## Program Description

The Mechanical Engineering bachelor’s degree prepares students to enter the field of engineering ready to be a productive member of an engineering team from day one. Graduates can find employment in a variety of industries, including product design, research and development, heating ventilation and air conditioning (HVAC), consulting engineering, medical devices, and manufacturing.

Students learn how to apply engineering principles to mechanical design, and to the design of thermal and fluid systems. Students also learn to work collaboratively in a team environment and to use software tools current in the field. The curriculum is project-based so that theoretical engineering principles are reinforced and experienced through hands-on creation and problem-solving. Arts & Sciences courses help students understand the core mathematical and scientific principles which are the foundation of engineering theory, and provide students with the communication and critical thinking skills required to succeed in the profession.

All students complete a two-semester senior design project, working with advisors from local industry on real-world engineering projects. Graduates are prepared to pass the Fundamentals of Engineering Exam, the first step in becoming a licensed professional engineer (PE).

**Dunwoody College of Technology**: a non-profit, private technical college since 1914.

<table>
<thead>
<tr>
<th>Credential Earned</th>
<th>BS Degree</th>
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</thead>
<tbody>
<tr>
<td>Classes Offered</td>
<td>Day</td>
</tr>
<tr>
<td>Length of Program</td>
<td>4 years (8 semesters)</td>
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<tr>
<td>Available Starts</td>
<td>Fall Semester; for Fall only starts, students can take Arts &amp; Sciences courses in Spring</td>
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</tbody>
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### Degree Requirements

- **MENG1110** Engineering Drawings & 3D Design
- **MENG1120** Introduction to Engineering
- **MENG1210** Machining for Engineers Lab
- **MENG1220** Machining for Engineers
- **MENG1230** Statics
- **MENG2110** Introduction to Programming
- **MENG2210** Electrical & Controls Engineering Lab
- **MENG2220** Electrical & Controls Engineering
- **MENG2230** Dynamics
- **MENG2240** Mechanics of Materials
- **MENG3110** Design for Manufacturability & CAD/CAM Lab
- **MENG3120** Design for Manufacturability & CAD/CAM
- **MENG3130** Introduction to Thermodynamics
- **MENG3140** Materials Science
- **MENG3210** GD&T & Measurements Lab
- **MENG3220** GD&T & Measurements
- **MENG3230** Fluid Mechanics
- **MENG3240** Failure Analysis & Design
- **MENG3250** Introduction to Heat Transfer
- **MENG4110** Transmission of Power Lab
- **MENG4120** Transmission of Power
- **MENG4130** Finite Element Analysis
- **MENG4140** Senior Design I
- **MENG4150** Principles of Quality & Lean Manufacturing
- **MENG4210** Heat Transfer Applications & HVACR Lab
- **MENG4220** Heat Transfer Applications & HVACR
- **MENG4230** Engineering Economics
- **MENG4240** Senior Design II
- **MENG4251** Engineering Ethics
- **MENG4260** Design of Experiments
- **MATH1811** Calculus I
- **MATH1820** Calculus II
- **MATH1821** Calculus II
- **PHYS1800** Physics I with Lab
- **PHYS1820** Physics II with Lab
- **ENGL1010** English
- **MATH2810** Multi-variable Calculus
- **CHEM2110** Chemistry with Lab
- **MATH2820** Linear Algebra & Differential Equations
- **MATH2260** Probability & Statistics
- **WRT2010** Technical Writing

### Salary Data

- **Recent Employers**: New program; First graduating class in May 2020
- **Salary Data**: Annual Average Salary

### How to Apply

- **dunwoody.edu**
- **612.374.5800**
- **info@dunwoody.edu**


AY2018-19 Revised: 7/09/18
Course Descriptions

MENG1110 Engineering Drawings & 3D Design, 4 cr.
Create 3D solid models and assemblies using SolidWorks. Interpret engineering prints; create detail and assembly drawings according to standards. Use freehand drawing as a graphical communication tool.

MENG1120 Introduction to Engineering, 3 cr.
Explore major topics in Engineering. Provides students with a pathway to success in the program, including time management, industry software, study skills, internship availability and career opportunities.

MENG1210 Machining for Engineers Lab, 2 cr.
Employ metalworking techniques using typical shop equipment including mills, lathes, grinders, saws, and drills. Utilize hand tools to prep stock and finish edges.

MENG1220 Machining for Engineers, 2 cr.
Use theory and understanding of machining operations to plan work to create parts efficiently.

MENG1230 Statics, 3 cr.
Identification, recognition and calculations associated with forces acting on rigid bodies at rest. Use vector analysis to analyze concurrent forces, non-concurrent forces, friction forces, centroids and moments.

MENG2110 Introduction to Programming, 3 cr.
Create programs to solve engineering problems. Apply modular design approaches, decision and loop structures, and object-oriented methods to write clear and efficient code for mechanical engineering applications.

MENG2210 Electrical & Controls Engineering Lab, 2 cr.
Apply electrical and electronic controls to solve real-world problems. Topics include AC and DC motors, electronic sensors, programmable logic controllers, motor drives and human machine interfaces.

MENG2220 Electrical & Controls Engineering, 2 cr.
Identification, recognition and calculations associated with electrical and electronic controls. Topics include AC and DC motors calculations, wiring diagrams, Ohm’s Law, series and parallel circuits, electronic sensors, programmable logic controllers, motor drives and human machine interfaces.

MENG2230 Dynamics, 3 cr.
Theory and calculations associated with kinematics and kinetics of particles, systems of particles and rigid bodies. Analyze the application of Newton’s laws to the planar motion of rigid bodies.

MENG2240 Mechanics of Materials, 3 cr.
Discover how materials behave under load including deformation under various loading profiles. Apply concepts to design of mechanical members such as a beams, shafts, columns, and other load bearing devices.

MENG3110 Design for Manufacturability & CAD/CAM Lab, 1 cr.
Use CAD/CAM software to create part geometries, toolpaths, machining parameters and post processes NC code. Design and create parts using other common manufacturing processes, such as casting, injection molding, and sheet metal forming processes.

MENG3120 Design for Manufacturability & CAD/CAM, 2 cr.
Introduction to common manufacturing processes, with emphasis on the principles of design for each process. Processes include: sheet metal forming, casting, welding, and plastic fabrication.

MENG3130 Introduction to Thermodynamics, 4 cr.
Theory and calculations associated with the principles of thermal energy as well applications of the first and second laws of thermodynamics. Topics include work and heat, control volume, steady states, uniform states, entropy, availability, power and refrigeration.

MENG3140 Materials Science, 3 cr.
Identify different types of materials, their properties, and appropriate uses. Processes that change material properties include: alloy composition, heat treatment, coatings, and other modifications.

MENG3210 GD&T & Measurements Lab, 2 cr.
Use lab metrology equipment to assess the geometric dimensions and tolerances of parts, and to perform other mechanical measurements such as temperature, pressure, and flow.

MENG3220 GD&T & Measurements, 2 cr.
Apply principles of physical measurements and error analysis to evaluate mechanical measurements. Create prints that include callouts for standards of accuracy using ASME/ANSI geometric dimensioning and tolerance standards.

MENG3230 Fluid Mechanics, 3 cr.
Introduction to fluid statics and mechanics; laminar and turbulent flow with associated calculations. Applications to industry are used in problems.

MENG3240 Failure Analysis & Design, 2 cr.
Examine advanced topics in modeling, design and best practices for machines, tooling and system assemblies. Evaluate components for protection against failure from low cycle fatigue, high cycle fatigue, ductile overload, corrosion.

MENG3250 Introduction to Heat Transfer, 3 cr.
Examine the fundamentals of heat transfer modes including conduction, convection, and radiation. Calculations for each mode are included.

MENG4110 Transmission of Power Lab, 2 cr.
Assemble and test mechanical power transmission systems, including gearboxes and fluid power systems. Correctly size components and evaluate power losses, service life, and safety factors.

MENG4120 Transmission of Power, 2 cr.
Apply principles of mechanical design and material failure to the design and analysis of mechanical power transmission components, such as gears, linkages, shafts, bearings and cams.

MENG4130 Finite Element Analysis, 3 cr.
Finite element modeling using both manual and software simulation analysis. Topics include two- and three-dimensional elements along with applications in solid mechanics, heat transfer and fluid mechanics.

MENG4140 Senior Design I, 4 cr.
Student design teams execute a two semester design project to solve a real world problem. Application of the design process, underlying science, and application of concepts and tools gained in the curriculum are necessary. Application of project management principles and tools.

MENG4150 Principles of Quality & Lean Manufacturing, 3 cr.
Investigate several quality conventions used to reduce waste, improve quality, decrease production times, and improve customer satisfaction. Topics include statistics, queuing models, control charts for variables, acceptance criteria, and acceptance sampling.

MENG4210 Heat Transfer Applications & HVACR Lab, 2 cr.
Hands-on testing of heat transfer devices including heat, ventilation, and air conditioning systems.

MENG4220 Heat Transfer Applications & HVACR, 2 cr.
Apply heat transfer theory to common industrial devices. HVACR and other applications are analyzed.

MENG4230 Engineering Economics, 2 cr.
Combines the concepts of finance and economics with the engineering environment. Analyze costs, risk, funding options, economic return on investment, legal and environmental concerns.

MENG4240 Senior Design II, 4 cr.
Continuation of Senior Design I projects. Final deliverables are submitted, project is presented and closed out. Presentations are open to students, faculty, and the public in a symposium format.
Course Descriptions

MENG4251 Engineering Ethics, 2 cr.
Interpret the connection between personal morality, the role of engineers and engineering in society, and relationship to one's employer. Case studies involving conflicts within these roles are reviewed and evaluated.

MENG4260 Design of Experiments, 2 cr.
Introduction to industrial experimentation through the use of statistical software to perform mathematical regression and analysis of variance for system functionality. Topics include randomized designs, blocking designs, full factorial designs and fractional factorial designs.

MATH1811 Calculus I, 4 cr.
The fundamental tool used by engineers and scientists to determine critical measurements, such as maximums, minimums and allowable rates of change. Computer software will enable the application of limits, derivatives, transcendental functions, implicit differentiation and related rates.

PHYS1800 Physics I with Lab, 4 cr.
Introduction to mechanics using differential calculus as a foundation. Topics include kinematics and dynamics of linear motion, static equilibrium, the conservation of energy and momentum, mechanics of solids and fluids, and thermodynamics. The laboratory portion incorporates experimentation, instrumentation, and graphical tools to verify calculations in motion, mechanics and thermodynamics.

MATH1821 Calculus II, 4 cr.
The fundamental tool used by engineers and scientists to determine critical measurements, such as calculating the area under curves or the capacities inside of complex geometries. Computer software will enable the application of the definite integral, the fundamental theorem of calculus, applications of integration, and numerical methods of integration.

CHEM2110 Chemistry with Lab, 4 cr.
Develop a basic understanding of the central principles of chemistry that are useful to explain and predict the properties of chemical substances based on their atomic and molecular structure; promotes the development of basic and advanced science process skills.

MATH2820 Linear Algebra & Differential Equations, 4 cr.
Introduction to Linear Algebra, including vector spaces and linear mappings between such spaces. Explore solution methods for ordinary differential equations, qualitative techniques; includes matrix methods approach to systems of linear equations and series solutions.

MATH2260 Probability & Statistics, 4 cr.
Introduction to probability and statistics with applications. Topics include: basic combinatorics, random variables, probability distributions, hypothesis testing, confidence intervals, and linear regression.

WRIT2010 Technical Writing, 3 cr.
Technical writing applications are studied for format, style, voice, and point of view; considered for purpose, audience, and subject. Critical thinking and developed expertise are employed to analyze, interpret, evaluate, summarize and generate various technical documents, individually and within teams.