

Certificate of Achievement-Advanced (COA-A)

Advanced Manufacturing and Prototyping Technician

Program Description

This Certificate of Achievement-Advanced covers the fundamentals of advanced manufacturing prototype and product development. Students learn to render digital designs using CAD/CAM software and produce three-dimensional models and prototypes using 3D printing/additive manufacturing (AM), CNC machining/subtractive manufacturing, or a combination of these processes. Additional topics include the safe setup and operation of 3D printers and CNC equipment, determination of processes and materials to be used for prototype development and production, and the inspection and testing of finished items. Upon completion, students are prepared for a range of advanced manufacturing and product development occupations including industrial and mechanical engineering technicians and prototype and model makers across multiple industry sectors, including medical, technology, aerospace, transportation, and consumer products. Advanced Manufacturing and Prototyping Technician program completers will also develop strong cross-disciplinary skills in 3D printing/AM and CNC machining to pursue career opportunities as members of industrial design and new product introduction teams.

Program Learning Outcomes

Upon completion, students will be able to

- Construct and inspect machined projects using conventional and CNC equipment that uses word address programs
- Create and manipulate designs for three-dimensional prototypes and models using CAD/CAM software
- Design and construct three-dimensional objects
- Differentiate and analyze the materials and processes used in subtractive and additive manufacturing
- Create part geometry using SolidWorks or Creo/Pro Engineer CAD software
- Utilize CAD software to produce and optimize design drawings for 3D printing/additive manufacturing, factoring geometric dimensioning and tolerancing (GD&T) considerations
- Differentiate and analyze the materials and processes used in manufacturing
- Produce prototypes and models using 3D printing/additive manufacturing processes and materials as per ANSI/ISO Standards
- Produce tool paths with constructed and imported geometry using Mastercam
- Create tool paths for CNC machining using constructed and imported geometry in Mastercam
- Construct machined projects using conventional and CNC equipment employing word address programming (G & M code)
- Inspect and test finished prototypes and parts
- Recommend design and production modifications as necessary

Certificate of Achievement-Advanced Requirements

Certificates of Achievement-Advanced are awarded by the college and notated on official transcripts.

- Completion of all major courses with a C grade or higher
- Demonstrated proficiency in English and mathematics as evidenced by eligibility for EWRT 1A, EWRT 1AH or ESL 5 and eligibility for MATH 114 or a transfer-level math course.
- No more than 18 quarter units may be transferred from other academic institutions.

Program Requirements

IMPORTANT NOTE: Some courses have prerequisites; see the college catalog for more information.

IMPORTANT NOTE: Some courses have a cross-listed and/or honors version. Students will receive credit for only one version of the course.

Required Core: (31 Units)

Course	Title	Units
DMT 53	Introduction to 3D Printing/Additive Manufacturing	4
DMT 54	3D Printing/Additive Manufacturing: Applications and Practice	4
DMT 56	3D Printing for AM Support Technicians and Operators	5
DMT 80	Introduction to Machining and CNC Processes	5
DMT 84A	Introduction to CNC Programming and Operation; Mill	5
DMT 92	Applied GD&T (ASME Y14.5m); Coordinate Measuring Machines (CMM)	4
DMT 95	Manufacturing Materials and Processes	4

List A: (4 Units)

Course	Title	Units
DMT 60A	SolidWorks (Introduction)	4
DMT 60B	SolidWorks (Introduction)	4
DMT 60C	SolidWorks (Introduction)	4
DMT 60D	SolidWorks (Introduction)	4
DMT 60E	SolidWorks (Introduction)	4
DMT 65A	Creo Parametric (Introduction)	4
DMT 65B	Creo Parametric (Introduction)	4
DMT 65C	Creo Parametric (Introduction)	4

Course	Title	Units
DMT 65D	Creo Parametric (Introduction)	4
DMT 65E	Creo Parametric (Introduction)	4

List B: (5 Units)

Course	Title	Units
DMT 87E	CAD/CAM Programming Using Mastercam	5

List C: (5 Units)

Course	Title	Units
DMT 87K	CAD/CAM Based CNC Surface Contouring Programming Using Mastercam	5

Total Required: 45 Units