

## **Design and Manufacturing**

While the basic sciences are concerned with the discovery of new knowledge, engineering is concerned with the application of existing knowledge to the design and fabrication of products and processes which are useful to society. The design process requires a synthesis of creativity, basic scientific knowledge, engineering analysis and project management skills. Good designers must be both creative and analytical. They must combine imagination with mathematics and science knowledge, a difficult but an immensely rewarding task.

Our curriculum is dedicated to providing Mechanical Engineering graduates with a strong foundation in the basic principles of engineering theory while also ensuring that students know how to apply that theory to real engineering problems. Design coursework starts in ME 441, Introduction to Engineering Design & Solid Modeling. A series of projects in several courses are also used to teach the design process with emphasis on problem identification, criteria generation, brainstorming, decision making, detailed design, economics and project management.

Design projects in fundamental courses and/or open-ended homework problems are used to help students appreciate the importance of learning how to apply fundamental knowledge to real world applications. In ME 643, Machine Design, students learn how to apply the fundamentals of mechanics to the design of machine elements like gears, bearings, shafts and fasteners. In ME 705, Thermal System Analysis and Design, the fundamentals of the thermal sciences are applied to open-ended design problems. The capstone design experience, ME 755-756 or Tech 797, is a two semester design project course (see page 19).

Mechanical Engineering students interested in design and manufacturing should consider taking additional courses as part of their technical elective requirements. These include: ME 777 – Computer Aided Engineering; ME 735, Mechanics of Composite Materials; ME 785, Solid Mechanics in Manufacturing; and ME 786, Introduction to Finite Element Analysis.