

INDUSTRIAL ENGINEERING, PH.D.

The Department of Industrial and Systems Engineering offers opportunities for graduate study leading to the master of science and the doctor of philosophy degrees in industrial and systems engineering.

In the Ph.D. program, four areas of specialization are available, each designed to produce graduates capable of leading new and developing areas within industrial and systems engineering. The four areas are: decision science/operations research, health systems, human factors and ergonomics, and manufacturing and production systems.

The specialization in *operations research, optimization, and analytics* trains students in analytical methodologies useful for solving decision problems, especially problems that involve the allocation of scarce resources, and the design, planning and operation of complex systems. Graduate study focuses on optimization modeling and algorithms, applied probability and stochastic modeling, and decision analysis.

The *health systems* specialization seeks to train students to look at broad issues in health care, including long-term care, prevention, quality improvement, health care financing, and system evaluation. Understanding how people solve problems is a basic requirement for health systems engineers, who must apply scientific methods in a value-laden setting.

The specialization in *human factors and ergonomics* is concerned with the quality of work lives, ergonomics, and occupational safety and health for both workers and management. By examining, designing, testing, and evaluating the workplace and how people interact within it, human systems engineers can create productive, safe, and satisfying work environments.

The specialization in *advanced manufacturing and industrial AI* is intended to provide the skills and knowledge necessary to compete successfully in a manufacturing environment. These skills include knowledge of the theory of manufacturing materials and processes and their control; knowledge of the essentials of manufacturing systems design and analysis; and knowledge of and hands-on experience with modern manufacturing technology.