SENIOR DESIGN program

top companies • real-world problems • outstanding faculty • brilliant students

Department of Mechanical Science and Engineering

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
In the Department of Mechanical Science and Engineering (MechSE), the students in our well-established senior design program have completed more than 1,000 projects. More than 200 companies and institutions have served as sponsors for these projects. For each project, teams of four students (24 teams per semester) work on “real-world” design problems and gain experience invaluable to their life after graduation.

Design projects come from industry and institutions and preferably contain multiple constraints. Students are supervised by faculty members. The sponsoring companies/institutions donate $5,000 to cover expenses of the course.

**BENEFITS TO COMPANIES**

- Fresh, “out of the box” look at a problem or issue
- Obtain a valuable design option
- Excellent recruiting opportunity
- See first-hand the performance of students who could become future employees
- Company receives exposure
- Window to faculty expertise in diverse technical fields
- Enhance public relations by donating to the University of Illinois

**WHERE IMAGINATION AND ENGINEERING MEET**

MechSE students have logged more than 700,000 work hours on senior design projects since 1991.

“We could have easily have spent $20,000 to hire a firm to validate the design, but we thought it would be nice to get some of our own engineering students involved in helping us solve a real problem at their university.”

Nick Jost
Caterpillar, Inc.

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John Melchi
National Center for Supercomputing Applications

**Deliverables**

- Proposal
- Mid-semester status report
- Final presentation
- Final report
- Prototype, if constructed

**OUR UNDERGRADUATE PROGRAM**

The MechSE Department has built an undergraduate program that ranks among the top in the world as a result of distinguished faculty, excellent undergraduate research opportunities, state-of-the-art facilities, and exceptionally bright students. We educate students to become future leaders in engineering, science, technology, and other vital areas, leading the way toward improving our society’s quality of life.
“The students did a great job working around Deere’s busy schedule. The students were very professional and enjoyable to work with. All design requirements were met. The Angle-o-Meter was a fantastic addition! It eliminates problems with measurement.”

James Wang
John Deere

“Excellent graphics in presentation. Communicated key issues clearly. Good design recommendations. All presentations were clear. Excellent explanation of problems and proposed solutions.”

Forrest Nixon
Cerro Flow Products, Inc.

**FACILITIES/RESOURCES AVAILABLE AT ILLINOIS**

Each senior design team works with an advisor who is one of the world-class faculty members from the MechSE Department. Within both the Department and the College of Engineering, the student teams have access an impressive array of equipment, laboratories, and services:

- **Rapid prototyping systems**, offering many choices of materials:
  - 3D Systems Viper Stereolithography
  - Objet Eden 350 Multijet Modeler
  - EOS Formiga Selective Laser Sintering
  - Stratasys Fortus 360 Fused Deposition Method

- **CNC water jet sheet cutting**

- **3-D laser non-contact scanner for reverse engineering**

- **EDM fabrication** (both wire and ram type systems)

- **Precision machine shop**:
  - Staffed by professional machinists
  - Consultations with engineering staff and machinists
  - Fabrication of complex components

- **A full inventory of sophisticated instrumentation**:
  - Physical test and measurement
  - Data acquisition and control
  - Thermal imaging camera
  - High speed video cameras

- **Testing laboratories and professional support staff**:
  - Strength of materials
  - Dynamics and controls
  - Seitz Materials Research Laboratory

- **Project laboratory space**:
  - Each team has its own assigned workspace
  - Student shop equipped to facilitate prototype development and testing
“This is the first time Vapor has worked with Illinois on a design project, and we are very happy with the results. The team came up with a number of new and novel design concepts.”

David C. Griffis
Vapor Bus International

IDEAL PROJECTS
The best senior design projects consist of mechanical design (not just analysis) challenges and are important to the client. This could mean a new product design, a product/component redesign, a manufacturing/process/thermal systems design, or another vital aspect that involves mechanical design.

The project should take four students each roughly 10 hours per week over the course of one semester (3.5 months) to complete. It is preferable, but not necessary, that the project involve building a prototype.

Ideal projects contain multiple constraints (need not have all):
- Economic
- Regulations
- Manufacturability
- Environmental
- Space
- Health
- Safety
- Sustainability
- Ergonomics
- Cultural

MORE THAN 1,000 PROJECTS SUCCESSFULLY COMPLETED

- Design of Blue Waters cooling system for the National Center for Supercomputing Applications
- Affordable human-powered water pump for Cambodia humanitarian project
- Bike helmet redesign for Caveat Emptor
- Surgical pad control box design for Innoventor
- Bridge impactor for fault detection for the Civil Engineering Department at the University of Illinois
- Industrial burner redesign for reduced weight for Eclipse
Make a lasting impact on the lives of our incredible students, and address a mechanical design challenge you are facing in an effective, affordable, and meaningful way.

To sign up or learn more, contact:

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