MACHINE TOOL TECHNOLOGY (MACH), AAS

At Dunwoody College of Technology, the Machine Tool Technology program provides students with entry-level skills and theoretical knowledge to program and operate all of the latest machine tools utilized in modern manufacturing facilities.

Graduates from this program are prepared to enter the industry as machine operators, production machinists, CAD/CAM technicians, CNC programmers, and tool designers.

The course of study includes: manual milling and turning; measurement and materials; job planning and layout; CAD/CAM software; CNC milling and turning; mold and die making; and EDM technology.

The program's curriculum is closely aligned with standards set forth by the National Institute of Metalworking Skills (NIMS). Due to high demand, most machine tool students can find full-time employment in the field long before graduation, and many will be working in a shop within the first year of the program.

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

Credential Earned: AAS
Length of Program: 2 years (4 semesters)
Classes Offered: Day
Available Starts: Fall Semester
Accreditation: NIMS (National Institute for Metalworking Skills)
Bachelor’s Completion Option(s): Industrial Engineering Technology (IENG), Bachelor of Science (https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/engineering/industrial-engineering-technology-ieng-bachelor-science/) | Business Management Leadership (AMGT), Bachelor of Science (https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/engineering/industrial-engineering-technology-ieng-bachelor-science/)

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

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH1000</td>
<td>Algebra &amp; Trigonometry</td>
<td>3</td>
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<tr>
<td>MATH2250</td>
<td>Statistics</td>
<td>3</td>
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<td>Communications</td>
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<td>General Elective</td>
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<td>Humanities</td>
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Natural Sciences 3
Social Sciences 3
Technical Requirements

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<tr>
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<tbody>
<tr>
<td>MACH1110</td>
<td>Machine Tool Fundamentals Lab</td>
<td>5</td>
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<tr>
<td>MACH1120</td>
<td>Machine Tool Fundamentals Theory</td>
<td>4</td>
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<tr>
<td>MDES1110</td>
<td>Engineering Drawings with SolidWorks</td>
<td>4</td>
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<tr>
<td>MACH1210</td>
<td>Advanced Machining Lab</td>
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<td>MACH1220</td>
<td>Advanced Machining Theory</td>
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<tr>
<td>MDES1230</td>
<td>Geometric Dimensioning &amp; Tolerances</td>
<td>4</td>
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<tr>
<td>MACH2210</td>
<td>CNC Mill, EDM &amp; Die Making Lab</td>
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<td>CNC Mill &amp; EDM Theory</td>
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<td>MACH2230</td>
<td>Die Design Theory</td>
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<tr>
<td>MACH2140</td>
<td>MasterCAM I</td>
<td>4</td>
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<tr>
<td>MACH2110</td>
<td>CNC Lathe, Mill &amp; Mold Making Lab</td>
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<td>MACH2120</td>
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<td>MACH2130</td>
<td>Mold Design Theory</td>
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<tr>
<td>MACH2240</td>
<td>MasterCAM II</td>
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Total Credits 72

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.

MACH1210 | Advanced Machining Lab | Laboratory (5 Credits)
Advanced manufacturing of parts through layout, bench work and job planning. Advanced manual turning and milling and an introduction to CNC M & G codes. CNC portion includes manual programming via machine control and software simulation.
Prerequisite(s): MACH1110
Corequisite(s): MACH1220

MACH1220 | Advanced Machining Theory | Lecture (4 Credits)
Identification, recognition and calculations associated with advanced milling and turning operations, inspection of finished parts and an introduction to the G & M codes used in CNC programming. CNC portion includes manual programming in notepad and immersive software simulation.
Prerequisite(s): MACH1120
Corequisite(s): MACH1210
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

MACH2210 | CNC Mill, EDM & Die Making Lab | Laboratory (5 Credits)
Advanced manufacturing processes using CNC lathe, CNC mill, wire EDM and sinker EDM. Design and build a complete blanking die, along with hand and inspection tool techniques to ensure proper fits and finishes. Explore the set up and operation of 4 axis machine tool.
Corequisite(s): MACH2220

MACH2220 | CNC Mill & EDM Theory | Lecture (2 Credits)
Advanced work holding principles, 4 axis CNC programming, axis definitions, wire EDM programming and power definitions.
Corequisite(s): MACH2210

MACH2230 | Die Design Theory | Lecture (2 Credits)
Die design fundamentals and components including bend tolerances, cutting clearances, tonnage calculations, forming, and fits and clearances for dies.

MACH2140 | MasterCAM I | Lecture (4 Credits)
2D and 3D geometry and surface model creation using MasterCAM software, an associative computer-aided manufacturing system for milling and turning. M and G code programs will be created, debugged and simulated cutter paths run for simple part geometries.
Prerequisite(s): MDES1110

MACH2110 | CNC Lathe, Mill & Mold Making Lab | Laboratory (5 Credits)
Advanced manufacturing processes using CNC lathes, CNC mill and EDM, design and build of an injection mold, along with hand and inspection tool techniques.
Prerequisite(s): MACH1210
Corequisite(s): MACH2120 MACH2130

MACH2120 | CNC Lathe & Mill Theory | Lecture (2 Credits)
Advanced CNC mill programming and introduction to CNC lathe programming. G & M codes, canned cycles, jigs, fixtures and work holding methods.
Prerequisite(s): MACH1220
Corequisite(s): MACH2110

MACH2130 | Mold Design Theory | Lecture (2 Credits)
Mold making methods and industry standard practices, history and uses. Design of one injection mold from concept to finished prints. Includes mold steels, press operation, molding cycle and inspection of finished parts.
Prerequisite(s): MACH1220
Corequisite(s): MACH2110

MACH2240 | MasterCAM II | Lecture (4 Credits)
Advanced 3D design, surface and solid model creation using MasterCAM. Tool path creation and posting for both 2D and 3D geometry including advanced surface and solid models. Lathe part creation and programming in 2D.
Prerequisite(s): MACH2140

MATH1000 | Algebra & Trigonometry | Lecture (3 Credits)
Real numbers and polynomials, exponents and radicals, fractional equations; proportions and linear equations; trigonometric functions, solutions of triangles, radians, trig functions graphs, vectors, and basic identities.
General Education: Mathematics

MATH2250 | Statistics | Lecture (3 Credits)
Descriptive and inferential statistics, frequency distributions, probability theory, and issues related to gathering data; computer spreadsheets facilitate the organization, analysis and display of data.
General Education: Mathematics