



ECU[®]

Excellence in Engineering
College of Engineering and Technology
Department of Engineering



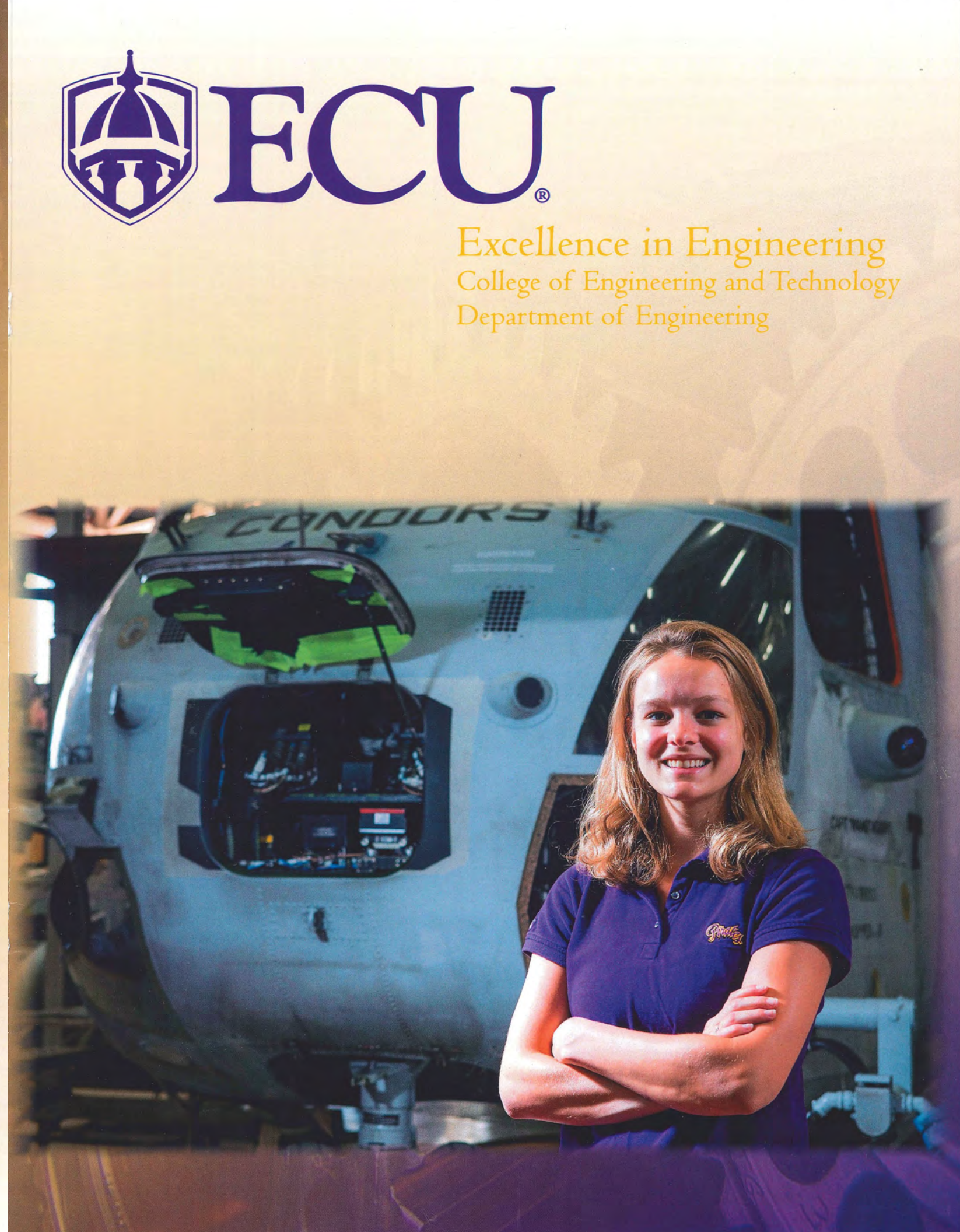
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Avenues For Success

The Engineering Learning Community: Residing and Working Together

The optional Engineering Learning Community unites ECU engineering students, primarily freshmen and sophomores, within a residential environment that promotes collaborative learning and friendships that build a foundation for success in the pursuit of an engineering degree. ELC students are block-scheduled in similar classes during their first semesters at ECU. This allows for student-led tutoring and facilitates development of a large network of peers. From this peer group, students often form smaller study groups that advance their academic success.

Internships: Valuable Experiences

Engineering students are encouraged to complete internships to expand their knowledge through hands-on activities within the types of industries in which they desire to work. ECU students gain a wealth of experience interning in real-world, often local and regional, industries, businesses, government, and nonprofit organizations as they explore, design, build, and test engineering solutions. Internships also provide experiences to build on students' resumes and open up possible job opportunities.

Senior Capstone Projects: Partnering for Success

Our Capstone program partners small groups of engineering seniors and a faculty advisor with a local industry to complete an open-ended engineering design problem that hones and refines their skills. The two-semester project is the culminating experience of the ECU BS in Engineering degree and involves developing a problem statement and scope, identifying constraints, conducting a literature search, identifying and analyzing alternatives, completion of a conceptual design, testing and evaluation, and completion of a final design and report. Hands-on capstone projects provide students the opportunity to work on real problems with actual clients and are another avenue for transition into a career.

Undergraduate Research: Preparation for Upward Mobility

Engineering students are offered opportunities to pursue undergraduate research with a department faculty member. The Office of Undergraduate Research at ECU offers Undergraduate Research and Creative Activity (URCA) awards that provide funds to undergraduate students for faculty-mentored or creative projects.

The Center for Sustainability is focused on research and outreach with the goal of creating and maintaining conditions under which humans and nature can coexist in dynamic harmony. The mission of the Center is to increase opportunities for sustainable innovation through research, education, and leadership development and cooperative partnerships with various industries within North Carolina, as well as throughout the broader global community.

Recognition of Success

ECU Engineering has chapters of several honor societies, including Tau Beta Pi for all engineering majors, IEEE-Eta Kappa Nu for electrical engineering students, and Alpha Eta Mu Beta for biomedical engineering students. All engineering seniors are offered the opportunity to be inducted into the Order of the Engineer.

Academic Advancement: MS in Biomedical Engineering

The Master of Science in Biomedical Engineering degree provides a foundation in applied biomedical engineering to advance career opportunities and produce leaders to support the health care industry, education, and economic development. Students perform multidisciplinary research in device and equipment design and apply innovative engineering technologies to solve complex problems in the life sciences, medicine, and dentistry.

Where Are Our Graduates?

A degree in engineering offers excellent job opportunities through a multitude of career paths. ECU Engineering graduates currently hold positions in organizations including Altec Industries, American Woodmark, ASMO, Aylward Enterprises, BMW, Carver Machine Works, Duke Energy, Fleet Readiness Center East, Hyster-Yale, Keihin Carolina Systems, Merck, Norfolk Southern, PCI, Pfizer, Roberts Company, RTI Surgical, Sequence, TCOM, and UTC Aerospace Systems.

Some ECU engineering graduates have opted to pursue further education at such prestigious schools as Auburn University, Clemson University, Cornell University, Duke University, East Carolina University, Georgia Tech, NC A&T, NC State, Penn State, University of Michigan, University of Tennessee – Knoxville, Virginia Tech, and Wake Forest University.

The BS in Engineering Program at ECU

More than ever, engineers who are interdisciplinary problem solvers are in demand to analyze and solve complex engineering problems cost effectively while making environmentally-conscious decisions. The engineering profession is changing quickly due to the global economy and advancements in technology. The job market for engineers is wide open in all fields, both technical and non-technical.

The ECU Department of Engineering meets today's challenges through an exceptional curriculum that spans many engineering disciplines. At ECU, the Bachelor of Science in Engineering degree prepares students to become leaders and decision makers with strong applications-based engineering abilities. ECU engineering students have a multifaceted engineering foundation that includes mechanics, materials, electronic systems, project management, and design-decision analysis.

Reinforcing that foundation, in the junior and senior years the ECU engineering student also specializes in a particular field of study by choosing an engineering concentration for 22 semester hours of study. These concentrations cover emerging and fast-growing engineering fields, guaranteeing the career skills demanded in the workplace.

Unique Engineering Education

Mission Statement

The mission of ECU's Department of Engineering is to provide a theory-based, application-oriented general engineering education that serves as a basis for career success and lifelong learning. Our graduates demonstrate the engineering and scientific knowledge to analyze, design, improve, and evaluate integrated technology-based systems. Our program welcomes a diverse student body and provides the support to foster success.

Excellence in Undergraduate Education

What is an Engineer? The word originates from the Latin word ingeniator – one who designs or devises. Throughout history, that definition has remained unchanged. The modern engineer is someone who quickly designs and devises solutions to technical and scientific problems. ECU engineers are trained to possess the skills to fulfill this vision, turning concepts into reality. Approximately 20 percent of undergraduate students enrolled in the ECU engineering program are female, consistent with the national average, according to the American Society for Engineering Education.

Activity-based, Small-class Learning: ECU engineering students are given their first hands-on laboratory projects as freshmen and gain experience through increasingly demanding projects as they develop engineering expertise. Activity-based learning enables students to develop skills in project management, entrepreneurship, and teamwork. Small classes and laboratories taught by faculty who know students by name lead to student success.

Immediate Impact: ECU engineering graduates are prepared to enter the job market, contribute quickly, and make a difference. The practical experience they gain eliminates an extended learning curve and allows for immediate productivity and effectiveness. Some students choose to further their education at some of the highest-ranked graduate schools as they are fully equipped to do so.

Accreditation: The Bachelor of Science in Engineering program, under ECU's College of Engineering and Technology, is accredited by the Engineering Accreditation Commission of ABET, Inc., a non-governmental organization that accredits post-secondary education programs in applied science, computing, engineering, and engineering technology.



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Biomedical Engineering



Biomedical engineering is the application of engineering principles to the medical field using mathematics, science, and engineering to understand, diagnose, and/or treat human disease. Biomedical engineering is a highly interdisciplinary field of engineering that uses the latest technological advances to directly impact human lives. In addition to the strong engineering core in mechanics, the ECU biomedical engineering concentration includes topics such as physiological systems, biomedical instrumentation, biomechanics, cardiovascular mechanics, and properties of biological materials. Through innovative teaching methods, ECU biomedical engineering students learn valuable lifelong skills such as communication, design, and research. Close collaboration and involvement with ECU's Brody School of Medicine and School of Dental Medicine faculty assures current and critical topics and laboratory experiences.

Biomedical engineers can choose from a broad scope of options, including graduate study, medical school, dental school, hospital and research operations, biomedical product development, manufacturing, and sales.

Bioprocess Engineering



Bioprocess engineering, one of the fastest growing segments of the economy, opens up to ECU students the opportunity to improve quality of life, protect the environment, and help meet the needs of a growing world population. Bioprocess engineers design and develop equipment, methods, and systems for the efficient environmentally-sound manufacturing of medicines, vaccines, diagnostics, food, and other biologically-based products. Topics of study for ECU students in bioprocess engineering include fermentation, separation, plant design, and bioprocess quality.

Bioprocess engineering graduates seek diverse positions in pharmaceutical manufacturing, biofuels, ecosystems protection, food safety, and human health, in fields as diverse as biological, agricultural, chemical, and environmental.

Electrical Engineering



Electrical engineering is a field that deals with the study of electricity, electronics, and electromagnetism and their applications that serve society. Sub-disciplines in electrical engineering include power, controls, instrumentation, circuits, communications, computers, and many others. In today's world, products designed by electrical engineers literally pervade every segment of life, from personal electronic devices, household appliances, and life-saving surgery robots to space exploration sensors. ECU electrical engineering students learn about digital circuits, microprocessors, electronics, signals and systems, power systems, and advanced controls.

Electrical engineers can find careers in business and industry for product design, manufacturing, consulting, sales, and research.

Environmental Engineering

Environmental engineering is one of the fastest growing disciplines. Environmental engineers apply scientific principles of biology, chemistry, hydrology, and soil science to design sustainable solutions for environmental problems. They have the skills to complete projects that improve public health and waste disposal, and control water and air pollution in settings ranging from urban sanitary facilities to industrial facilities to rural agriculture. ECU environmental engineering students study topics such as water quality analysis and treatment, air pollution control, stormwater design and management, and surface and groundwater hydrology.

Environmental engineers find employment in civil and environmental consulting firms, state and federal environmental agencies, and industrial processing and manufacturing companies. They often work with scientists, planners, resource managers, and other engineers finding and designing solutions to numerous environmental problems in pollution control, public health, and sustainable resource management.



Industrial and Systems Engineering

Industrial and systems engineering is the perfect blend of engineering technical skills and people orientation. Industrial and systems engineers focus on the design, analysis, and operation of systems ranging from a single piece of equipment to large business, social, and environmental systems. Industrial and systems engineering addresses overall system performance and productivity, responsiveness to customers' needs, and the quality of the products or services produced by the enterprise. ECU industrial and systems engineering students study the human side of management processes; flow of materials in a variety of production systems; and design of work environments based on measurement, ergonomics, and human and human-machine interface work activities.

Industrial and systems engineers find that jobs are plentiful in every aspect of industry, including sales, marketing, personnel, manufacturing, and engineering management. Graduates are in demand to design, analyze, optimize, and improve systems used in business and industry. Not limited to manufacturing, careers also encompass service industries such as government, health care, transportation, logistics, and consulting.



Mechanical Engineering

Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers have the skills to support the design and improvement of a wide range of products from supersonic aircraft to toasters and bicycles. ECU mechanical engineering students learn the science and engineering principles of designing and building machines, structures, components, power trains, pumps, compressors, turbines, engines, power plants, refrigerators, air conditioners, furnaces, and more. Mechanical engineers strive to improve the efficiency of processes so they require less energy and production time, are sustainable, and reduce environmental impact.

Mechanical engineers are in great demand. They may specialize in areas such as combustion, thermal systems, machine design, and robotics, or cross over into advanced technologies such as artificial limbs and nanotechnology.

