Undergraduate Program in

MECHANICAL ENGINEERING

What do Mechanical Engineers Do?

Mechanical engineers use principles of energy, mechanics, and materials to design and manufacture machines and devices of all types. Examples include:

- Sustainable energy systems
- Power-producing machines
- Automotive vehicles and systems of transportation
- Industrial production equipment
- Material handling systems
- Robotics and autonomous systems
- Biomedical devices
- Control and sensor devices

Mechanical Engineers' Broad Reach Enhances Quality of Life

Mechanical engineering graduates have a broad background enabling them to work in research and development for many industries that use mechanics, energy and heat, mathematics, design, and manufacturing.

Mechanical engineers work to solve contemporary problems such as:

- How can we design the next generation of sustainable and autonomous vehicles?
- How can we design and develop novel sustainable energy systems?
- Can we develop new revolutionary materials to reduce cost and increase product performance?
- How can digital design and analysis technologies increase the efficiency of complex product and system development?

Facts About ME@UB

- Full-time faculty: 35
- The average starting salary for ME BS positions is **$64,500**. The mean annual wage for ME's is **$85,930**
- Degrees offered: BS, MS, and PhD
- A five-year BS Mechanical Engineering + MBA program is available

Curriculum Overview

[FRESHMAN-SOPHOMORE]

The first two years build the basic science and mathematics skills needed for the practice of mechanical engineering: chemistry; two semesters of physics; math through differential equations; mechanics and dynamics of rigid bodies; and mechanics of deformable bodies. Mechanical engineering courses start in the sophomore year.

[JUNIOR]

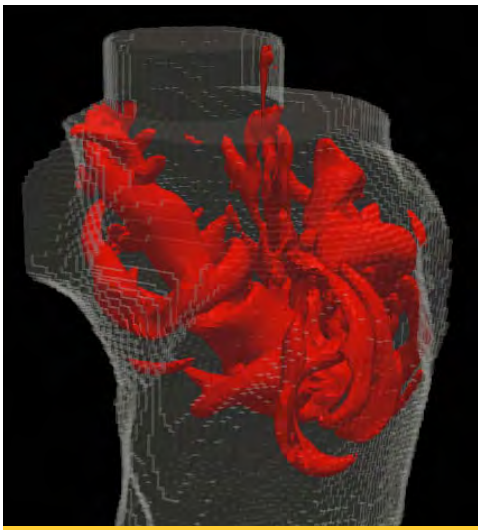
The third year develops the engineering sciences and provides the basic knowledge in areas such as fluid mechanics and heat transfer, computers and instrumentation, materials, and manufacturing processes, machines and mechanisms and computer-aided design (CAD). Hands-on laboratories build practical skills from the classroom instruction.

[SENIOR]

With the background acquired in the junior year, students are equipped to study design theory and methods and to engage in a capstone design experience. For the rest of the senior year, technical elective courses are available, both inside and outside the MAE department.

Specializations

Nine separate specializations are available, which students may pursue by choosing from technical electives. Some of these are:



MAE researchers are using computational fluid dynamics (CFD) to improve the design and placement of cardiovascular devices such as artificial heart valves.

- Dynamic Systems and Control
- Design and Manufacturing
- CAD/CAE and Engineering Computation
- Energy and Applied Thermodynamics
- Bioengineering

Employment Outlook

Mechanical engineering is expected to show stable employment growth of 9% per year through 2020, with more than 21,300 additional mechanical engineers required nationally.

(Source: http://www.bls.gov/oes/current/oes172141.htm.)

Did You Know?

Mechanical engineering is one of the broadest engineering disciplines. A student who completes a mechanical engineering degree can successfully compete in design, development, manufacturing, and testing in a variety of industries. Our graduates have also been successful in continuing their studies at graduate programs at UB and in other highly competitive engineering programs across the country.

University at Buffalo
Department of Mechanical and Aerospace Engineering
School of Engineering and Applied Sciences

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Did You Know?

Mechanical engineers create the processes and systems that drive technology and industry. They also work effectively in multidisciplinary teams. Major employers hiring our graduates include DuPont, Honda, IBM, Praxair, General Electric, Dresser-Rand, General Motors, U.S. Navy, Lockheed-Martin, Moog, and Kodak.

Student Excellence

Philip Odonkor recently completed a dual major with honors in both Mechanical Engineering and Aerospace Engineering. He is completing a PhD and working on applying optimization techniques to make energy systems work smarter and more efficiently.

"My early interactions with faculty and students convinced me that I would be surrounded by a group of technically gifted, passionate and creative individuals at a very affordable and ambitious institution, in a resurgent town. All these have proved true. Needless to say, I have been thrilled with my decision so far."

Work Opportunities

Many of our students gain industrial experience during their undergraduate studies. Some students will find engineering-related employment in the summer. Others get experience through 3-credit internships. For many graduates, these experiences put them ahead in their job search and allowed them to hit the ground running when they started working.

Undergraduate Research

UB is also a premier research institution that caters to its undergraduates for the finest engineering education. The ME program offers many opportunities for undergraduates to participate in state-of-the-art research projects. Participants are immersed in a collaborative learning and research environment led by faculty and graduate student mentors. They also report that some of their most meaningful lessons have come about when they are allowed to develop and follow their own ideas—and to learn from their own mistakes.

Student Clubs and Activities

ME students at UB actively participate in projects and activities across many student clubs including the American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE). Both of these groups introduce new ME students to educational and fun activities, actively recruiting students at all levels to participate in national design challenges. Students compete with other universities, and seek to outdo the previous year's ME classes. SAE projects have included design and fabrication of Formula (races) cars, Mini-Baja dune buggies, and environmentally clean snowmobiles. ASME projects have included human-powered vehicles and solar-powered boats.

"The Society of Automotive Engineers gives students the opportunity to take knowledge from the classroom and apply it in a hands-on, creative, and inspiring environment. The Clean Snowmobile Team has received two 1st place finishes since the inception of the competition in 2000 and has been featured twice in magazine articles. In 2012 our mini-Baja team placed 7th out of 103 teams overall at Wisconsin. Members on both teams get the chance to experience the full process of designing, building, testing and marketing their vehicles. These are once in a lifetime experiences for students." —**Robert Neuman Jr.**, SAE President

Did You Know?

A BS in mechanical engineering provides a sound background for the pursuit of many professional opportunities. Graduates with a BS in ME have continued study in law school and medical school, in addition to continuing with graduate studies in ME. Others have obtained MBA degrees to pursue professional careers combining technology and business.

To apply, please visit **admissions.buffalo.edu**

Successful Alumni

Catherine (Kitty) Pilarz (BS '80) Senior Director, Worldwide Product Saftey, Mattel, Inc, responsible for safety policies for Mattel and Fisher Price; Chairman, Board of Directors and Fellow of ASTM International, Vice-Chair of ASTM F15 Executive Committee; in 2010, she received the ASTM Dana Award in recognition of her commitment to children's safety through development of global standards.

Award-Winning Faculty

ME faculty at UB have received recognition for both teaching and research accomplishments, with over 40 awards from national and international organizations for excellence in research and in teaching. Research awards have come from the National Science Foundation, the National Institutes of Health, and the Office of Naval Research, and international study awards have come from the J. William Fulbright and the Alexander von Humboldt Foundations.

Professor **Kemper Lewis** is the Director of the Sustainable Manufacturing and Advanced Robotic Technologies (SMART) Community of Excellence and a Fellow of the American Society of Mechanical Engineers (ASME). His many awards and honors include the NSF Career Award and the SUNY Chancellor's Award for Excellence in Teaching.

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