

# ENGINEERING DRAFTING & DESIGN (MDES), AAS

At Dunwoody College of Technology, the Engineering Drafting & Design program provides students with the entry-level skills and theoretical knowledge to engineer and design products utilizing the latest technology in CAD/CAM software.

Graduates from this program are prepared to enter the industry as mechanical designers, drafters, CAD/CAM technicians, quality inspectors, and tool designers.

The course of study includes print reading; machine tool applications; measurement and materials; job planning and layout; CAD/CAM software; solid modeling; finite element analysis; transmission of power; and 3D prototyping. Students spend a significant amount of time in the machine shop and metrology lab, gaining hands-on manufacturing skills to help them understand the realities of 21st-century manufacturing. Students obtain Certified Solidworks Associate (CSWA) certification as part of their course of study.

Arts & Sciences curriculum supports the technical coursework by enhancing the students' communication, mathematics, and critical thinking skills.

Credits earned in the Engineering Drafting & Design AAS directly transfer into the following Dunwoody programs:

- Industrial Engineering Technology Bachelor of Science (IENG) (<https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/engineering/industrial-engineering-technology-ieng-bachelor-science/>)
- Business Management & Leadership Bachelor of Science (AMGT) (<https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/business/business-management-leadership-amgt-bs/>)

**Credential Earned:** AAS

**Length of Program:** 2 years (4 semesters)

**Classes Offered:** Day

**Available Starts:** Fall Semester

## Program Outcomes

- Demonstrate required industry safety standards.
- Create professional documentation using appropriate methods.
- Develop a relationship between fit, form, and function using ergonomics to ensure a working product.
- Initiate problem-solving skills and techniques to develop manufacturing related solutions.
- Explore cultural and environmental issues related to manufacturing.
- Demonstrate proper use of manufacturing equipment.
- Perform objectives required of an industry-based capstone project.

## Degree Requirements

Code	Title	Credits
<b>General Requirements</b>		
MATH1010	Algebra I	3
MATH1020	Algebra II	3
Communications		3

Humanities		3
General Science Elective		3
Social Sciences		3
<b>Technical Requirements</b>		
MACH1110	Machine Tool Fundamentals Lab	5
MACH1120	Machine Tool Fundamentals Theory	4
MDES1110	Engineering Drawings with SolidWorks	4
MDES1210	Process & Tool Design Lab	5
MDES1230	Geometric Dimensioning & Tolerances	4
MDES2130	Advanced SolidWorks	4
MDES2110	Product Design Lab	5
MDES2120	Product Design Theory	4
MDES2230	Statics & Strength of Materials	4
MDES1220	Creo Parametric	4
MDES2210	Transmission of Power Lab	5
MDES2220	Transmission of Power Theory	4
<b>Total Credits</b>		<b>70</b>

## Courses

### Descriptions

#### **MACH1110 | Machine Tool Fundamentals Lab | Laboratory (5 Credits)**

Manufacturing of parts through layout and bench work, includes the use of band saws, drill presses, surface grinders, manual lathes and vertical mills. Basic principles in metal-cutting technology includes threading, tapers, knurling, boring, radii cutting and milling procedures such as squaring stock, the use of rotary table and the many other milling and turning operations.

**Corequisite(s):** MACH1120

#### **MACH1120 | Machine Tool Fundamentals Theory | Lecture (4 Credits)**

Identification, recognition and calculations associated with basic principles in metal-cutting technology including machine feeds and speeds, threading, tapers, knurling, boring, radii cutting and milling and turning procedures.

**Corequisite(s):** MACH1110

#### **MDES1110 | Engineering Drawings with SolidWorks | Lecture (4 Credits)**

Creation of 3D solid models, assemblies and related engineering documentation using SolidWorks. Blueprint reading and application of ASME/ANSI standards to CAD drawings.

#### **MDES1210 | Process & Tool Design Lab | Laboratory (5 Credits)**

Distinguish modern manufacturing processes such as molding, welding, heat treating, and machining; identify typical materials, tools, and required equipment. Analysis of process-specific capabilities such as tolerance, surface finish, cost effectiveness, and geometry restrictions.

**Prerequisite(s):** MACH1110

#### **MDES1230 | Geometric Dimensioning & Tolerances | Lecture (4 Credits)**

Principles of geometric dimensioning and tolerancing in the context of engineering and manufacturing. Application of principles using coordinate measurement machines.

**Prerequisite(s):** MDES1110

#### **MDES2130 | Advanced SolidWorks | Lecture (4 Credits)**

Simulation (Finite Element Analysis) and advanced surface modeling techniques. Culminates in testing for CSWA certification.

**Prerequisite(s):** MDES1110

**MDES2110 | Product Design Lab | Laboratory (5 Credits)**

Introduction to product design methods and concepts; converting product ideas and requirements into working designs. Design balance and relation to concepts such as aesthetics, performance, ergonomics and manufacturability.

**Prerequisite(s):** MDES1210

**Corequisite(s):** MDES2120

**MDES2120 | Product Design Theory | Lecture (4 Credits)**

Integrate methods and concepts of product design to actual designs of simple products. Determine design parameters, develop product opinions, narrow the focus for balance, and document the final design.

**Corequisite(s):** MDES2110

**MDES2230 | Statics & Strength of Materials | Lecture (4 Credits)**

Fundamentals of statics and strength of materials. Development of techniques and mathematical methods used in design. Problem solving includes statics, direct stress, strength of materials, indirect stress, torsional stress and combined stress.

**Prerequisite(s):** MDES2130

**MDES1220 | Creo Parametric | Lecture (4 Credits)**

Create solid models, assemblies and engineering documentation using Creo Parametric. Apply fits and geometric dimensioning and tolerancing to models and drawings.

**MDES2210 | Transmission of Power Lab | Laboratory (5 Credits)**

Design and draw projects with applications of gears, chains, bearings, cams, motors, clutches, cylinders, fluid and mechanical power transmission, robots and automation. Design resolution incorporating; project management, project selection, product design, calculations, design analysis, documentation, technical communications, quality and presentation.

**Prerequisite(s):** MDES2110

**Corequisite(s):** MDES2220

**MDES2220 | Transmission of Power Theory | Lecture (4 Credits)**

Identification, recognition and calculations associated with components of machines; mechanical and fluid power transmission, motors, clutches, gears, chains, bearings, cams, robots and automation. Design resolution incorporating; project management, project selection, product design, calculations, design analysis, documentation, technical communications, quality and presentation.

**Prerequisite(s):** MDES2120

**Corequisite(s):** MDES2210

**MATH1010 | Algebra I | Lecture (3 Credits)**

Foundational algebra is applied in the context of geometry and trigonometry. Topics include rules of exponents, simplifying expressions, solving equations, computing measurements of two and three dimensional shapes, solving right triangles, and solving oblique triangles.

**General Education:** Mathematics

**MATH1020 | Algebra II | Lecture (3 Credits)**

Algebraic and trigonometric skills are developed further. Topics include, functions, graphing, factoring, advanced solving techniques, systems of linear equations, coordinate trigonometry, and vectors.

**Prerequisite(s):** MATH1010

**General Education:** Mathematics