

Cornell Engineering

Sibley School of Mechanical and Aerospace Engineering

UNDERGRADUATE DEGREE PROGRAM

Do your interests lie in the areas of aircraft and space vehicles, diesel engines, the mechanics and control of musculoskeletal systems, or solar and other renewable energy conversion devices? If you understand the essential need for discovering and applying new knowledge and developing new tools for the practice of engineering, then the B.S. degree in mechanical engineering at Cornell may be right for you.

Cornell's mechanical engineers are trained in both of the following broad areas:

- *Mechanical Systems and Materials Processing* is concerned with the design, analysis, testing, and manufacture of machinery, vehicles, devices, and systems. Particular areas of emphasis include biomechanics, computer-aided design, control systems, dynamic systems, materials processing, mechanical stress analysis, precision engineering, and vehicle engineering.
- *Engineering of Fluids, Energy, and Heat-Transfer Systems* is concerned with the experimental and theoretical aspects of fluid flow and heat transfer, and the sciences of combustion and thermodynamics. Specific areas of concentration include fluids/aerospace engineering; thermal systems engineering; and vehicle engineering.

**BREAK
THE RULES to
CHALLENGE
CONVENTIONAL
THOUGHT**

The undergraduate major program is a coordinated sequence of general courses you begin in your second year. You are then well equipped to take upper-level electives in aerospace engineering, biomechanics, energy and the environment, engineering materials, mechanical systems and design, thermo-fluids engineering, or vehicle engineering. You may also participate in an independent project either within a student project team or in conjunction with a faculty member.

UNDERGRADUATE RESEARCH PROJECT OPPORTUNITIES

Mechanical and Aerospace Engineering (MAE) faculty members are experts in aerospace, biomechanical, and thermal systems engineering, as well as fluid mechanics, mechanics of materials, and robotics. They contribute their wealth of knowledge and expertise to students who can choose from a variety of exciting research and design projects, such as:

- designing robotics for planetary exploration, disaster relief, and environmental monitoring
- designing and building a Baja car (an off-road race car), an unmanned vehicle capable of long-duration flight, or a race car
- designing a miniature mechanism with flapping wings (a miniornithopter)
- designing a system for effective growth of artificial cartilage tissue
- designing a walking robot that can set a new world distance record

MAE REQUIRED COURSES

ENGRD 2020	Statics and Mechanics of Solids
ENGRD 2210	Thermodynamics
MAE 2030	Dynamics
MAE 2250	Mechanical Synthesis
MAE 3230	Introductory Fluid Mechanics
MAE 3240	Heat Transfer
MAE 3260	System Dynamics
MAE 3270	Mechanics of Engineering Materials
MAE 3780	Mechatronics
MAE 4272	Fluids/Heat Transfer Laboratory
MAE 4291	Supervised Senior Design Experience
MAE 4300	Professional Practice in Mechanical Engineering

MECHANICAL ENGINEERING



SOME AREAS OF FACULTY RESEARCH

aerodynamics & aeroacoustics

bioenergy

biomaterials

biomass combustion

combustion dynamics of biofuels

computational fluid mechanics

geotextiles

immunotherapy & cell engineering

microfluidic device design

mechanics of biological materials

nano- and micro-scale engineering

robotics & computer controlled machinery

satellite systems

self-assembling chemical reactors

solar & renewable energy

thermofluids

turbulence

turbines

- designing software for multi-material 3D printing
- designing, building, launching, and operating a highly maneuverable, 50K nanosatellite
- exploring new machine learning algorithms to control a robot constructed of struts and cables
- designing a wind farm layout using two-year wind data and redesigning wind turbine blades
- developing artificial intelligence in computer-aided design
- modeling the impact of clean diesel technologies on air quality
- studying how vibrating bodies in the wind may yield a source of energy
- developing methods to determine the strength of musculoskeletal tissues
- investigating aircraft wing tip vortex wakes
- designing evolutionary computation to model and forecast earthquakes
- designing a system to track the dispersion of particulates emitted by vehicles
- designing and wind-tunnel testing a body for a race car

MAE By the Numbers

MAE undergraduate students	290
MAE graduate students	230

Starting salaries of B.S. Mechanical Engineering graduates (for 2018)

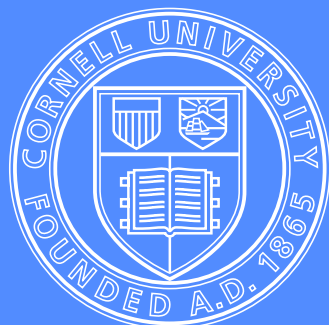
Low	\$37,292
Median	\$72,960
High	\$125,000

MAE SAMPLE ELECTIVE COURSES

MAE 1170	Introduction to Mechanical Engineering
MAE 2270	Introduction to Entrepreneurship for Engineers
MAE 3050	Introduction to Aeronautics
MAE 3130	Atomic and Molecular Structure of Matter
MAE 4020	Wind Power
MAE 4060	Introduction to Spaceflight Mechanics
MAE 4120	Community Wind Energy Research
MAE 4150	GPS: Theory and Design
MAE 4160	Spacecraft Technology and Systems Architecture
MAE 4180	Autonomous Mobile Robots
MAE 4250	FSAE Automotive Design Project
MAE 4340	Innovative Product Design via Digital Manufacturing
MAE 4510	Aerospace Propulsion
MAE 4580	Introduction to Nuclear Science and Engineering
MAE 4590	Introduction to Controlled Fusion: Principles and Technology
MAE 4610	Entrepreneurship for Engineers
MAE 4640	Orthopaedic Tissue Mechanics
MAE 4650	Biofluid Mechanics
MAE 4700	Finite Element Analysis for Mechanical and Aerospace Design
MAE 4730	Intermediate Dynamics and Vibrations
MAE 4780	Feedback Control Systems
MAE 4860	Automotive Engineering
MAE 4900	Independent Research and Engineering Project Teams
MAE 5010	Future Energy Systems
MAE 5070	Dynamics of Flight Vehicles

MASTER OF ENGINEERING DEGREE PROGRAM

The Master of Engineering (M.Eng.) degree program in mechanical engineering, aerospace engineering, or engineering mechanics is a one-year professional course of study that allows students to develop a high level of competence in engineering science, current technology, and engineering design. It is interdisciplinary in nature and allows flexibility in tailoring a program to fit individual needs and interests. Typical M.Eng. graduates enter the work force with greater opportunities and at significantly higher salaries than those entering with a B.S. degree, and many are offered earlier chances of advancement. Although the majority of M.Eng. students start the program immediately following the completion of their B.S. degrees, some are industrial employees who have enrolled through their companies' continuing education programs.



Cornell University is an equal-opportunity affirmative-action educator and employer. Produced by the Office of Engineering Admissions.

mae.cornell.edu