minimum grade of C. *Course Advisory:* IT 151 with a minimum grade of C. SCC minimum English and Math standards. An introductory course in civil drawing with emphasis on land division, breakdown of survey notes, office procedures and related math computations. Includes instruction in a variety of industry standard maps, including subdivision maps, assessors parcel maps and topographic maps. *Two hours lecture, three hours lab.*

**DRFT 085 3.0 Units****Civil Drafting II**

*Prerequisite:* DRFT 080 with a minimum grade of C. *Course Advisory:* IT 151 with a minimum grade of C; SCC minimum English and Math standards. Designed for the advanced civil drafting student with emphasis on computer programs and experience compatible with the industry standards. Includes the study of plan and profile, cross-section and earthwork calculations. *Two hours lecture, three hours lab.*

**DRFT 092 1.0 to 3.0 Units****Special Problems**

*Prerequisite:* DRFT 050. Individualized projects for advanced students who demonstrate competency to carry out individual work. Students may take this course up to the maximum number of units over multiple semesters. *Three to nine hours by arrangement.*

**DRFT 130 3.0 Units****Advanced Printed Circuit Board Design**

*Prerequisite:* DRFT 075 with a minimum grade of C. *Course Advisory:* SCC minimum English and Math standards. The student will learn how to design complex circuit boards from schematic layout to artwork generation. Course requires completion of a complete set of drawings for a printed circuit board, including proper documentation, all based on industry standards. Through-hole and surface mount technology are studied. *Two hours lecture, three hours lab.*

**DRFT 140 3.0 Units****Surveying**

*Prerequisite:* DRFT 080 with a minimum grade of C. *Course Advisory:* IT 151 with a minimum grade of C; SCC minimum English and Math standards. Presents the principles and practices of surveying. Topics include measurement of directions, distances and elevations. Students will learn the use and care of electronic survey equipment, transits, tapes and levels and be introduced to topics that include transverse calculations, horizontal and vertical curves, measuring standards and mapping. *Two hours lecture, three hours lab.*