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 engineering. Five areas of specialization are available, each designed to produce graduates capable of leading new and developing areas within industrial and systems engineering. The five areas, each with its own courses of study and admission procedures, are: decision science/operations research, health systems, human factors and ergonomics, manufacturing and production systems, and quality engineering. Since each area offers faculty, research, and courses that are unique, both with respect to each other and to much of industrial and systems engineering taught elsewhere, it is advisable to see Graduate Program on the department website for further information.

The specialization in decision science/operations research trains students in analytical methodologies useful for solving decision problems, especially problems that involve the allocation of scarce resources. Graduate study focuses on applied probability and statistics, decision analysis, optimization modeling, and optimization algorithms.

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 manufacturing and production systems 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.

The quality engineering specialization is designed to provide the necessary background for quality engineering careers in industry or government. Emphasis is on the foundations of quality improvement, job and organizational design, and process control.