



EARN YOUR  
**DEGREE** IN  
INDUSTRIAL & SYSTEMS  
ENGINEERING



COLLEGE OF ENGINEERING  
GRADUATE DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING  
VIRGINIA TECH.



## What is Industrial and Systems Engineering?

Industrial and systems engineers are concerned with the design, development, improvement, implementation and evaluation of integrated work systems comprised of people, information and knowledge, equipment, energy, materials, and processes.

The Grado Department of Industrial and Systems Engineering utilizes innovative and creative practices and technologies to achieve the highest quality of instruction and student learning.

Coursework encompasses operations research, manufacturing systems, human factors and ergonomics, and management systems. The curriculum addresses not only the decisional, physical and technical aspects of systems, but also the organizational, economic, business, and human elements.

Students develop technical capabilities as well as professional skills such as teamwork, communication, ethical behavior, and lifelong learning.

# CAREERS

The demand for industrial and systems engineers has grown dramatically in recent years. The need for organizations to minimize costs, while maintaining safety and quality, ensures the longevity of the profession and its continual growth.

The educational experience prepares students for a broad variety of employment opportunities in various industries and positions.

## Sample Industries:

- ✓ Manufacturing Logistics
- ✓ Warehousing
- ✓ Consulting
- ✓ Information Technology
- ✓ Transportation
- ✓ Financial Services
- ✓ Healthcare

## Sample Careers:

- ✓ Management Engineer
- ✓ Software Engineer Analyst
- ✓ Quality Engineer
- ✓ Production Manager
- ✓ Business Technology Analyst
- ✓ Manufacturing Engineer
- ✓ Systems Engineer
- ✓ Product Development Manager



# Key Areas of Study



## Manufacturing Systems

Design and improve manufacturing facilities (processes, equipment, materials) and how they are operated.

*Career Examples: Quality engineer; production manager; facility designer*



## Human Factors & Ergonomics

Design and improve products and systems that humans interact with, both cognitively and physically.

*Career Examples: Computer user interface developer; athletic equipment designer*



## Management Systems

Design and improvement of systems used to manage business enterprises and other organizations.

*Career Examples: Project manager; continuous improvement coordinator; government or business consulting*



## Operations Research

Application of advanced mathematical methods to help make better decisions.

*Career Examples: Flightpath coordinator; production planning coordinator; scheduler for hospital staffing, emergency room nurses, surgical staff, or trucking routes*



## Co-Ops & Internships

The Grado Department of Industrial and Systems Engineering encourages students to take advantage of all types of work experience relating to their major. Through effective, collaborative planning by the student, academic advisor, and career and professional development, an internship, cooperative education (co-op), and/or externship experience can be undertaken. While the ISE academic program is structured, students can still complete an internship often with only an additional semester or year. Within-program work experiences can be of varying lengths, such as one summer (internship), one to three semesters (co-op), or a few hours or days shadowing a person in your career field (externship).

Top companies that hire ISE students for co-ops and internships:

- Altec Industries
- BMW Manufacturing
- Capital One
- Dell
- General Electric
- Moog
- Volvo Group North America
- Walt Disney



## Study Abroad

Many engineering students study abroad to build cultural competency and to see engineering in a different context. You can take technical courses, language or cultural classes while abroad.

Speaking to your advisor early in your academic career is key to planning a study abroad experience.

Explore another culture in Europe, Australia, China, Iceland, Brazil, and more!

Programs popular with ISE Students:

- College of Natural Resources and Environment (New Zealand)
- Green Program (Peru, Iceland, Nepal, and other locations)
- Karlsruhe Institute of Technology (Germany)
- Pontifical Catholic University of Paraná (Brazil)

# Undergraduate Research

Whether you plan to pursue graduate study or embark upon a career in industry, undergraduate research provides many benefits. You'll develop research skills that are applicable in many other settings while exploring a topic of interest to you in greater depth than possible in the classroom. You'll gain valuable experience as you collect, organize, and analyze data, help solve a research problem, and communicate the results of your work.



## Benefits:

- Support of faculty members with clearly defined goals, objectives, and evaluation of the research project
- You can earn course credit or pay
- Potential for your research to be published in a publication
- Potential for presenting your research at national or regional conferences

## Examples of current undergraduate research projects for Fall 2019:

- Intelligent Virtual Coach for Self-Training Manual Skills in Laparoscopy
- Designing, Programming, and Testing Flying Robots
- Project Scheduling for Nuclear Power Plant Outages
- A Simulation-Optimization Study in Biomass Feedstock Logistics
- Picture Sonification for Different Art Styles
- New Auditory Displays for Automated Vehicles
- Biomechanical Analysis of Alexander Technique Training on Balance and Gait locations
- Biomechanical Analysis of Reactive Balance and Dual Mental Tasks
- Data Analytics for Advanced Manufacturing Systems
- Augmented Perception to Support Whole-body Exoskeletons for Advanced Vocational Enhancement

# Student Organizations

## Alpha Pi Mu



Alpha Pi Mu focuses on recognizing top junior and senior industrial engineering students for their academic achievements. The organization also endeavors to increase professional development among members, promote networking among faculty, undergraduate, and graduate students, and have fun!

## Institute of Industrial & Systems Engineers



IISE is the world's largest professional society dedicated solely to the support of the industrial engineering profession and individuals involved with improving quality and productivity. Founded in 1948, IISE provides professional development opportunities to undergraduate students through company information sessions, networking, and Six Sigma/Lean certifications.

## ISE Ambassadors



ISE Ambassadors assist the department, student body, and community by supporting a variety of areas including advisory board and alumni relations, community outreach, curriculum development and improvement, and event planning.

## Human Factors and Ergonomics Society



The Human Factors and Ergonomics Society, founded in 1957, is the world's largest scientific association for human factors/ergonomics professionals. HFES serves the needs of members and the public by promoting and advancing the discovery and exchange of knowledge concerning the characteristics of human beings that are applicable to the design of systems, products, tools, and environments of all kinds.

## Institute for Operations Research and the Management Sciences



The VT-INFORMS chapter aims to stimulate interest in the fields of Operations Research, Manufacturing Systems and Processes, and Management Sciences, as well as to provide professional development opportunities for students in ISE and other related programs at Virginia Tech. The Chapter seeks to be a platform for students and faculty to get familiar with research and industry professionals.



# Academic Advising



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Undergraduate academic advisors in the ISE department are committed to providing the support necessary to ensure student success. They assist current, new and prospective students in their efforts to reach their educational and career goals. Students are encouraged to visit with an advisor at least once per semester to stay on track for graduation.

## Advising Services:

Academic Advising	Selecting electives, transferring courses, plan of study, adding a minor, scheduling, and study abroad planning.
Career Exploration	Co-op or internship planning, resume support, and post-graduation career planning.
Personal Support	Referrals to campus and community resources.

# By the Numbers



Survey from recent ISE graduates show that the salary of Virginia Tech industrial and systems engineers is on the rise, with \$84,000 as the annual median primary compensation.

Median Starting Salary

~\$71,000



When it comes to landing a job after graduation, ISE graduates have secured highly competitive employment opportunities.

Students employed by graduation

87%



Most ISE students take advantage of the opportunities that are available to explore their career interests and have a competitive advantage when looking for a full-time position upon graduation.

Students who intern or co-op

80%



We are committed to fostering a diverse community students. Virginia Tech Engineering strives to recruit and graduate a high quality, diverse student body.

Students that identify as female

35%



Our generous ISE community of alumni and friends has made the promise of a Virginia Tech education possible for so many talented students.

Annual scholarship funding

\$148,000



The U.S. News & World Report consistently ranks the Virginia Tech ISE Department as a top program for both undergraduate and graduate programs.

Rankings by the U.S. News & World Report

4th



## Hokie Mentorship Connect

Hokie Mentorship Connect is an online platform that can unite Virginia Tech undergraduate students with alums for career-related support.

In the Grado Department of Industrial and Systems Engineering, we strive to provide valuable mentoring opportunities to our students. We work to match current students with seasoned alumni in their desired field. This gives students the chance to get an expert's advice and insight on educational and career options, best networking practices, and goal-setting. The program exists to promote fellowship and networking for career development purposes. As a result, open lines of communication can be formed and meaningful long-term relationships can be established between multiple generations of Hokies.

Industrial and systems engineering undergraduate students also have access to a private discussion board on the platform that connects them directly with alumni of the program. No formal mentoring relationship is required to ask questions and connect with alumni.

We encourage all of our students to take advantage of this free resource. There's no substitute for experience, and we have alumni ready to answer your questions about academics, your field and everything in between.



## CONTACT US

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