Advanced Manufacturing Technology
Precision Machining

GENERAL INFORMATION

Everett Community College offers a number of pathways toward technical careers, using stackable certificates and degrees. The first level, for students seeking entry into the technical world would be the **Manufacturing Pre-Employment Certificate**, a credential that would allow one to work in entry-level manufacturing. The next level up would be to take classes leading to a **Skills-Oriented Certificate**. And for those seeking a higher level of education, and the job skills and responsibilities that go with it, EvCC offers skills oriented **ATA Degrees**. This Advanced Manufacturing Technology curriculum guide describes all three levels in the Precision Machining discipline. This program also provides a flexible framework for the incorporation of credit from prior learning in industry or government. An early conference with one of the designated advisors is strongly suggested for success.

THE PROGRAM

The Advanced Manufacturing Technology – Precision Machining Program is part of a cluster of programs. Four **Associate in Technical Arts degrees** and nine **certificates** in **Advanced Manufacturing Technology** are offered, and may be pursued on a full-time or part-time basis at Everett Community College (EvCC).

ATA degree Programs:

- **Advanced Manufacturing Tech – Precision Machining**
- **Advanced Manufacturing Tech – Technical Design (CAD)***
- **Advanced Manufacturing Tech – Composites***
- **Advanced Manufacturing Tech - Welding and Fabrication***
- **Advanced Manufacturing Tech -- Mechatronics**

*** Described in a separate guide.**

Certificate Programs:

- **Manufacturing Pre-Employment**
- **Precision Machining**
- **Engineering Technology (CAD)***
- **CATIA 3D Experience ***
- **Composites ***
- **Welding and Fabrication ***
- **Mechatronics**
- **Introduction to Composites ***
- **Introduction to Robotics**

*** Described in a separate guide.**

The overall program is designed for maximum flexibility, in that one may choose to take one or two courses to enhance their current skills, or pursue a certificate or degree, depending on their goals. The program outcomes for students pursuing the degree will prepare them to perform the following tasks:

- Solve technical mathematical problems
- Read and understand basic engineering drawings
- Understand and utilize machine technology
- Write programs and setup CNC machines
- Operate and perform maintenance on CNC machines
- Document technical activities in written and verbal reports
- Be prepared for successful employment

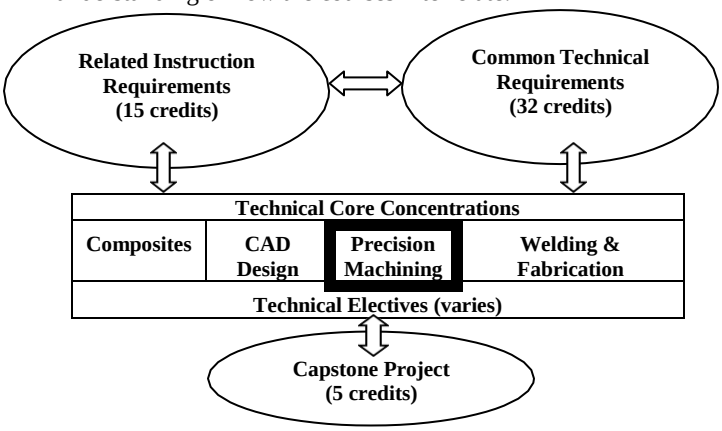
CREDIT FOR PRIOR LEARNING

Adults with work experience or completion of industry training programs may be eligible for college credit by following "External Credit" evaluation procedures. Students currently in high school may take selected technical courses while in high school and apply at that time for college credit.

External Credit:	Contact Enrollment Services Call: 425-388-9219
Tech Prep:	www.everettcc.edu/techprep Or contact your high school counselor

THE COURSES

The courses for this program may be divided into four categories: related instruction requirements (15 credits), common technical requirements (32 credits), technical core concentration classes (31 to 40 credits), technical electives (credit varies) and the final capstone class (5 credits). Students seeking an ATA degree will take the number of credits shown in each area plus a number of technical elective classes until the total credit accumulations meets or exceeds the degree requirement. Note that a minimum of 28-40 credits need to come from any one technical concentration to qualify for that particular degree. The actual courses are listed further on in this curriculum guide. See the diagram below for an understanding of how the courses interrelate.



GETTING STARTED AT EVCC

Our Enrollment Services Office provides information about application, advising, orientation and registration for new and continuing students. Students interested in the program should talk to an advisor prior to selecting classes for the first quarter:

Advising	425-388-9339
Enrollment Services	425-388-9219
Precision Machining (Darin Chase)	425-388-9390
CAD (David Primacio)	425-267-0160
CAD (Sean Auger)	425-388-9534
Mechatronics (Ken Ackerman)	425-388-9290
Welding (Robert White)	425-388-9457
Welding (Karl Fulton)	425-388-9447
Composites (Michael Patching)	425-388-9092

Approved by Instructional Council March 2020

ATA Degree: Advanced Manufacturing Tech – Precision Machining
92 credits

The courses required for an **Associate in Technical Arts Degree in Advanced Manufacturing Tech – Precision Machining** are listed below. Students should meet with an advisor and maintain this checklist while at Everett Community College. The quarter before expected completion, this checklist should be submitted with a diploma application to the Enrollment Services Office. EvCC does not offer every course each quarter, so please consult a class schedule and an advisor to plan course selections. Note that to earn this degree, a cumulative GPA of 2.0 or higher must be maintained.

Student Name:_____**Advisor Signature**:_____**Date:**_____

❑ **COMPLETION of Diversity Course**
(BUS 110D, ENGL 098D or ENGL& 101D suggested) _____ _____ _____
Course Title **Qtr/Yr Completed** **Grade**

Course Number	Course Title	Credits	Quarter Planned	Quarter completed	Grade
RELATED INSTRUCTION (15 credits)					
ENG T 101 or MATH 086 or higher	Introduction to Graphics and Measurements	5			
ENGL 98/98D or ENGL& 101/101D	Intro to College Writing or English Composition I	5			
BUS 110D, BUS 165, CMST& 210, CMST& 230	Human Relation Course from this group. Business 110D recommended	5			
COMMON TECHNICAL REQUIREMENTS (32 credits)					
MFG T 100	Preparation for Success and Safety in Industry	5			
CT 101	Introduction to Composites	5			
MFG T 117	Blueprint Reading and Schematics	3			
ENG T 100, or 108, or 185	Engineering Graphics: Intro to CAD	4			
MFG T 101 or MFG T 113*	Introduction to Machining	5			
WELD 101 or higher	Introduction to Welding	5			
MECH 119 or higher	Introduction to Robotics	5			
PRECISION MACHINING TECHNICAL CORE REQUIREMENTS (40 credits)					
MFG T 104	Machine Operator I	20			
MFG T 105	Machine Operator II	20			
TECHNICAL ELECTIVES (2 - 12 credits - see last page for additional suggestions)					
MFG T 102 (recommended)	Manufacturing Employment Readiness	12			
CAPSTONE PROJECT REQUIREMENTS (5 credits – select one class from the list below. Generally follows all other classes.)					
MFG T 229 or MFG T 230	Manufacturing Team Project	5			
	MINIMUM REQUIRED CREDITS	**92**	**Min 2.0 cumulative GPA**		

* If you already have the certificate, this class was embedded in the certificate and you don't need to take it. Additionally, the following courses may be substituted for MFG T 101: MFG T 107, 119, 113 or 202.

Interested in transferring to a university?

Students completing this ATA degree can transfer directly to the Information Technology and Administrative Management (ITAM) program at Central Washington University or to the Manufacturing Operations program at Clover Park Technical College to pursue a Bachelor of Applied Science (BAS) degree. Go to www.cwu.edu/it-management/bas-overview or www.cptc.edu/programs/basmo for more information.

Principles of Precision Machining: Certificate

GENERAL INFORMATION

The Principles of Precision Machining Certificate program is designed to provide students with the basic skills necessary to gain employment as machine operators. Students will develop skills in applied machining including basic math, basic and advanced blueprint reading, conventional lathe and mill operations, small shop tools and operation, shop safety and teamwork. This certificate may be considered a stand-alone credential for people seeking to enter the Precision Machining field, or as part of a stackable set of certificates and degrees in the EvCC Advanced Manufacturing Program leading to a degree in Precision Machining.

There is a current need in Washington for more than 1,000 CNC operators. Graduates of this certificate program may work in companies of different sizes, from small shops to large aerospace companies. Indicators show the industry will remain strong beyond the year 2020.

PROGRAM INFORMATION

The two- quarter program will focus on skills used in a modern machine shop. The first quarter focuses on machine shop math, blueprint reading, and conventional machine tool theory and lab. CNC is introduced. The second quarter builds upon skills gained in the first quarter, adds in geometric dimension and tolerance, applied math skills including geometry and trigonometry, and more CNC programming and operations.

PROGRAM OUTCOMES

- Solve technical mathematical problems
- Read and understand basic engineering drawings
- Understand and utilize machine technology
- Write programs and setup CNC machines
- Operate and perform maintenance on CNC machines
- Document technical activities in written and verbal reports
- Be prepared for successful employment

COURSE INFORMATION

MFG T 104 Machine Operator 1
Applied machinist math including measurements, basic blue print reading, conventional lathe and mill operations, small shop tools operation and an introduction to CNC. Students are introduced to processes and procedures, and shop safety and teamwork.

MFG T 105 Machine Operator 2
Develops skills in advanced blueprint reading including understanding of Geometric Dimensioning and Tolerance; applied math skills including geometry and trigonometry; technical core skills in CNC Machine programming and operation are further developed.

GETTING STARTED AT EVCC

Our Enrollment Services Office provides information about application, advising, orientation and registration for new and continuing students. If students have questions about applying or getting started they may contact Enrollment Services.

- Enrollment Services, Parks Student Union
  425-388-9219
  admissions@everettcc.edu
- Advising Center, Rainier Room 108,
  425-388-9339

PROGRAM ADVISORS

For specific guidance about this certificate, contact:

- Advanced Manufacturing Training & Education Center (AMTEC) 425-388-9570, mfg@everettcc.edu

Certificate: Principles of Precision Machining (40 Credits)

This checklist is targeted at students with an interest CNC operator and machinist. Courses have prerequisites. Upon enrollment, this checklist should be submitted with a diploma application to the Enrollment Services Office.

Student:_____ **Advisor:**_____ **Date:** _____

Course Number	Course Title	Credits	Quarter Planned	Quarter Done	Grade
REQUIRED COURSES					
MFG T 104	Machine Operator 1	20			
MFG T 105	Machine Operator 2	20			
		TOTAL: 40 credits		**Minimum 2.0 GPA**	

Manufacturing Pre-Employment Certificate

GENERAL INFORMATION

The Manufacturing Pre-Employment certificate is a one-quarter program designed to prepare students to work at the entry level in a manufacturing facility and the aerospace industry.

This course serves as an introduction to manufacturing. The knowledge and skills acquired in this course are required for entry level positions in diverse workplace scenarios with special emphasis on aerospace. Content includes a survey of mechanical concepts, precision measurement, blueprint reading, quality assurance, workforce skills/communication, ergonomics, lean manufacturing, and sustainable business practices.

This certificate may be considered a stand-alone credential for people seeking to enter the manufacturing field, or as part of a stackable set of certificates and degrees in the EvCC Advanced Manufacturing Program.

GETTING STARTED AT EVCC

Our Enrollment Services Office provides information about application, advising, orientation and registration for new and continuing students. If students have questions about applying or getting started they may contact Enrollment Services. Contact:

- Enrollment Services, Parks Student Union, 425-388-9219 admissions@everettcc.edu
- Advising Center, Rainier Room 108, 425-388-9339

PROGRAM CERTIFICATE OUTCOMES

- Understand and solve basic technical mathematical problems
- Communicate orally and in writing about technical activities
- Be prepared for successful employment
- Understand and work with entry level technical and mechanical systems
- Perform work using basic computer skills
- Meet industry requirements for safety and first aid

For specific guidance about this certificate, contact:

- Advanced Manufacturing Training & Education Center (AMTEC) 425-388-9570, mfg@everettcc.edu

For more information about our graduation rates, the median debt of students who completed the program, and other important information, please visit our website at www.everettcc.edu/gainfulemployment

Certificate: Manufacturing Pre-Employment
12 Credits

This checklist is targeted at students with an interest in an entry level manufacturing systems and/or the aerospace industry. Upon enrollment, this checklist should be submitted with a diploma application to the Enrollment Services Office.

Student:_____**Advisor Signature:**_____**Date:** _____

Course Number	Course Title	Credits	Quarter Planned	Quarter Done	Grade
REQUIRED COURSES					
MFG T 102	Manufacturing Employment Readiness	12			
		TOTAL: 12 credits		**Minimum 2.0 GPA**	

This certificate satisfies the requirements for MFG T 100 and Technical Electives of the Advanced Manufacturing ATA Degree.

DEGREE ELECTIVES

You may complete elective credits to satisfy the ATA degree requirements in this program. These should be technical in nature, but need not be if your selection enhances your ultimate employability. Any college level English course, for example, would enhance your communication skills and be considered acceptable. Please browse through the college catalog and examine the wide variety of courses offered at EvCC. The following list is presented for your convenience and represents some of the more commonly selected elective courses.

COMPOSITES TECHNOLOGY

CT 161	Materials and Processes
CT 202	Composites
CT 120	Composite Fabrication
CT 125	Composite Assembly
CT 130	Composite Repair
CT 145	Composite Special Projects

WELDING

WELD 111	Basic Layout
WELD 150	Blueprint Reading for Industry
WELD 151	Carbon Steel Metallurgy for the Trades
WELD 152	Welding Base Materials: Processes & Procedures
WELD 153	Non-Ferrous Metallurgy for the Trades
WELD 190	Oxyacetylene
WELD 191	Basic Arc
WELD 192	Advanced Arc
WELD 193	Basic Pipe
WELD 194	Gas Tungsten Arc Welding (TIG)
WELD 195	Gas Metal Arc/Flux Core Arc Welding
WELD 196	Flux Core Arc Welding
WELD 210	Heavy Plate Fabrication
WELD 211 or	Sheet Metal Fabrication **or**
WELD 217	Advanced Sheet Metal Fabrication
WELD 212	Pipefitting & Pipe Systems Fabrication
WELD 213	Practical Fabrication and Advanced Welding Techniques
WELD 214	Sub-Arc Welding
WELD 216	Advanced Tig Welding
WELD 225	Welding Skills Building
WELD 285 or	CNC Plasma Cutting **or**
WELD 286	Aerospace CNC Plasma Cutting
WELD 295	Work Experience Internship

MANUFACTURING TECHNOLOGY

MFG T 102	Manufacturing Employment Readiness
MFG T 107	Machining with Mastercam
MFG T 113	CNC Cutting Solutions
MFG T 202	Lean and Operations Management

TECHNICAL DESIGN (CAD)

ENG T 100	Introduction to Engineering Graphics and 2D AutoCAD
ENG T 103	Introduction to Revit
ENG T 196	Advanced Workbenches with CATIA 3D Experience
ENG T 203	Intermediate AutoCAD
ENG T 259	Engineering Graphics (SolidWorks II)
ENG T 193	Intermediate Catia
ENG T 217	CAD Projects

OTHER SUGGESTIONS

BT 100	Beginning Keyboarding
ACCT 110	Small Business Accounting
BUS& 101	Introduction to Business
BT 162	Job Search & Professional Development
BT 242	Excel
BT 243	Advanced Excel
IT 117	CCNA 1: Introduction to Networking
ECON 101D	Understanding Economics
ENG T 104	Mechanical Blueprint Reading
ENGR& 104 or BUS 102	Introduction to Design
GEOG 205	Physical Geography with GIS, GPS, and Remote Sensing labs
GRAPH 100	Intro to Digital Studio
GRAPH 110	Foundations of Graphic Design
GRAPH 113	Graphic Design and Typography
PHOTO 110	Photography I: Basic Elements

ENGLISH COURSES
You may select any English course, ENGL& 101 or higher, or any Communications course (CMST).

HUMAN RELATIONS (R)
You make take any human relations course listed on page 2

INTERNSHIP
MFG T 171
MFG T 172

MATHEMATICS COURSES
MATH 086 is particularly recommended for the degree if you haven't taken a higher level course in Technical Geometry and Trigonometry.

SCIENCE COURSES
You may select any physics, chemistry, or engineering course

BUSINESS COURSES
You may select any business course