MECHANICAL ENGINEERING (MENG), BACHELOR OF SCIENCE

At Dunwoody College of Technology, 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 the design of mechanical, thermal, and fluid systems. Students also learn to work collaboratively in a team environment and use software tools current in the field. The curriculum is project-integrated 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.

Credential Earned: BS
Length of Program: 4 years (8 semesters)
Classes Offered: Day
Available Starts: Fall Semester

Program Outcomes

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- An ability to communicate effectively with a range of audiences.
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Degree Requirements

Code	Title	Credits
General Requirements		
CHEM2110	Chemistry with Lab	4
ECON1000	Introduction to Micro & Macro Economics	3
MATH1811	Calculus I	4
MATH1821	Calculus II	4
MATH2260	Probability & Statistics	4
MATH2810	Multi-Variable Calculus	4
MATH2820	Linear Algebra & Differential Equations	4
PHYS1800	Physics I with Lab	4
PHYS1820	Physics II with Lab	4
SPCH1000	Speech	3
WRIT2010	Technical Writing	3
Humanities Electives		3
Social Science Elective		3
Technical Requirements		
ENGR1110	Introduction to Engineering	3
ENGR1210	Introduction to Programming	3
ENGR1220	Intro to Automation, Mfg, Elec Dev & Sys	3
ENGR2210	Mechatronics with Lab	2
ENGR3120	Engineering Economics	2
ENGR4110	Engineering Ethics & Safety	2
ENGR4120	Principles of Quality, Lean Mfg & DOE	3
MENG1110	Engineering Drawings & 3D Design	4
MENG1210	Machining for Engineers Lab	2
MENG1220	Machining for Engineers	2
MENG1230	Statics	3
MENG2230	Dynamics	3
MENG2240	Mechanics of Materials	3
MENG3111	Design for Manufacturability with Lab	3
MENG3130	Thermodynamics	4
MENG3140	Materials Science	3
MENG3211	GD&T & Measurements with Lab	4
MENG3230	Fluid Mechanics	3
MENG3240	Failure Analysis & Design	2
MENG3250	Heat Transfer	3
MENG4111	Control of Dynamic Systems w/ Lab	4
MENG4130	Finite Element Analysis	3
MENG4140	Senior Design I	4
MENG4211	Heat Transfer Applications & HVACR w/Lab	4
MENG4240	Senior Design II	4
Total Credits		**123**

Courses

Descriptions

ENGR1110 | Introduction to Engineering | Lecture (3 Credits)
Explore major topics in Engineering. Provides a pathway to success in the School of Engineering programs, including time management, industry software, study skills, teamwork skills, internship availability and career opportunities. This course must be taken at Dunwoody for the Industrial Engineering Technology Degree.

ENGR1210 | Introduction to Programming | Lecture/Laboratory (3 Credits)
Examine and implement computational problem-solving strategies using computer languages to solve engineering problems. Develop algorithms and translate solutions into computer programs. Distinguish differences in programming languages and software tools with applicability to different types of problem solutions. Apply modular design and clear documentation for efficient problem solving.

ENGR1220 | Intro to Automation, Mfg, Elec Dev & Sys | Lecture/Laboratory (3 Credits)
Apply PLCs and electronic components to design and troubleshoot automated industrial equipment. Topics include AC and DC motors, programming, sensors and basic circuit analysis techniques for design, analysis, and programming of control systems.

ENGR2210 | Mechatronics with Lab | Lecture/Laboratory (2 Credits)
Analyze electrical and mechanical systems such as drives, sensors, control systems, data presentation, and communication in the context of mechatronics. Different motive forces are utilized, control systems implemented, and operating environment challenges presented. Course content is applied to real-world projects.

ENGR3120 | Engineering Economics | Lecture (2 Credits)
Economic analysis of engineering decisions under uncertainty. Concepts include time value of money, cash flow estimation, rate of return analysis, net present value estimation, and asset evaluation. Applications include comparing different project alternatives accounting for heterogeneity in cost, revenue, taxation, depreciation, inflation, and risk.

ENGR4110 | Engineering Ethics & Safety | Lecture (2 Credits)
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. Interpret safety and accident information to develop a basic understanding of needed safety protocols in a variety of engineering environments.

ENGR4120 | Principles of Quality, Lean Mfg & DOE | Lecture (3 Credits)
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.

MENG1110 | Engineering Drawings & 3D Design | Lecture/Laboratory (4 Credits)
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.

MENG1210 | Machining for Engineers Lab | Laboratory (2 Credits)
Employ metalworking techniques using typical shop equipment including mills, lathes, grinders, saws, and drills. Utilize hand tools to prep stock and finish edges.
Corequisite(s): MENG1220

MENG1220 | Machining for Engineers | Lecture (2 Credits)
Use theory and understanding of machining operations to plan work to create parts efficiently.
Corequisite(s): MENG1210

MENG1230 | Statics | Lecture (3 Credits)
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.
Prerequisite(s): MATH1810 Or MATH1811

MENG2230 | Dynamics | Lecture (3 Credits)
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.
Prerequisite(s): MENG1230

MENG2240 | Mechanics of Materials | Lecture (3 Credits)
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.
Prerequisite(s): MENG1230

MENG3111 | Design for Manufacturability with Lab | Lecture/Laboratory (3 Credits)
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. Design and create parts using common manufacturing processes, such as casting, injection molding, and sheet metal forming processes.
Prerequisite(s): MENG1210 And MENG1220

MENG3130 | Thermodynamics | Lecture (4 Credits)
Introduction to thermodynamic analysis which provides a foundation for subsequent thermoscience courses, e.g. fluid dynamics, heat transfer, HVACR. Application of the laws of thermodynamics to the analysis of power and refrigeration cycles is a main focus.
Prerequisite(s): PHYS1800

MENG3140 | Materials Science | Lecture (3 Credits)
Identify different types of materials, their properties, and appropriate uses. Processes that change material properties include: alloy composition, heat treatment, coatings, and other modifications.
Prerequisite(s): MENG1220 And CHEM2110

MENG3211 | GD&T & Measurements with Lab | Lecture/Laboratory (4 Credits)
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. Use lab metrology equipment to assess the geometric dimensions and tolerances of parts, and to perform other measurements such as temperature, pressure, and flow.
Prerequisite(s): MATH2260 And MENG3130

MENG3230 | Fluid Mechanics | Lecture (3 Credits)
Introduction to fluid statics and mechanics; laminar and turbulent flow with associated calculations. Applications to industry are used in problems.
Prerequisite(s): MATH2820

MENG3240 | Failure Analysis & Design | Lecture (2 Credits)
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.
Prerequisite(s): MENG2240

MENG3250 | Heat Transfer | Lecture (3 Credits)
Examine the fundamentals of heat transfer modes, including conduction, convection, and radiation. Calculations for each mode are included.
Prerequisite(s): MATH2820 And MENG3130

MENG4111 | Control of Dynamic Systems w/ Lab | Lecture/Laboratory (4 Credits)
Introduction to the fundamentals of controls, covering foundational controls theory (first and second order system response, transfer functions, and design of control systems). Analyze the response of dynamic systems, and then apply these techniques, using a PID control, to the control of real world engineering systems. Possible applications include fluid power, heat transfer, and mechanical systems.
Prerequisite(s): MENG2230 And MATH2830

MENG4130 | Finite Element Analysis | Lecture (3 Credits)
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.
Prerequisite(s): MATH2820

MENG4140 | Senior Design I | Capstone (4 Credits)
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.

MENG4211 | Heat Transfer Applications & HVACR w/Lab | Lecture/ Laboratory (4 Credits)
Apply heat transfer theory to common industrial devices. Analyze HVACR and other applications. Hands-on testing of heat transfer devices includes heat, ventilation, and air conditioning systems.
Prerequisite(s): MENG3250

MENG4240 | Senior Design II | Capstone (4 Credits)
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.
Prerequisite(s): MENG4140

Policies

School of Engineering Policies

General Applicability

While college faculty will provide you with information and advice, it is your responsibility to understand and comply with all policies and to complete satisfactorily all degree requirements within the allotted time frame. This includes the responsibility to track your completion of major, university and campus requirements, as well to comply with residence, minimum progress and scholarship requirements.

For details, you should refer to the college's academic policies (https://catalog.dunwoody.edu/catalog-student-handbook/academic-policies/).

Please note that you are subject to current policies and regulations, regardless of your admission date.

Admission to Dunwoody School of Engineering

Your admission into the Dunwoody School of Engineering is also an admission into the engineering program you have selected. Your completion of this degree requires your compliance with stated degree requirements and academic good standing.

Applicability of Academic Plan

Normally the Academic Plan that you will follow is the plan year that you have entered under. However with program evolution we reserve the right to move you to a newer academic plan resulting from an evolution of the program. This change will not delay your graduation or cost you more than your original plan if you remain in academic good standing and take courses when offered.

In the event that you do not maintain continuous enrollment, your academic plan may be changed to your new admission date.

In the event of part time enrollment, academic plans will be valid for only 6 years.

School of Engineering Student Success Monitoring

The School of Engineering strives to motivate and empower students to complete courses of study leading to degrees in Electrical, Mechanical, Software Engineering and Industrial Engineering Technology. The program of study in each of these disciplines is cumulative in nature, that is, content is intended to build upon content learned in earlier semesters.

Student academic progress must consider the level to which students have successfully mastered earlier concepts in determining if a student is making adequate progress in their chosen field of study.

Students will be determined to be making adequate progress toward degree completion if they are following the recommended program of study and are achieving grades of C or better in all of their courses each semester.

A student who is following the recommended program of study who receives a grade of less than a C in any technical or School of Engineering course will be required to meet their Academic Coordinator to review their study skills and to develop a plan for enhanced Academic Achievement for the next semester. This grade of less than C may result in an adjustment of the next semester schedule to support needed prerequisites or remedial measures.

Any student who is following the recommended program of study who receives two or more grades of C or lower in technical or School of Engineering courses will be required to meet with their Academic Coordinator and the School of Engineering Dean to determine appropriate next steps.

Any student who is not following the program of study defined by the Academic Plan will be required to meet with the Academic Coordinator each semester to ensure that they are registered for the appropriate courses.

Because of the cumulative nature of the Engineering program courses, no more than two passing grades of less than C will be allowed to count toward graduation. The final design experience(s) in all programs must be completed with a grade of no less than C.