Industrial Engineering (MS, PhD)

www.grad.clemson.edu/brochure/IndustEng
Introduction

The graduate program in industrial engineering is consistently ranked in the nation’s top 30 by *US News & World Report* and emphasizes education, research, discovery and application of knowledge in the areas of production and service systems, human factors, and education and learning systems.

Programs of Study

**MS**  If you are accepted into the program, you may pursue an MS degree by either the non-thesis or thesis option. Both options require that you complete a rigorous set of courses designed to provide a strong foundation across the breadth of industrial engineering, but both also offer sufficient flexibility so that your degree is tailored to your background and career objectives. The non-thesis option requires 33 semester hours of course work and the successful completion of a comprehensive exam. Most students complete these requirements in three semesters. The thesis option requires 24 semester hours of course work and successful completion of a thesis. Most students require at least four semesters when pursuing this option.

**PhD**  The PhD is intended for students interested in a career of research and teaching; hence, work leading to this degree focuses on formal course work, independent study, participation in seminars and preparation of a dissertation based on original research. The basis for granting the PhD includes your grasp of the subject matter as displayed in course work and on the qualifying exam as well as your competency to plan and conduct independent and original research as evidenced through the dissertation.

Research

**Production and Service Systems**  One active area of research is exploring both theoretical and applied aspects of production and service systems. Faculty and students focus on the design, implementation and maintenance of supply chain and logistics systems, with special emphasis on the application of optimization and engineering analysis tools to modeling, design and analysis of these systems.
Human Factors  Another significant research area in the department centers on human factors systems and safety. Funded research by faculty include a wide variety of issues related to human factors associated with transportation accidents and incidents, aviation inspection systems, human computer interaction and system safety.

Education and Learning Systems  Because the quality of engineering education is more important than ever, researchers at Clemson University are focusing on the development, application and evaluation of alternative approaches to the delivery of engineering subject material that are effective and efficient and increase student success.
The research facilities in industrial engineering are arranged in six labs and centers.

- The **Advanced Technology Systems Laboratory** pursues research in human-machine systems as it applies to a variety of domains, such as quality and process control systems and aircraft maintenance.

- The **Advanced Quality Engineering Laboratory** focuses on research to discover scientific knowledge and technological solutions to quality-engineering problems. Broad research areas include robust design, reliability engineering, tolerance design, human-machine collaborative design optimization and process target and military operations research.

- The **Ergonomics Laboratory** supports research in industrial ergonomics, including environmental measurement, work design and eye-motion tracking.

- The **Education and Learning Systems Research Laboratory** provides a setting for the development, application and evaluation of new industrial engineering curricula and delivery systems.

- The **Human-Computer Systems Laboratory**’s mission is to improve the design of human-computer systems, which in turn allows people to use these systems to carry out their work efficiently. The lab focuses on understanding users and their tasks while making use of technology to meet the users’ needs. This user-centered design process produces human-computer systems that are both useful and readily usable.
• The Center for Engineering Logistics and Distribution is a National Science Foundation sponsored Industry/University Cooperative Research Center consisting of nine universities and over 30 industry and government members. Research focuses on theoretical and applied logistics problems associated with the entire supply chain from procurement of raw materials to delivery of finished goods to customers. Research activities frequently involve mathematical modeling and computational optimization.

In addition to the labs, you will also have access to smart classrooms equipped for integrated networking and audio-visual technologies. A design studio and a design laboratory, consisting of a suite of reconfigurable space, supports graduate design courses and provides project space, video teleconferencing and more.

Financial Aid

The department awards approximately 25 teaching and research assistantships each year. While the exact amounts vary, most students find that the assistantships offset most, if not all, of the expenses associated with obtaining their graduate degree.

Cost of Study

Tuition for 2007-08 is $3,641 per semester for in-state students and $7,285 per semester for nonresidents. Off-campus rates are $330 per hour for in-state students and $660 per hour for nonresidents. Graduate assistants pay a flat fee of $950 per semester and $315 per summer session. Graduate fellows pay South Carolina resident fees.
Student Group

The Graduate Program in Industrial Engineering typically has about 25 PhD and 30 MS students, with women consistently comprising about one third. Students come from all over the world to study industrial engineering at the University, including, most recently, China, France, Germany, Egypt, Honduras, Jordan, India, Mexico, Peru, Sri Lanka, Taiwan, Thailand and the United States.

Student Outcomes

Because of the program’s broad nature, graduates with a master’s degree choosing a career in industry are sought by a wide variety of industries including automotive, aviation, chemical, consulting, electronics, financial, health care and information technology. PhD graduates enter both academia and industry in locations around the world. Recent Clemson PhD graduates who chose academia are now faculty members of universities in the United States, Turkey and Thailand.

Applying

You are encouraged to apply if you have baccalaureate and/or master’s degrees in engineering, mathematics, the sciences or quantitative areas in business. It is strongly recommended that you begin your degree program in the fall semester, although you may apply for January admission if you have a baccalaureate degree in industrial engineering.

You may apply on the web at www.grad.clemson.edu/Admissions.php. Applications and all supporting materials, along with a $55 nonrefundable fee, must be received no later May 1 for the following fall semester. Only complete application packages received by February 1 are considered when awarding assistantships.

Faculty Listing

- Byung-rae Cho, Associate Professor; PhD, Oklahoma. Industrial engineering. Research interests include quality engineering, design of experiments, robust design, tolerance design, operations research, reliability engineering and decision theory.
- William G. Ferrell Jr., Professor; PhD, North Carolina State. Operations research. Research interests include supply chain logistics, applied optimization and multicriteria optimization.
• Sandra K. Garrett, Assistant Professor; PhD, Purdue. Human factors. Research interests include information flow and knowledge development within complex environments, team coordination and healthcare systems engineering.

• Anand K. Gramopadhye, Professor and Department Chair; PhD, SUNY at Buffalo. Industrial engineering. Research interests include human factors in manufacturing and aviation systems, modeling humans in technologically complex systems, hybrid systems and using technology to solve interesting human-machine system design problems.

• Joel S. Greenstein, Associate Professor; PhD, Illinois. Mechanical engineering. Research interests include user-centered design, human-computer interaction, computer-supported collaborative work and knowledge management and human factors.

• Delbert L. Kimbler Jr., Professor; PhD, Virginia Tech. Industrial engineering and operations research. Research interests include industrial ergonomics, work design and industrial engineering education.

• Mary Elizabeth Kurz, Assistant Professor; PhD, Arizona. Systems and industrial engineering. Research interests include modeling manufacturing systems for scheduling purposes and developing heuristics and meta-heuristics to find solutions for scheduling problems.

• Maria E. Mayorga, Assistant Professor; PhD, California at Berkeley. Industrial engineering and operations research. Research interests include modeling and analysis of the supply chain, application of stochastic optimization in production and service systems and analysis of queuing systems.

• Brian J. Melloy, Associate Professor; PhD, South Florida. Industrial and management systems engineering. Research interests include operations research with applications in human factors engineering.

• Scott A. Shappell, Professor; PhD, University of Texas Medical Branch. Neuroscience. Research interests include human error, accident causation and safety management.

• Kevin M. Taaffe, Assistant Professor; PhD, Florida. Industrial and systems engineering. Research areas include production and inventory management, transportation and logistics system analysis, optimization and simulation modeling.
For More Information

William G. Ferrell, Jr.
Department of Industrial Engineering
110 Freeman Hall
Box 340920
Clemson University
Clemson, South Carolina 29634-0920
Telephone: 864-656-4716
Fax: 864-656-0795
Email: fwillia@ces.clemson.edu