

NC STATE

# UNDERGRADUATE PROGRAMS

Industrial and Systems Engineering

[ise.ncsu.edu](http://ise.ncsu.edu)

So you  
want to  
be an  
**ENGINEER?**

*But which kind?*

## Take our quiz and find out!

1. Do you want the flexibility to work in almost any industry?
2. Do you like to find ways to do things better?
3. Are you good at math?
4. Do you enjoy working with people?
5. Are you interested in management or running a company?

If you answered “Yes” to any of these questions, you might be the perfect industrial and systems engineer. Look inside to discover what industrial and systems engineers do and how it might be just the thing for you.

**ise** EDWARD P. FITTS DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING

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# Why should I become an **Industrial and Systems Engineer?**

It's simple. **Industrial and systems engineers (ISEs) figure out how to do things better.** They use their engineering, mathematics and physical sciences knowledge to design and improve the productivity, quality and safety of systems and processes. As a result, they are known as “people person” engineers.

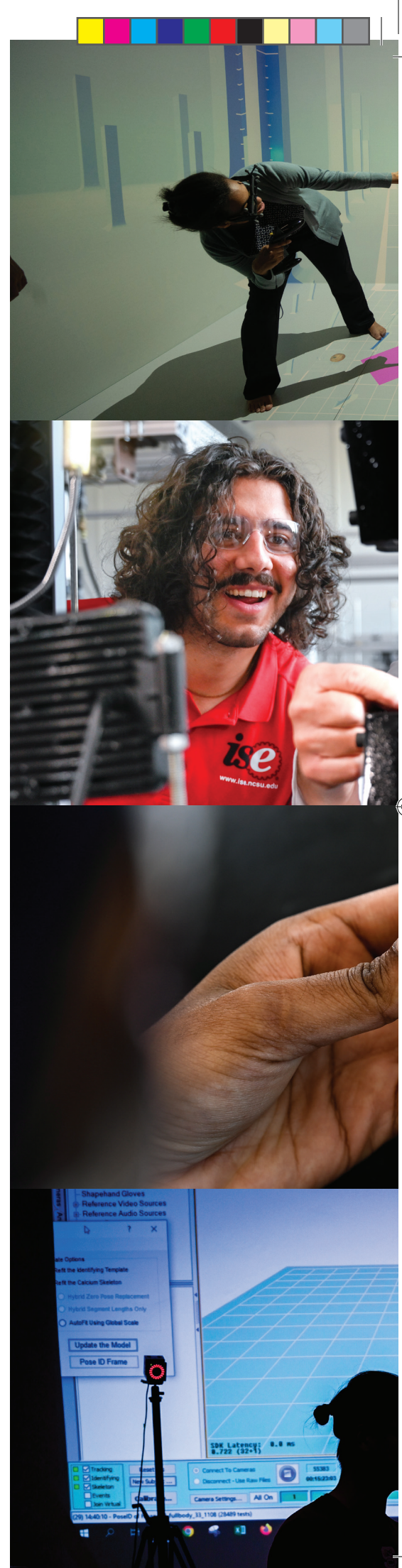
But before you think they all work in factories, ISEs work in almost any industry, including healthcare, retail, banking and transportation. Because they focus on improving quality and productivity while reducing costs, many get promoted into management positions. For the same reason, ISE is an excellent choice for anyone wanting to run their own business.

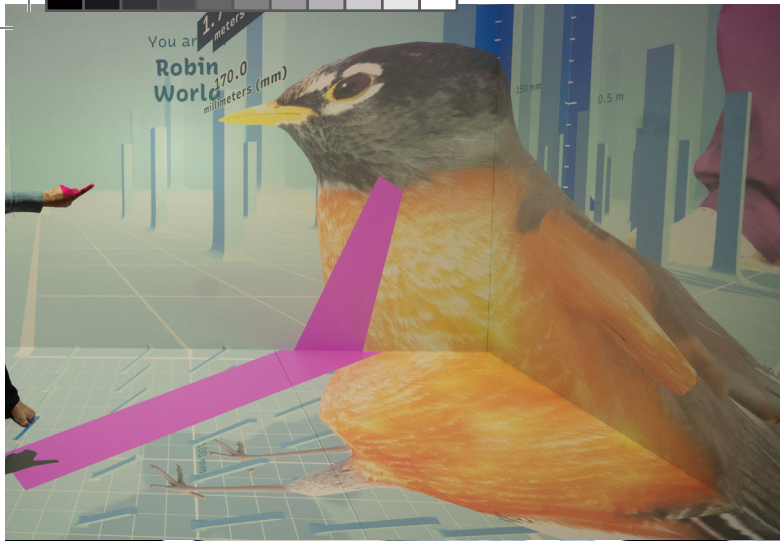
## Career Ready

Experts predict that ISE employment will continue to grow over the next decade, according to the U.S. Bureau of Labor (BLS). This growth is faster than the average for all occupations. **Over 90 percent of our students have a job at graduation or are going to grad school.** Many of them have found a job before the start of their final semester. At our College of Engineering Career Fairs, over one-third of the 300+ companies are looking for industrial and systems engineers.

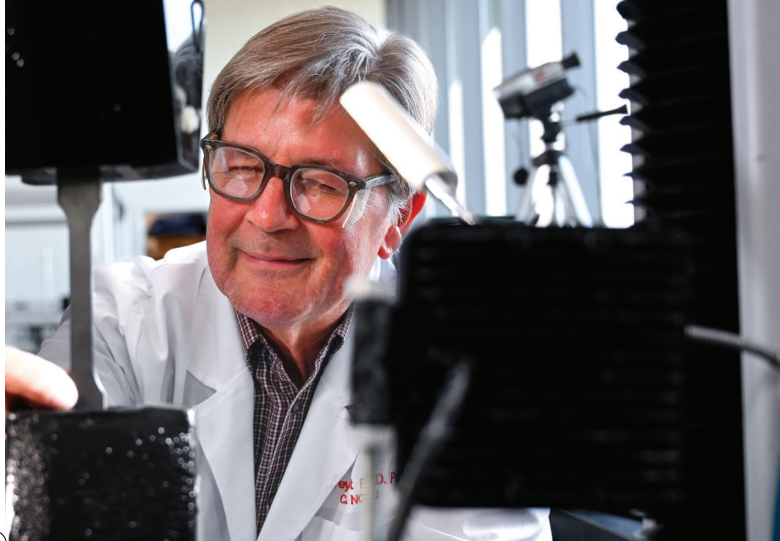
ISEs can expect to be paid well for their expertise, with median annual salaries significantly higher than the median for all workers, according to the BLS.

The ISE Department has developed close ties with many corporations across the United States, including Intel, IBM, Cisco, Microsoft, Amazon, Tesla, Duke Energy and many more.

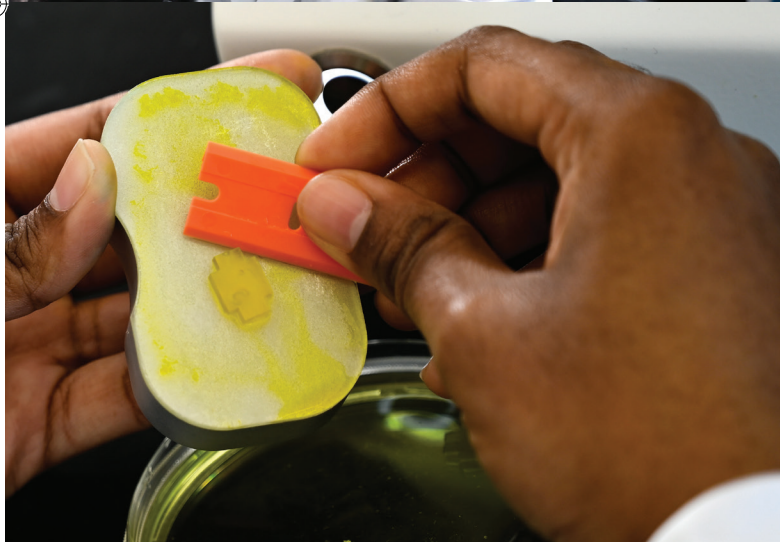




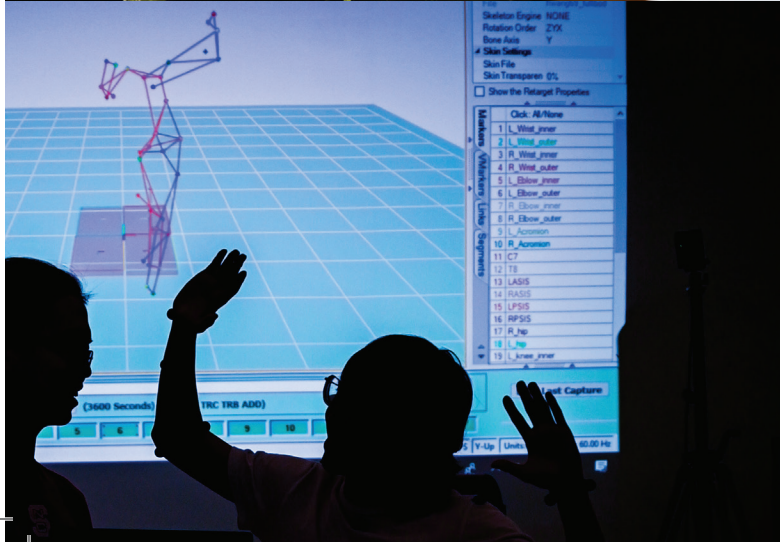
Using virtual reality to understand better scale and extreme sizes—  
designed by **industrial and systems engineers**



Designing, prototyping and testing 3D-printed parts—  
designed by **industrial and systems engineers**



Bioprinting and manufacturing human tissues—designed  
by **industrial and systems engineers**



Using motion capture to improve worker safety—  
designed by **industrial and systems engineers**



# CURRICULUM: Bachelor of Scienc

General engineering

First Year   Fall Semester		Credit Hours
CH 101	Chemistry, A Molecular Science	3
CH 102	General Chemistry Lab	1
E 102	Engineering in the 21st Century (GEP-IP)	2
E 115	Introduction to Computing Environments	1
ENG 101	Academic Writing and Research	4
HES ***	Health and Exercise Studies Course	1
MA 141	Calculus I	4

**ISE PRO TIP:** Remember that this is a guideline. You have a ton of flexibility when it comes to selecting courses. Talk with an advisor to discover all of your choices.

General engineering

First Year   Spring Semester		Credit Hours
	GEP Requirement	3
E 101	Introduction to Engineering and Problem Solving	1
EC 205 or EC 201 or ARE201 (A)	Fundamentals of Economics Principles of Microeconomics Introduction to Agricultural and Resource Economics	3
HES ***	Health and Exercise Studies Course	1
MA 241	Calculus II	4
PY 205	Physics for Engineers and Scientists I	3
PY 206	Physics for Engineers and Scientists I Lab	1

Become a  
Python guru  
and learn  
about BIG  
DATA

Second Year   Fall Semester		Credit Hours
ISE 135	Computer-Based Modeling for Engineers	3
MA 242	Calculus III	4
MSE 200 or MSE 201	Mechanical Properties of Structural Materials Structure and Properties of Engineering Materials	3
PY 208	Physics for Engineers and Scientists II	3
PY 209	Physics for Engineers and Scientists II Lab	1
ST 371	Introduction to Probability and Distribution Theory	3

**ISE PRO TIP:** You can choose between different courses depending on which fits your interests and needs.

Second Year   Spring Semester		Credit Hours
	GEP Requirement	3
CE 214 or MAE 206	Engineering Mechanics - Statics Structure and Properties of Engineering Materials	3
ISE 215	Introduction to Computer-Aided Design (CAD)	1
ISE 216	Product Development and Rapid Prototyping	3
MA 303 or MA 341	Linear Analysis Applied Differential Equations I	3
ST 372	Introduction to Statistical Inference and Regression	3

Learn about  
product  
development

ence in Industrial Engineering (BSIE)

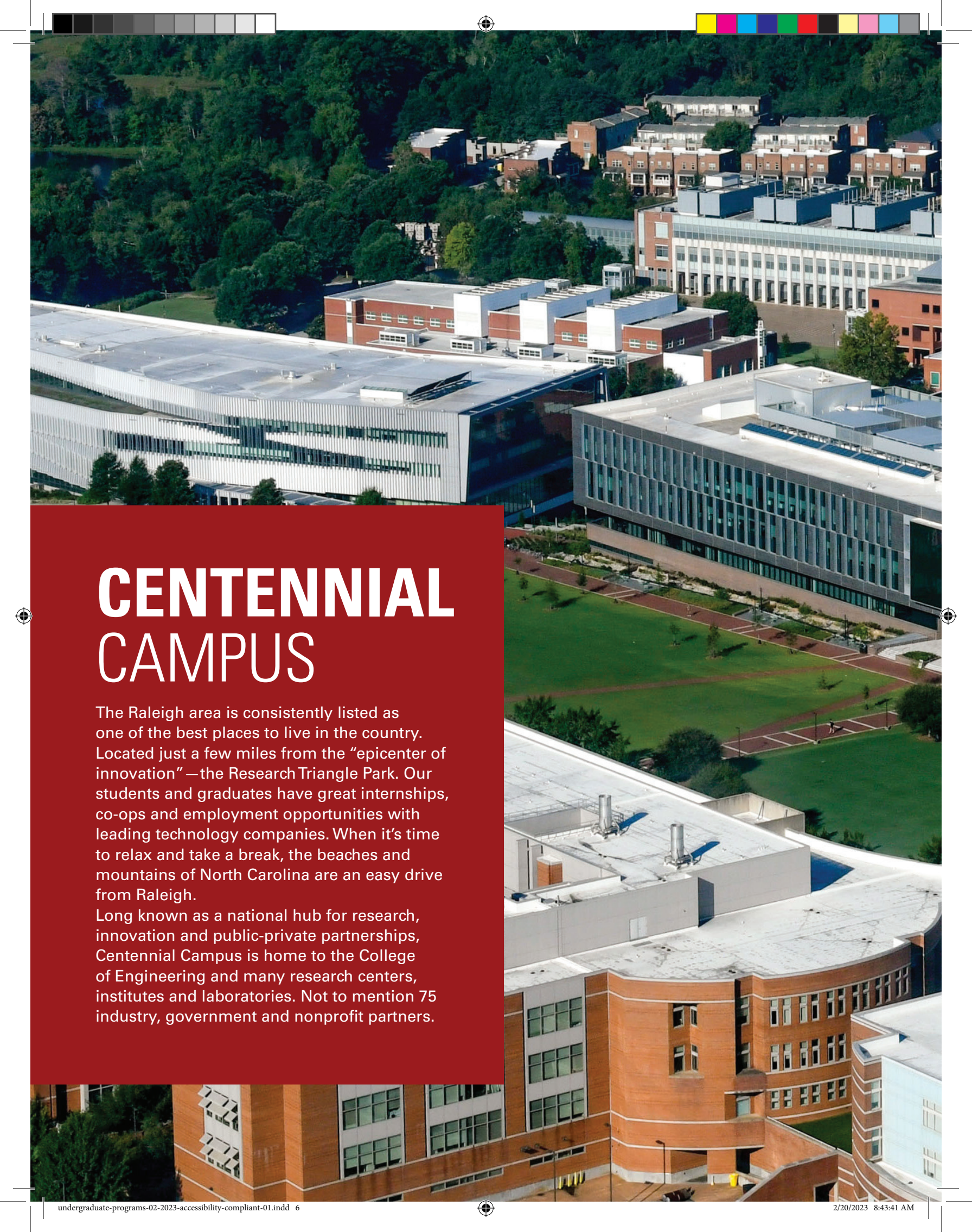
Third Year   Fall Semester		Credit Hours
Make cool stuff	Ethics	3
	ECE 331 Principles of Electrical Engineering	3
	ISE 315 Introduction to Computer-Aided Manufacturing	1
	ISE 316 Manufacturing Engineering I - Processes	3
	ISE 362 Stochastic Models in Industrial Engineering	3
	ISE 352 or ISE 443 Fundamentals of Human-Machine Systems Design Quality Control	3
ISE PRO TIP: This course could also count towards an unfulfilled GEP requirement		
Stop bad products before they are shipped		
ISE PRO TIP: You can choose between classes and then the following semester you take your other option.		

Third Year   Spring Semester		Credit Hours
Optimize supply chains	Engineering Science Elective	3
	Technical Elective	3
	ISE 352 or ISE 443 Fundamentals of Human-Machine Systems Design Quality Control	3
	ISE 361 Deterministic Models in Industrial Engineering	3
	ISE 408 or ISE 441 Control of Production and Service Systems (CP) Introduction to Simulation (CP)	3
Design safe and efficient processes		
ISE PRO TIP: You will see orange-colored courses (labeled with a CP) called critical path courses. These courses represent specific requirements that predict your success in the BSIE program.		

Fourth Year   Fall Semester		Credit Hours
Build a model that simulates patients in a hospital	ENG 331 Communication for Engineering and Technology	3
	ISE 398 Lean Six Sigma for Industrial Engineers	1
	ISE 408 or ISE 441 Control of Production and Service Systems (CP) Introduction to Simulation (CP)	3
	ISE 453 Modeling and Analysis of Supply Chains (CP)	3
	ISE 520 or Technical Elective Healthcare Systems Performance Improvement I	3
ISE PRO TIP: To earn a Health Systems Engineering Certificate, you will take ISE 520 as a technical elective and ISE 521 instead of ISE 498.		

Fourth Year   Spring Semester		Credit Hours
	GEP Requirement	3
	GEP Requirement	3
	GEP Requirement	3
	Technical Elective	3
	ISE 311 Engineering Economic Analysis	3
	ISE 498 or ISE 521 Senior Design Project (CP) Healthcare Systems Performance Improvement II	3
Work on an industry project		



An aerial photograph of Centennial Campus, showing several large, modern academic buildings with extensive glass facades and brick accents. The campus is surrounded by lush green trees and a large green lawn with a red running track. In the background, a dense forest covers a hillside.

# CENTENNIAL CAMPUS

The Raleigh area is consistently listed as one of the best places to live in the country. Located just a few miles from the “epicenter of innovation” —the Research Triangle Park. Our students and graduates have great internships, co-ops and employment opportunities with leading technology companies. When it’s time to relax and take a break, the beaches and mountains of North Carolina are an easy drive from Raleigh.

Long known as a national hub for research, innovation and public-private partnerships, Centennial Campus is home to the College of Engineering and many research centers, institutes and laboratories. Not to mention 75 industry, government and nonprofit partners.





# A Living, Working Community

Centennial Campus is a bustling—and growing—community. A sprawling landscape with walking trails, a championship golf course, restaurants, condos and a hotel. A mini-city nestled around Lake Raleigh. And, just as important, a destination for fun.

You can catch a movie on the vast Oval Lawn, chow down at a food truck rodeo, enjoy a live concert on the shore and kayak by moonlight on the lake.

The state-of-the-art campus is a collision of learning, research and innovation—leading to game-changing advancements and technologies that shape the world.

## Fitts-Woolard Hall

Centennial Campus's center is the new home of the Edward P. Fitts Department of Industrial and Systems Engineering—Fitts-Woolard Hall.

The construction of the 227,000-square-foot building with more than 100 classrooms and state-of-the-art laboratories was made possible by a unique public-private partnership.


The building has been named to honor Edward P. Fitts, Jr. (ISE' 61), his wife, Debra, Edgar S. Woolard, Jr. (ISE' 56), and his wife, Peggy. Fitts-Woolard Hall honors their commitment to the College of Engineering's continued growth and progress.

## Take the Virtual Tour

If you can't make it to Centennial Campus, take a virtual tour of Fitts-Woolard Hall and see all the different areas within the ISE Department.

**[go.ncsu.edu/TourFitts](https://go.ncsu.edu/TourFitts)**





# Get Ready to **Think and Do**

NC State is a leading public university in one of the fastest-growing cities in America. Here, we pair bold thought with purposeful action to tackle some of the world's biggest challenges.

Whether you're learning in the lab, the field or the classroom, you'll gain real-world experience—and set yourself up for a strong future.

If you can see yourself here, we're ready to welcome you home. A community of bright minds and big thinkers is waiting.

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