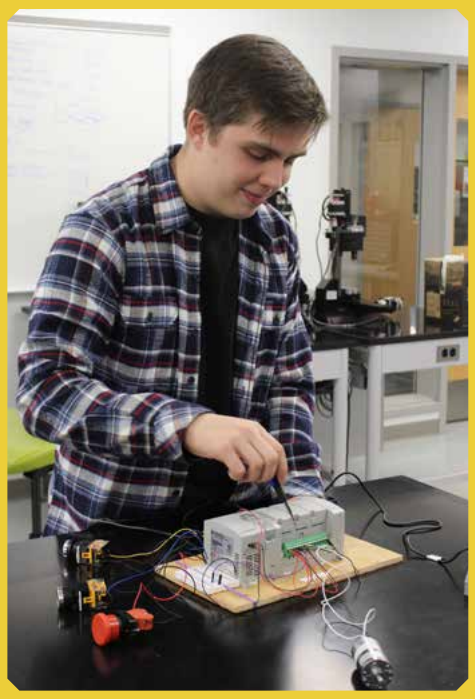
NDSU NORTH DAKOTA STATE UNIVERSITY



ONE DEGREE. COUNTLESS CAREERS

INDUSTRIAL AND MANUFACTURING ENGINEERING

Welcome to the department of Industrial and Manufacturing Engineering, otherwise known as "IME" at North Dakota State University. NDSU's College of Engineering is well-known for its high-quality undergraduate programs, innovative teaching, imaginative research and student focus.

The IME department offers a Bachelor of Science in two programs of study: industrial engineering and management, and manufacturing engineering. NDSU is one of only 19 universities in the U.S. offering a manufacturing engineering program.

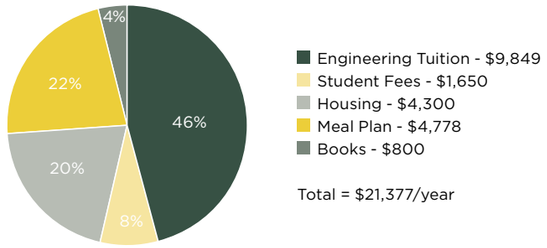
Nearly all economic sectors are starving for highly educated, skilled problem solvers with great communication abilities. IME graduates are well-positioned to meet these needs. This gives our graduates nearly an **endless number of opportunities** for career choices and geographic locations, as well as fast-paced career growth.

WHY CHOOSE NDSU?

NDSU is an economic engine for the state and region that combines teaching and research in a rich learning environment.

We offer an excellent education at one of the most reasonable costs available.

COST OF ATTENDENCE



Total = $21,377/year

	ND Residents	MN Residents	MT, SD, Sask, Manitoba	Other States
Engineering Tuition (13+ credits)	$9,849	$11,031	$11,891	$14,774
P/T Engr. Tuition (12 or less credits)	$405.33	$453.97	$486.39	$607.99

We provide several scholarships for undergraduate students at the department level. NDSU also is proud to offer guaranteed awards for incoming students who meet certain academic criteria.

WHY CHOOSE IME?

JOB PLACEMENT

IME Department:

90%

College of Engineering:

88%

MEDIAN STARTING SALARY

Industrial Engineering and Management graduates:

$66,500

Manufacturing Engineering graduates:

$60,000

College of Engineering graduates:

$63,000

SCAN ME

Scan to hear what NDSU students and alumni have to say about our IME program.

STUDENT FOCUSED

- **Smaller class sizes and faculty accessibility**
- **Undergraduate research opportunities**
- **Cooperative education opportunities**

STRONG STUDENT ORGANIZATIONS

We have more than 30 engineering-related student groups including the Society of Women Engineers, Bison Robotics and student chapters of the Institute of Industrial and Systems Engineers and the Society of Manufacturing Engineers.

CONNECTED TO INDUSTRY

The majority of our students participate in internships and co-ops. When you leave NDSU, you will have excellent hands-on experience for career success and a network of friends and professional colleagues.

RESEARCH AND DISCOVERY

Undergraduate research is encouraged in our department. It promotes critical thinking and problem-solving skills, provides networking experiences and creates career development opportunities.

Our faculty and staff have extensive experience in industrial and manufacturing specialties. They are committed to leading the way in the following areas:

- Operations research
- Facility planning and management
- Ergonomics and human factors
- Additive/advance manufacturing
- Quality and reliability
- Data analytics
- Health care

The IME department has seven labs to support research and students' educational needs.

Additive Manufacturing Lab

An extrusion-based, bio-compatible, layered-fabrication system has been designed and developed in our laboratory to deposit both engineering materials as well as delicate biomaterials.

The laboratory also has a range of selective-laser sintering systems as well as laser-stereo lithography system, capable of producing parts with a wide range of thermo-mechanical properties.

Automation Lab

The IME automation system simulates a real production line in a miniature scale.

Human Factors Lab

Allows for teaching and research in ergonomics and man-machine interfaces. The lab provides a hands-on emphasis on optimizing person-machine and person-system interactions.

Manufacturing Lab

The machine shop gives students the chance to use one of our Computer Numeric Control machines.

Quality and Reliability Lab

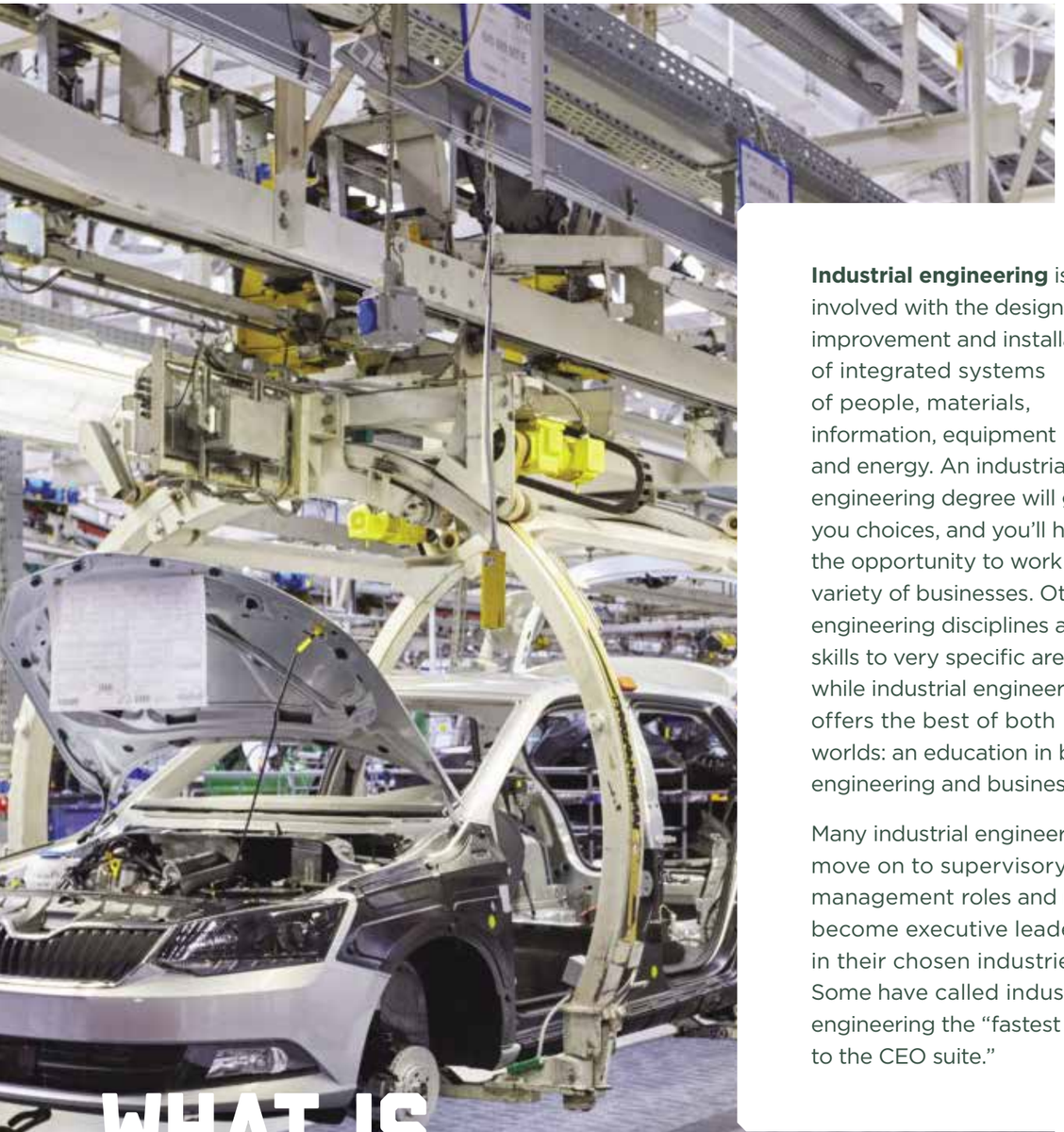
The HawQ test chamber allows for testing and design validation of electronic products.

Sensing and **P**redictive **A**nalytics for **C**omputational **H**ealth **S**ystems (SPACHeS) Lab

Focused on smart connected systems and prognostic analytics for health care applications.

Simulation Lab

This computer lab utilizes ARENA to simulate manufacturing and business service to optimize operations and outcomes.



WHAT IS INDUSTRIAL ENGINEERING?

Industrial engineering is involved with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. An industrial engineering degree will give you choices, and you'll have the opportunity to work for a variety of businesses. Other engineering disciplines apply skills to very specific areas, while industrial engineering offers the best of both worlds: an education in both engineering and business.

Many industrial engineers move on to supervisory and management roles and may become executive leaders in their chosen industries. Some have called industrial engineering the "fastest way to the CEO suite."

WHAT INDUSTRIAL ENGINEERS DO

- Optimize complex processes
- Develop and implement integrated systems of people and resources
- Integrate mathematics, physical and social sciences into engineering design
- Review production schedules, engineering specifications and process flows in a manufacturing plant
- Figure out how to manufacture parts or products, or delivery services, with maximum efficiency
- Develop management control systems to make financial planning and cost analysis more efficient
- Design quality-assurance systems
- Meet with clients, vendors, management and staff about the status of projects

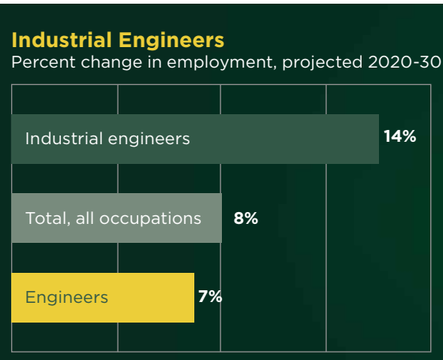
CAREER OPPORTUNITIES

Our programs will help you develop a strong base in general education and engineering fundamentals that provide the foundation for a vast range of career choices and a lifetime of growth.

Our graduates are hired in every industry type including:

- Health care
- Entertainment
- Transportation (air, sea, land and space)
- Manufacturing
- IT and cyber-security
- Financial and investment industry

Industrial Engineers
Percent change in employment, projected 2020-30



Note: All occupations includes all occupations in the U.S. Economy.
Source: U.S. Bureau of Labor Statistics, Emplyyment Projections program

EMPLOYMENT

Industrial engineers are employed in a wide range of industries, including major manufacturing industries, consulting and engineering services, health care, and research and development firms. This versatility is because industrial engineers are the only engineering professionals trained specifically to be productivity and quality improvement specialists. That makes their work valuable for many industries.

The U.S. Bureau of Labor statistics cites the 2020 median pay at $88,950 per year, or $42.76 per hour.

Starting job titles for industrial engineers

- Systems engineer
- Supply chain engineer
- Operations researcher
- Cost engineer
- Field engineer
- Manufacturing engineer
- Production engineer
- Process engineer
- Project manager
- Automation engineer
- Safety engineer
- Human factor engineer

SCAN ME

Scan to learn more about IE from the U.S. Department of Labor.

WHAT IS MANUFACTURING ENGINEERING?

Manufacturing engineers are the individuals responsible for development, design, implementation and monitoring of manufacturing processes, equipment, tools and machinery used in the making of a wide variety of products.

Their primary goal is to create the stages of a manufacturing system that creates a product in the most time-efficient and cost-effective way possible, while maintaining staff safety and product quality.

WHAT MANUFACTURING ENGINEERS DO

- Design new processes, tools or equipment
- Analyze necessary manufacturing processes to determine the most effective equipment and processes
- Install new equipment
- Optimize machine and equipment use through ongoing analysis and identification of inefficiencies within the system
- Determine causes of failures using statistical methods and recommend changes in designs, tolerances or processing methods
- Work with manufacturing staff to train on new equipment or optimization processes
- Supervise technicians, technologists, analysts, administrative staff or other engineers
- Help with troubleshooting problems within the manufacturing process

CAREER OPPORTUNITIES

Our graduates are hired in every industry type including:

- Energy
- Industrial automation
- Medical devices
- Ag equipment
- Recreational equipment

WHAT IS THE DIFFERENCE BETWEEN MECHANICAL AND MANUFACTURING ENGINEERING?

Mechanical engineers focus on the design and analysis of mechanical systems. Manufacturing engineers focus on applying engineering principles to the development and implementation of converting raw material into finished products.

MANUFACTURING ENGINEERING

HERE'S WHAT OUR GRADUATES SAY:

"My experience at NDSU truly prepared me for success in my career. The IME department is filled with people who want students to excel and looking back, I know I made the right choice for my higher education."

-Hanna Quade, B.S. 2017, manufacturing engineering

"I like the wide variety of career pathways it can lead you to. I have done so many different things in my career. I felt at ease in the very technical engineering jobs as well as the management of projects and people. It gave me a good background to get started."

– Mike Brandt, BS 1989

"I was drawn to industrial engineering and management because it was the people side of engineering. I can use math and logic skills to solve real-world problems. I like making a difference. I have a natural curiosity to learn more about people, processes and systems and how they interact to produce results. I enjoy listening to people around me, taking a hands-on approach, thinking innovatively and approaching problem solving with a positive attitude."

– Kim Heinle Nelsen, BS 1991

"I love the variety that my IME degree has given me. From the people and processes I get to work on, I've never become bored or felt like I was in a rut. The degree has led me into a career where I am challenged, but I feel well prepared to tackle those challenges from the IME methodology that NDSU taught me. The creative freedom and problem solving that comes with an IME degree is what I love most."

– Hannah Holte, BS 2016

NDSU | INDUSTRIAL AND MANUFACTURING ENGINEERING

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