

# ADVANCED MANUFACTURING (ADVM)

## ADVM 0001. Technical Drafting I

Units: 3

Formerly known as DES 1

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)  
Fundamental use of design equipment to create both two dimensional technical sketches and two and three dimensional computer generated (CAD) working drawings that are used for product definition. Introduction to product and process definition as specified by engineering design disciplines. This course teaches introductory 3D AutoCAD skills. Designed for students with no previous experience in engineering design/drafting. (CSU)

## ADVM 0002. Technical Drafting II

Units: 3

Formerly known as DES 2

Prerequisite: Completion of ADVM 1 with grade of "C" or better or equivalent as determined by instructor  
Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)  
Intermediate concepts of engineering design including sections, auxiliaries, threads, fasteners, and dimensional tolerancing. Basic concepts of Geometric Dimensioning and Tolerancing. Design for manufacturability and assembly explored to include material selection and properties of materials. This course teaches intermediate/advanced 3D AutoCAD skills. Designed for students who have attained a fundamental knowledge of the processes and practices of engineering design/drafting. (CSU)

## ADVM 0003D. Design for Additive Manufacturing - 3D Printing

Units: 3

Formerly known as DES 3D

Hours: 90 (36 lecture, 54 laboratory)

Introduction to design for 3D printing through machine operation and use of design software to create geometric models to satisfy defined requirements. Introduction to product design process and exploration of additive manufacturing (3D printings) impact on that process, as well as manufacturing. Designed for students with no prior experience with 3D printing or design. (not transferable)

## ADVM 0011. Three-Dimensional Modeling

Units: 3

Formerly known as DES 11

Prerequisite: Completion of ADVM 2 or ADVM 3D or MECH 44 or ENGR 151 or ADVM 66 with grade of "C" or better; or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)  
Processes employed in developing design solutions using a feature based parametric solid modeler. Includes 3D part and assembly modeling, and the development of 2-dimensional part, assemblies, welding and sheet metal drawings per ASME standards. SolidWorks is the solid modeler used. (CSU, UC)

## ADVM 0012. Geometric Dimensioning and Tolerancing

Units: 3

Formerly known as DES 12

Prerequisite: Completion of ADVM 2 or ADVM 11 or ADVM 66 or ENGR 151 with grade of "C" or better or equivalent as determined by instructor  
Hours: 54 lecture

Expands upon basic knowledge of dimensioning mechanical drawings by adding form and feature controls in order to clearly define parts. Review of basic dimensioning and tolerancing. Topics, as defined in ASME Standards, include geometric tolerancing symbols and terms, rules of geometric dimensioning and tolerancing, datums, material condition symbols, tolerances of form and profile, tolerances of orientation and runout, location tolerances and virtual condition. (CSU)

## ADVM 0028. Independent Study

Units: 1-3

Designed for students interested in furthering their knowledge at an independent study level in an area where no specific curriculum offering is currently available. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU, UC-with unit limitation)

## ADVM 0062. Introduction to Computer Aided Design and Manufacturing (CAD/CAM)

Units: 2.5

Hours: 81 (27 lecture, 54 laboratory)

Introduction to CAD/CAM using Fusion 360. Covers practical on-the-job skills needed for precision machining. Students will learn skills needed to read and understand detailed drawings, create a process plan for machining parts, create 3D CAD files from 2D drawings, create 2D drawings from 3D models, plan and create CNC toolpaths and export G-code for manufacturing. (not transferable)

## ADVM 0063. Design and 2-D Manufacturing of 3-D Objects

Units: 2

Hours: 72 (18 lecture, 54 laboratory)

Students will learn the basic working principles of water jet cutting, laser cutting, laser engraving, plasma cutting, CNC and manual press brake machinery. Class projects will be modeled using computer software and then cut, engraved, or formed using the appropriate manufacturing process for the job. (not transferable)

## ADVM 0064. Computer-Aided 2D Design

Units: 3

Formerly known as WELD 64

Hours: 90 (36 lecture, 54 laboratory)

Study of Computer Numerically Controlled (CNC) cutting systems in the 2D world using industry standard hardware and development software. Topics include design principles, copyright, selection of materials, billing of materials and job estimating, basic G and M code commands, use of consumables, cut quality evaluation, and trouble-shooting techniques. (not transferable)

## ADVM 0066. CNC Machining Level 1

Units: 3

Formerly known as WELD 66

Advisory: Completion of ADVM 62 with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Intermediate course making billet aluminum parts from start to finish using HAAS CNC milling machines. Fusion 360 will be used to model and program class assignments which are then posted to HAAS machines where students will learn how to set up and operate HAAS CNC vertical machining centers. After the parts have been machined, students will use common industry measuring and inspection techniques to insure their parts are in tolerance. (not transferable)

**ADVM 0067. CNC Machining Level 2**

*Units: 3*

Formerly known as WELD 67

Prerequisite: Completion of ADVM 66 with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Applications using multi-axis CNC machining. Developing complicated part geometry with Computer Aided Design (CAD), importing files, planning machine operations, and developing machine codes by Computer-Aided Machining (CAM) with multi-axis focus. Includes simulation modeling used to proof the assigned laboratory exercises and set-up for 3+2 and 4th and 5th axis operation of CNC machining centers. (not transferable)

**ADVM 0068. Advanced Mill 4th and 5th Axis**

*Units: 3*

Prerequisite: Completion of ADVM 67 with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Advanced CNC machining 4th and 5th axis Mill work. Developing complicated part geometry with Computer Aided Design (CAD), Post process CAM tool path development, planning machine operations, and developing machine codes and techniques for cost effectiveness. CNC Lathe operations. (CSU)

**ADVM 0095. Internship in Advanced Manufacturing**

*Units: 0.5-4*

Designed for advanced students to work in an area related to their educational or occupational goal. Provides new on-the-job technical training under the direction of a worksite supervisor, allowing students to expand knowledge and skills in the chosen field. Mandatory orientation session and faculty approval to determine eligibility. One unit of credit is equal to 54 hours of work. Students may earn up to a total of 16 units in internship courses (any course numbered 95 and PDEV 94). (CSU-with unit limitation)