

# Industrial Engineering, Ph.D.

## Research and Study

The Ph.D. in industrial engineering program is intended for students who wish to prepare themselves for a career creating and cultivating new knowledge. In addition to a broad selection of technical research courses, the program emphasizes original research under the close supervision of a faculty member. Students develop an individualized research project that typically includes the design and analysis of experimental or theoretical work or the invention of new processes, techniques, or devices, which ultimately leads to original publications in the academic literature. The training is appropriate for people seeking a career in academia or in research and development in industry.

The coursework requires some diversity of technical skills in three major areas which include systems, human factors, and analytics. The systems area emphasizes the design, construction, and analysis of complex systems with interdependent parts that include people and machines. The human factors area emphasizes the interaction of people with systems, and includes the study and analysis of people's cognitive and physical limitations. The analytics area emphasizes the application of mathematical formulas, including statistical approaches, as well as algorithmic and computational approaches to deriving knowledge from data. Each area is supported by several faculty members, and many faculty members support multiple areas; see Facilities in the Department of Industrial and Systems Engineering section of the catalog to learn more about each research lab and its activities.

## Learning Outcomes

Students will:

- demonstrate a broad knowledge of the field of industrial and systems engineering and deep knowledge in their specific area of study;
- identify and solve problems of value to industry and society;
- demonstrate independent thinking and forge new paths to discovery;
- make meaningful and novel contributions to knowledge in a single or multiple domains;
- disseminate research results to the research and application community;
- demonstrate the ability to lead interdisciplinary teams in pursuit of research; and
- demonstrate ethical and professional behavior.