

Drafting Technology/Engineering

The Curriculum

Students majoring in drafting technology prepare to enter several areas of the technology, including mechanical, electrical, and aeronautical/aerospace technology, and their various research and development fields. The curriculum emphasizes the universal language used in industrial, technical, and engineering applications. Students will develop the skills needed to produce and interpret technical drawings, using traditional as well as multi-axis computer-based graphics generation. Laboratory experiences include working on many different types of drafting problems designed to refine the students' abilities to interpret, analyze and transmit facts graphically. Supplementary core course requirements stress the development of basic skills in mathematics, communication, and the sciences.

The Associate Degree/Occupational Certificate Major

The program is designed to prepare students for employment within the broad spectrum of the drafting and design field. Various options are available to meet both short- and long-range educational goals. Students may select the technically specific Occupational Certificate program or the broad-based Associate in Science degree in Drafting Technology or the Computer-Aided Drafting Design emphasis (with options in Electronic or Mechanical CAD). By completing the associate degree, the student ensures a high level of competency within the technology as well as developing a strong, broad-based foundation in preparation for future upgrade. Individual and sequenced courses are designed for those who are currently employed and wish to upgrade or specialize in a specific subject area.

If you intend to transfer:

Courses that fulfill major requirements for an associate degree at Irvine Valley College may not be the same as those required for completing the major at a transfer institution offering a baccalaureate degree. If you plan to transfer to a four-year college or university, you should (1) refer to the transfer section of this catalog, (2) consult the catalog of your prospective transfer institution (see the IVC Transfer Center for assistance), and (3) schedule an appointment with an IVC counselor to develop a plan of study before you begin your program. In addition, it may be helpful to meet with the appropriate department faculty at IVC.

If you plan to complete an associate degree or occupational certificate:

You must complete one of the following sets of courses to fulfill the requirements for the Occupational Certificate or the Associate in Science (A.S.) degree major. For the A.S. degree, you must also meet the general education requirements listed on page 21. Refer to page 16 for additional options for fulfilling the major requirement for the A.S. degree.

DRAFTING TECHNOLOGY MAJOR

(A.S. Degree or Occupational Certificate)

<i>First Year</i>		<i>Units</i>
DR 101	Mechanical Drafting	3
DR 102	Mechanical Drafting and Design	3
ENGR 21	Introduction to Engineering and Technology	1
ENGR 23	Engineering Graphics and Descriptive Geometry	3
MATH 124	Trigonometry	3
MATH 253	Intermediate Algebra	5
<i>Second Year</i>		
DR 120	Fundamentals of Technical Illustration	2
DR 150	Introduction to Computer-Aided Drafting	3
DR 160	Introduction to CAD for Electronic Schematic Entry Applications	3
Total units:		26

Recommended electives: *ET 101; GEOL 23; MATH 252.*

(majors continue on next page)

**Computer-Aided Drafting Design Emphasis (Electronic Option)
(A. S. Degree or Occupational Certificate)**

		<i>Units</i>
CIM 100A	Introduction to Keyboarding for Computers I	1.5
DR 100	Fundamentals of Mechanical Drafting	3
DR 150	Introduction to Computer-Aided Drafting	3
DR 160	Electronic Drafting	3
DR 161	Electronic Printed Circuit Card Layout and Design	3
DR 162	Advanced Printed Circuit Card Design	3
ET 101	Survey of Electronics	3
ENGR 21	Introduction to Engineering and Technology	1
MATH 124	Trigonometry	<u>3</u>
Total units:		23.5

Recommended electives: *ET 102; PHYS 2A; SP 1; WR 1 or 102.*

**Computer-Aided Drafting Design Emphasis (Mechanical Option)
(A. S. Degree or Occupational Certificate)**

		<i>Units</i>
CIM 100A	Introduction to Keyboarding for Computers I	1.5
DR 100	Fundamentals of Mechanical Drafting	3
DR 101	Mechanical Drafting	3
DR 102	Mechanical Drafting and Design	3
DR 150	Introduction to Computer-Aided Drafting	3
ENGR 21	Introduction to Engineering and Technology	1
ENGR 23	Engineering Graphics and Descriptive Geometry	3
ENGR 183	Computer-Aided Design Techniques	3
ENGR 184	Advanced Computer-Aided Design	3
ENGT 140	Manufacturing Processes—Systems Introduction	3
MATH 124	Trigonometry	<u>3</u>
Total units:		29.5

Recommended electives: *DR 120, 160, 201; ET 101; PHYS 2A; SP 1; WR 1 or 102.*

Drafting Courses

DR 100 **3 units**
FUNDAMENTALS OF MECHANICAL DRAFTING
Coreq: CIS 205L. This course develops basic drafting skills, including the proper use of drafting instruments, lettering, geometric construction, multiview projection, selections and conventions, pictorial drawings, single auxiliary views, and dimensioning. NR
Lecture hours: 2 Lab hours: 4

DR 101 **3 units**
MECHANICAL DRAFTING
Prereq: Dr. 100. Coreq: CIS 205L. This course develops the basic skills required to produce industrial quality assembly and detail drawings, including first and second auxiliary views, shop practices, and tolerancing. Students further develop their fundamental mechanical drawing skills. NR
Lecture hours: 2 Lab hours: 4

DR 102 **3 units**
MECHANICAL DRAFTING AND DESIGN
Prereq: Dr. 101. Coreq: CIS 205L. In this course students develop the basic skills needed for industrial-level mechanical drawing and conceptual design, including assembly drawings and detail drawings. They study the fundamentals of mechanical design and strategies for creative design. NR
Lecture hours: 2 Lab hours: 4

DR 120 **2 units**
FUNDAMENTALS OF TECHNICAL ILLUSTRATION
 This course introduces the basic techniques of technical illustration, including oblique and isometric pictorial drawing and shading. The course covers technical illustration as it is used in product design, manufacturing, installation and maintenance manuals, and sales brochures. NR
Lecture hours: 1 Lab hours: 3

DR 150 **3 units**
INTRODUCTION TO COMPUTER-AIDED DRAFTING
Coreq: CIS 205L. This is an introductory course teaching the operation and application of a computer-aided drafting (CAD) system that is used to create, modify, store, and plot mechanical, architectural, and electronic drawings. R-E-3
Lecture hours: 2 Lab hours: 4

DR 160 **3 units**
INTRODUCTION TO COMPUTER-AIDED DRAFTING FOR ELECTRONIC SCHEMATIC ENTRY APPLICATIONS
Coreq: CIS 205L. This course reviews the history of printed circuit card technology over the last twenty years. Several designs will be taken through layout, block diagrams, schematics, schematic capture, autorouting of single- and multiple-layer printed circuit cards, and computer-aided manufacturing report generation. Each design will be applied to various technologies, from the past to the present, showing how technologies dictate methods. NR
Lecture hours: 1.5 Lab hours: 4.5

DR 161 3 units

ELECTRONIC PRINTED CIRCUIT CARD LAYOUT AND DESIGN

Prereq: Dr. 160. *Coreq:* CIS 205L. This course presents the concepts of layout, block diagrams, schematics, schematic capture, and autorouting of single- and multi-layer printed circuit boards and computer-aided manufacturing report generation per MIL STD 275/IPG-7-400 guidelines. NR

Lecture hours: 1.5 *Lab hours:* 4.5

DR 162 3 units

ADVANCED PRINTED CIRCUIT CARD DESIGN

Prereq: Dr. 161. *Coreq:* CIS 205L. Several designs will be taken through layout, block diagrams, schematics, schematic capture, autorouting of single- and multiple-layer printed circuit cards and computer-aided manufacturing report generation. Each design will be applied to MIL-STD-275/IPC-G-400 guidelines with emphasis on surface mount devices (SMD), hybrid microcircuits (HMC), and component databases. NR

Lecture hours: 1.5 *Lab hours:* 4.5

DR 199 0.5-5 units

SEMINAR IN DRAFTING

Drafting 199 is a lower-division seminar given over to the study of a specific topic, issue, or problem within drafting which is not part of the regular college curriculum. R-E

Lecture hours: 0.5-5 *Lab hours:* 0.5-5

DR 201 3 units

INTERPRETATION OF INDUSTRIAL DRAWINGS

This course is directed toward reading and understanding prints used throughout manufacturing. The course includes the basic orthographic concepts, abbreviations and symbols, the interpretation of specifications, and the graphic construction and sketching of views. Drafting 201 is designed for the non-technical and technical-based student. NR

Lecture hours: 3

DR 289 0.5-5 units

SPECIAL TOPICS IN DRAFTING

The Special Topics course is a grouping of short seminars designed to provide students with the latest concepts in the field of drafting. The course content is thematic in nature, and each seminar topic within the course differs from other offerings in the same course. R-E

Lecture hours: 0.5-5 *Lab hours:* 0.5-5

Engineering Courses

ENGR 21 1 unit

INTRODUCTION TO ENGINEERING AND TECHNOLOGY

This course is a survey of the fields of engineering and related occupations. It is designed to familiarize the student with the educational requirements and opportunities for employment as a scientist, engineer, or technician, as well as the nature and responsibilities of such work. NR

Lecture hours: 1

ENGR 23 3 units

ENGINEERING GRAPHICS AND DESCRIPTIVE GEOMETRY

Coreq: CIS 205L. In this course students will learn the principles of graphical expression through sketching, orthographic projection, auxiliary views, dimensions, and working drawings. They will learn and practice the descriptive geometry methods of points, lines, planes, warped surfaces, intersections and developments. NR

Lecture hours: 1.5 *Lab hours:* 4.5

ENGR 183 3 units

COMPUTER-AIDED DESIGN TECHNIQUES

Coreq: CIS 205L. This is an advanced course providing instruction in the latest techniques available in computer-aided design. The course focuses on the use of the computer as a tool in all phases of the design process. Students will work with computer-aided design systems, using computer graphics to solve a variety of design problems. NR

Lecture hours: 1.5 *Lab hours:* 4.5

ENGR 184 3 units

ADVANCED COMPUTER-AIDED DESIGN

Coreq: CIS 205L. This advanced course uses a high-function CAD/CAM system which offers design and manufacturing engineers a tool for 2-D and 3-D graphic applications. The course is intended to explore higher functions of CAD/CAM modeling systems using advanced curves and surfaces. NR

Lecture hours: 1.5 *Lab hours:* 4.5

Engineering Technology Courses

ENGT 130 3 units

INDUSTRIAL AUTOMATION

Coreq: CIS 205L. This course combines automation techniques and philosophies used throughout industry into a comprehensive computer-integrated environment. Major topics include machine control, robotics, programmable controllers, and material handling. The course also introduces system integration and related components structured for an industrial environment. NR

Lecture hours: 3

ENGT 140 3 units

MANUFACTURING PROCESSES—SYSTEMS INTRODUCTION

This is an introductory course in manufacturing technology concepts, functions, and techniques. The course provides exposure to manufacturing activities, computer-aided design (CAD), computer-aided manufacturing (CAM), manufacturing systems and plant layout, materials handling, process control cost and value, quality control, production control, and the solution of manufacturing technology problems. NR

Lecture hours: 3