

Machine Technology Level I Certificate

The Machine Technology — Level I Certificate Program requires the completion of 18 units with a minimum grade of “C” in each course taken. At least one half of the units toward the certificate must be completed at Fullerton College.

Machine Technology-Level I Certificate
Required Courses (18 units)
Machine 101 F Introduction to Machine Tools (5)
Machine 102 F Intermediate Machine Tools (5)
Machine 103 F Advanced Machine Tools (5)
Machine 110 F CNC Machine Set-up & Operation (3)

Road map: Take the following courses in order:

- Fall or Spring-Machine 101(or Machine 101 and Machine 110)
- Fall or Spring-Machine 102 (or Machine 102 and Machine 110)
- Fall or Spring-Machine 103 (or Machine 103 and Machine 110)
- Fall or Spring-Machine 110

Machine Technology-Level II Certificate

The Machine Technology-Level II Certificate Program requires the completion of 34-36 units of which - 25 units are in required courses. An additional 9-11 units must be chosen from the restricted electives listed below. A minimum grade of “C” is required in each course taken. At least one half of the units toward the certificate must be completed at Fullerton College.

Machine Technology-Level II Certificate	
Required Courses (25 units)	Restricted Electives (9-11 units)
DRAF 101 F Blueprint Reading for Metal Trades (2)	DRAF 171 F Fundamentals of Drafting (2)
DRAF 173 F Geometric Dimen. & Tolerancing (2)	Machine 120 F Advanced CNC Set-up & Operation (3)
Machine 110 F CNC Machine Set-up & Operation (3)	METL 192 F Fundamentals of Metallurgy (3)
Machine 101 F Introduction to Machine Tools (5)	TECH 108 F Manufacturing Processes (3)
Machine 102 F Intermediate machine Tools (5)	TECH 127 F Industrial Safety (2)
Machine 103 F Advanced Machine Tools (5)	WELD 121A Introduction to Welding (2)
Tech 081 F Technical Mathematics I (3)	Machine 116 F Machine Tools (2)

Road map: Take the following courses in order:

- Fall or Spring-Machine 101 and DRAF 101 and restrictive electives
- Fall or Spring –Machine 102 and Tech 81 and restrictive electives
- Fall or Spring-Machine 103 and Machine 110 and restrictive electives

- Fall or Spring- DRAF 173 and restrictive electives

Surfcam Skills Certificate

The Surfcam Skills Certificate requires a total of 6 units. Both classes must be completed with a grade of “C” or better.

Surfcam Skills Certificate
Required Courses (6 units)
Machine 154 F CNC programming using Surfcam (3)
Machine 156 F Advanced CNC Programming using Surfcam (3)

Road map: Take the following courses in order:

- Fall or Spring-Machine 154
- Fall or Spring –Machine 156

Mastercam Skills Certificate

The Mastercam Skills Certificate requires a total of 6 units. Both classes must be completed with a grade of “C” or better.

Mastercam Skills Certificate
Required Courses (6 units)
Machine 150 F CNC Programming using Mastercam (3)
Machine 152 F Advanced CNC Programming using Mastercam (3)

Road map: Take the following courses in order:

- Fall or Spring- Machine 150
- Fall or Spring –Machine 152

Computer Numerical Control (CNC) Certificate

The Computer Numerical Control (CNC) Certificate Program requires the completion of 42-47 units of which 33-36 units are in required courses. An additional 9-11 units must be chosen from the restricted electives listed below. A minimum grade of "C" is required in each course taken. At least one half of the units toward the certificate must be completed at Fullerton College.

Computer Numerical Control (CNC) Certificate	
Required Courses (33-36 units)	Restricted Electives (9 -11 units)
DRAF 101 F Blueprint Reading for Metal Trades (2)	
DRAF 140 F AutoCAD for Industry (3)	Machine 120 F Advanced CNC Set-up & Operation (3)
DRAF 173 F Geometric Dimen. & Tolerancing (2)	Machine 102 F Intermediate machine Tools (5)
Machine 150 F CNC Programming using Mastercam (3)	TECH 88 Technical Science (3)
Machine 152 F Advanced CNC Programming using Mastercam (3)	TECH 127 F Industrial Safety (2)
Machine 156 F Advanced CNC Programming using Surfcam (3) OR	WELD 121A Introduction to Welding (2)
Machine 154 F CNC programming using Surfcam (3)	
Machine 110 F CNC Machine Set-up & Operation (3)	
Machine 115 F CNC Parts Programming (3)	
Machine 101 F Introduction to Machine Tools (5) Or	
Machine 116 F Machine Tools (2)	
METL 192 F Fundamentals of Metallurgy (3)	
Tech 081 F Technical Mathematics I (3)	
TECH 108 F Manufacturing Processes (3)	

Road map: Take the following courses in order:

- Fall or Spring-Machine 101 or Machine 116 and DRAF 101 and Tech 081
- Fall or Spring –Machine 110 and Machine 150 and DRAF 140 and restrictive electives
- Fall or Spring-Machine 115 and Machine 152 and restrictive electives
- Fall or Spring-Machine 154 and METL 192 and DRAF 173 and restrictive electives
- Fall or Spring- Machine 156 and TECH 108 and a restrictive elective

CNC Operator Skills Certificate

The CNC Operator Skills Certificate Program requires a total of 14 units of which 14 units are in required courses with a minimum grade of “C” is required in each course taken. At least one half of the units toward the certificate must be completed at Fullerton College.

CNC Operator Skills Certificate	
Required Courses (14 units)	
MACH 110 F CNC Machine Set-up & Operation (3)	MACH 120 F Advanced CNC Set-up & Operation (3)
MACH 115 F CNC Parts Programming (3)	MACH 101 F Introduction to Machine Tools (5)

Road map: Take the following courses in order:

- Fall or Spring-Machine 101 and Machine 110
- Fall or Spring –Machine 115
- Fall or Spring-Machine 120

Manufacturing Technology Associate in Science Degrees

Program Code: 2503842

Curriculum leads to the Associate in Science Degree. The Manufacturing Technology Major incorporates courses from a number of departments within the Technology and Engineering Division. A student pursuing the Manufacturing Technology major must take core courses from all of these departments in addition to a concentration in one or more of the major areas. The areas of concentration are: Drafting; Machine Technology; and Welding. Requires 29-33 units from courses listed.

Program Level Student Learning Outcomes

Outcome 1: Demonstrate welding on 16 gauge steel with inert gas welding equipment.

Outcome 2: Develop manufacturing procedure for metal sub-assemblies.

Manufacturing Technology Associate of Science Degree		
Required Courses (14 units)		Units
DRAF 171 F	Fundamentals of Drafting	2
MACH 116 F	Machine Tools	2
TECH 108 F	Manufacturing Processes	3

WELD 121AF	Introduction to Welding	2
METL 192 F	Fundamentals of Metallurgy	3
TECH 127 F	Industrial Safety	2
Select 15-19 units from the courses listed below for a Drafting concentration. Choose all courses from the same area:		
Drafting Courses		
DRAF101 F	Blueprint Reading for Manufacturing	2
DRAF140 F	AutoCAD For Industry	3
DRAF141 F	Advanced CAD for Industry	2
DRAF143 F	3D Applications Using AutoCAD	2
DRAF171 F	Fundamentals of Drafting	2
DRAF173 F	Geometric Dimensioning and Tolerancing	2
DRAF944 F	Solidworks	2
DRAF945 F	Advanced Solidworks	2
Select 15-19 units from the courses listed below for a Machine Technology concentration. Choose all courses from the same area:		
MACH101 F	Introduction to Machine Tools	5
MACH102 F	Intermediate Machine Tools	5
MACH103 F	Advanced Machine Tools	5
MACH104 F	Advanced Topics in Machine Technology	5
MACH110 F	CNC Machine Set-Up and Operation	3
MACH115 F	CNC Parts Programming	3
MACH116 F	Machine Tools	2
MACH120 F	Advanced CNC Machining	3
MACH130 F	Multiple Axis CNC Set and Operation	3
MACH140 F	Basic CNC Swiss Style Lathe Set-up and Operation	3
MACH142 F	Advanced CNC Swiss Style Lathe Set-up and Operation	3
MACH145 F	Basic CNC Swiss Style Lathe Programming and Applications	3
MACH150 F	CNC Programming Using Mastercam	3
MACH152 F	Advanced CNC Programming Using Mastercam	3

MACH154 F	CNC Programming Using Surfcam	3
MACH156 F	Advanced CNC Programming Using Surfcam	3
MACH180 F	Introduction to Metrology	3
MACH182 F	Introduction to CMM Inspection and Romer Arms	3
MACH184 F	Advanced CMM and Romer Arm Inspection	3
MACH185 F	CMM and Romer Arm Applications	2
Select 15-19 units from the courses listed below for a Welding concentration. Choose all courses from the same area:		
WELD121AF	Introduction to Welding	2
WELD121BF	Fundamentals Inert Gas Welding	2
WELD091AF	Industrial Welding Fundamentals	5
WELD091BF	Semi-Automatic Welding Applications	5
WELD091CF	Manual Arc Welding Fundamentals	5
WELD096 F	Welding Inspection Technology	5
WELD098 F	Welding Fabrication Technology	2
WELD091DF	Structural Welding Certification	5
Total Units		29-33

Road map: Take the following courses in order:

- Fall or Spring-DRAF 171 and Machine 116 and Tech 108 and additional concentration units
- Fall or Spring -Weld 121A and METL 192 and additional concentration units
- Fall or Spring-Tech 127 and additional concentration units
- Fall or Spring-Additional concentration units to complete concentration requirement of 15 units.

Metrology Mini Certificate-Pending approval as of 8-14-19

The Machine Technology — Metrology Mini Certificate Program requires the completion of 13 units with a minimum grade of “C” in each course taken. At least one half of the units toward the certificate must be completed at Fullerton College.

Metrology Mini Certificate	
Required Courses (13 units)	Units
Machine 180 F Introduction to Metrology (3)	3
Machine 182 F Introduction to CMM and Romer Arm Inspection (3)	3
Machine 184 F Advanced CMM and Romer Arm Inspection (3)	3
Machine 185 F CMM and Romer Arm Applications (2)	2
DRAF 173 F Geometric Dimensioning and Tolerancing (2)	2
Total Units	13

Road map: Take the following courses in order:

- Fall or Spring- Machine 180
- Fall or Spring-Machine 182 and DRAF 173
- Fall or Spring –Machine 184 and Machine 185

Metrology Certificate

The Machine Technology — Metrology Certificate Program requires the completion of 29 units with a minimum grade of “C” in each course taken. At least one half of the units toward the certificate must be completed at Fullerton College.

Metrology Certificate	
Required Courses (30 units)	Units
Machine 180 F Introduction to Metrology (3)	3
DRAF 101 F Blueprint Reading	2
TECH 081 F Technical Math I	3
DRAF 173 F Geometric Dimensioning and Tolerancing (2)	2
Machine 182 F Introduction to CMM and Romer Arm Inspection (3)	2
Machine 184 F Advanced CMM and Romer Arm Inspection (3)	3
Machine 185 F CMM and Romer Arm Applications (2)	2
METL 192 F Metallurgy	3
TECH 108 F Manufacturing Processes	3
MACH 116 Introduction to Machine Tools	2
DRAF 944 F Solidworks	3
Total Units	29

Road map: Take the following courses in order:

(Note: All courses must be completed)

- Fall or Spring-TECH 081 and DRAF 101 and MACH 180
- Fall or Spring- DRAF 173 and Machine 182
- Fall or Spring- Machine 184 and METL 192
- Fall or Spring-Machine 185 and DRAF 944
- Fall or Spring –Machine 116 and TECH 108

CNC Swiss Lathe Certificate

The Machine Technology — CNC Swiss Lathe Certificate Program requires the completion of 9 units with a minimum grade of “C” in each course taken. All units towards the certificate must be completed at Fullerton College.

CNC Swiss Lathe Certificate	
Required Courses (9 units)	Units
Machine 140 F Basic CNC Swiss Style Lathe Set-up and Operation (3)	3
Machine 142 F Advanced CNC Swiss Style Lathe Set-up and Operation (3)	3
Machine 145 F Basic CNC Swiss Style Lathe Programming and Applications (3)	3
Total Units	9

Road map: Take the following courses in order:

- Fall or Spring- (Advisory: Mach 101 or Mach 110 or Mach 116 with a grade of “C” or better.)
Machine 140
- Fall or Spring- Machine 142
- Fall or Spring- Machine 145

Industrial Technology-AS Degree

The Industrial Technology programs prepares students by giving a broad understanding of communications, business finance, graphics, construction, manufacturing, and transportation systems, as well as many other subjects that are found in today's industry. Students are given instructions in various skill areas that can be applied directly in the workforce, such as in the manufacturing of products; designing of products with computer-aided design (CAD) software; constructions of buildings; repairing of automobiles; printing; photography; and other communication media skills for various TV, film, internet, print shops, and entertainment industries. A variety of businesses and industries are in need of individuals who have the knowledge and flexibility to learn, implement and manage new technology within complex business environments. Schools need well prepared industrial and technology education teachers to help educate and guide young men and women into high technology careers. On the business and industry side, Industrial Technology majors assume roles as "Industrial Technologists" in a wide variety of industrial and business settings and they understand managerial concepts and principles. Common to all Industrial Technologists is the focus on continuous improvement in the areas of productivity and quality. Technologists apply management theory and practice with technical skills to solve problems. Students typically go on to a 4 year institution to further their studies in specialties related to industry needs. Curriculum leads to the Associate of Science Degree. At least one half of the units toward the degree must be completed at Fullerton College. This degree requires 18 units chosen from the courses listed below.

Industrial Technology Associate of Science Degree		
Required Courses (18 units) Select 18 units from the following:	Courses may be taken in any order.	Units
ACCT100AF	Financial Accounting Principle	3
AUTO131 F	Automotive Fundamentals	4
BUS151 F	Business Mathematics	3
CRTV118 F	Introduction to Radio, TV and Film	3
CSTR100 F	Beginning Residential Construction	4
DRAF171 F	Fundamentals of Drafting	2
MACH116 F	Machine Tools	2
PHOT101 F	Basic Photography	3
PRNT101 F	Introduction to Printing	3
TECH127 F	Industrial Safety	2
WELD121AF or Welding 100 F	Introduction to Welding	2

Industrial Technology graduates will demonstrate the skills needed to apply business practices, information technology, and other technical skills necessary to collaborate with, organize, and lead interdisciplinary teams. In demonstrating this educational objective, graduates will exhibit the following outcomes. They will be able to:

- apply theories and principles to solve technical and management problems

- design, test and analyze a system or process to meet desired needs
- apply good written and oral communication and presentation skills
- collect, analyze and interpret data
- collaborate within a digital enterprise with a multi-disciplinary project team
- select and use computer applications software associated with desired needs