WELCOME TO THE DEPARTMENT OF ENGINEERING

College of Engineering and Technology
East Carolina University

www.engineering.ecu.edu    engineering@ecu.edu
ECU Department of Engineering

- Engineering Program began in Fall 2004
- First graduating class was in May 2008
- Accreditation by ABET, Inc. awarded in August 2009 (retroactive to first class), renewed in October 2014
- 538 graduates to date
- Now ~550 students, ~28 faculty
- MS degree in Biomedical Engineering
- MS degree in Mechanical Engineering being planned
- Plans to grow to about 1,000 undergraduate and 100 graduate students as resources permit
<table>
<thead>
<tr>
<th>Fields of Engineering Represented by Faculty</th>
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</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
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<tr>
<td>Bioengineering</td>
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<tr>
<td>Biological &amp; Agricultural Engineering</td>
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<tr>
<td>Biomedical Engineering</td>
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<tr>
<td>Chemical Engineering</td>
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<tr>
<td>Civil Engineering</td>
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<tr>
<td>Computer Engineering</td>
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<td>Electrical Engineering</td>
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<td>Engineering Education</td>
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<tr>
<td>Engineering Management</td>
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<tr>
<td>Engineering Mechanics</td>
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<tr>
<td>Engineering Science &amp; Mechanics</td>
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<tr>
<td>Environmental Engineering</td>
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<td>General Engineering</td>
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<td>Industrial Engineering</td>
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<tr>
<td>Information &amp; Communication Engineering</td>
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<td>Materials Engineering</td>
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<tr>
<td>MBA</td>
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<td>Mechanical Engineering</td>
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<td>Nuclear Engineering</td>
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<td>Polymer Engineering</td>
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Characteristics of ECU Engineering

• Focus on *Excellence in Undergraduate Engineering Education*

• Broad curriculum
  – All graduates receive BS in Engineering

• Small class sizes
  – Most class sizes are 30 or fewer, freshman class sizes are typically about 25

• High degree of student-faculty integration
  – Students and faculty get to know each other
  – All classes and labs taught by a faculty member, not a teaching assistant
  – Many opportunities for undergraduate research
Characteristics of ECU Engineering

• Laboratory-intensive curriculum
  – Many more labs than most engineering programs

• Active partnerships with industry
  – Engineering Advisory Board made up of 50+ members of local and regional industry representatives
  – Industry, Brody School of Medicine, School of Dental Medicine, other ECU department sponsorship of capstone projects
  – Many internships available with local companies
Focused on Student Success

• Small classes, taught by faculty
• Many labs, also taught by faculty
• Paid student teaching assistants help faculty with labs and learn more as they help others learn
• Engineering Learning Community
• Engineering Ambassadors assist with events
• Junior and senior Engineering students paid by the department to tutor science, math, and engineering at the Pirate Academic Success Center
• Professional societies: ASME, IEEE, ASHRAE, ISPE, PENC, IISE, BMES, SWE, NSBE, AIAA
Honor Societies

• Tau Beta Pi, NC Zeta chapter – all engineering majors
• IEEE-Eta Kappa Nu, Mu Lambda chapter – electrical engineering
• Alpha Eta Mu Beta – biomedical engineering
ECU Engineering Curriculum

• All students complete an engineering “core”
• Students select a concentration for specialized study junior and senior years
  – Biomedical Engineering
  – Bioprocess Engineering
  – Electrical Engineering
  – Environmental Engineering
  – Industrial and Systems Engineering
  – Mechanical Engineering
ECU Engineering Curriculum

• All courses are the same for the first three semesters
• All students complete a year-long capstone design project during senior year
• All students complete the equivalent of a full year of basic math and science courses
• All students complete the University’s General Education Curriculum requirements (English, Writing Intensive, Social Sciences, Fine Arts, physical education, and Humanities courses)
Freshman Year

• Hands on, Early on – ECU Engineers are “doers”!
• Engineering Core:
  ▪ ENGR 1000 Introduction to Engineering
  ▪ ENGR 1012 Engineering Graphics*
  ▪ ENGR 1016 Introduction to Engineering Design*
  ▪ ENGR 2050 Computer Applications in Engineering*

• Engineering students begin engineering courses right away

*Classes with lab sessions
Freshman Year

• Math and Science:
  – Calculus I and II
  – Chemistry and Biology

• Foundations Curriculum:
  – Two semesters of English
  – Social Science Elective
Sophomore Year

• Engineering Core:
  - ENGR 2000 Engineering Design and Project Management I
  - ENGR 2022 Statics
  - ENGR 2070 Materials and Processes
  - ENGR 2450 Dynamics
  - ENGR 3800 Quality Systems

• The sophomore year builds on the math/science foundation and prepares students for advanced engineering courses
Sophomore Year

• Math and Science:
  – Calculus III, Differential Equations, Statistics
  – Physics I and II (calculus-based)
  – Biomedical, bioprocess, and environmental students take Chemistry II

• General Education Curriculum:
  – Humanities/Fine Arts Elective

• Students choose a concentration before second semester of sophomore year
Junior Year

• Engineering Core:
  - ENGR 2514 Circuit Analysis*
  - ENGR 3000 Engineering Design and Project Management II*
  - ENGR 3034 Thermal and Fluid Systems*
  - ENGR 3024 Mechanics of Materials*
  - ENGR 3050 Instrumentation*
  - ENGR 3420 Engineering Economics

• Engineering Concentrations:
  - 3 - 4 courses in selected concentration
Junior Year

- General Education Curriculum:
  - Elective course
  - Kinesiology

- The junior year is almost completely filled with engineering courses
Senior Year

• Engineering Core:
  ▪ ENGR 4010 Capstone Design I*
  ▪ ENGR 4020 Capstone Design II*

• Engineering Concentrations:
  ▪ 3 - 4 courses in selected concentration

• Students are eligible, and strongly encouraged, to take the Fundamentals of Engineering (FE) Exam in the Spring: first step toward registration as a Professional Engineer

ECU
Senior Year

• General Education Curriculum:
  ▪ Health
  ▪ Social Science Electives
  ▪ Humanities and Fine Arts Electives
Biomedical Engineering

• The application of engineering principles to the fields of biology and medicine
  – Uses mathematics, physics/biology/chemistry, and engineering design to understand, diagnose, and/or treat human disease

• Interdisciplinary field of engineering that uses the latest technological advances to directly impact human lives

• Multidisciplinary projects with BSOM, SDOM, College of Arts and Sciences, College of Allied Health Sciences & College of Business
Bioprocess Engineering

• Biological version of chemical engineering
  Live organisms and enzymes are used in production processes rather than organic or inorganic chemicals and catalysts

• Design production processes for:
  Biofuels, Biopharmaceuticals, Vaccines, Industrial Proteins, Foods for Humans and Animals

• Critical need for bioprocess engineers in North Carolina
  3rd largest state in US with biotech companies
Electrical engineering (EE) is a field that encompasses the study and application of electricity, electronics and electromagnetism. Electrical Engineers design revolutionary technologies that pervade every aspect of modern human life. Examples include:

- Cellular Phones
- Electric Power
- Computers
- Space Exploration and Communication
- Radio
- Television

Electronic devices are an integral part of our lives.
Environmental Engineering

- Engineering resilient solutions to sustain our quality of life and natural resources for a current and future society

- Growing Population and Economy
- Land, Air, and Water Quality
- Water Supply and Treatment
- Agriculture and Food Supply
Industrial and Systems Engineering

• Analysis of the relationships of “systems.”
• Improve the entire system - not one small part.
• Directed at the human interface

Example: Transportation Systems:
Analyze relationships, customer needs, and required system capabilities to improve logistics, supply chain, and/or distribution within transportation systems.
Mechanical Engineering

- Design devices and systems involving energy and mechanics, such as power generation, transportation, manufacturing

- Demand for mechanical engineers is growing rapidly in North Carolina and elsewhere
## General Information on Graduates

- Total graduates, May 2008 – August 2017 is 538

<table>
<thead>
<tr>
<th>Year</th>
<th>Graduates</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>69</td>
<td>58</td>
<td>11</td>
</tr>
<tr>
<td>2015</td>
<td>84</td>
<td>75</td>
<td>9</td>
</tr>
<tr>
<td>2016</td>
<td>106</td>
<td>82</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Biomedical</th>
<th>Bioprocess</th>
<th>Electrical (new)</th>
<th>Industrial &amp; Systems</th>
<th>Mechanical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>16</td>
<td>3</td>
<td>6</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>2015</td>
<td>12</td>
<td>3</td>
<td>11</td>
<td>9</td>
<td>49</td>
</tr>
<tr>
<td>2016</td>
<td>19</td>
<td>6</td>
<td>14</td>
<td>10</td>
<td>57</td>
</tr>
</tbody>
</table>
Employment

Many of our students have internships, summer jobs, and/or co-op positions while they are in school.

Approximately 95% of our graduates have engineering jobs or acceptance to graduate school within 90 days of graduation.

Graduates pursue advanced graduate and professional studies.
## Where Have Our Graduates Gone?

### Partial Company List
- ASMO North Carolina
- Attends Healthcare Products
- Carver Machine Works
- Caterpillar
- Duke/Progress Energy
- Edgecombe-Martin Electric Coop
- Fleet Readiness Center East (Cherry Point)
- Glaxo Smith Kline
- Greenville Utilities
- Pfizer
- Jones-Onslow Electric Coop
- Keihin North America
- Merck & Co.
- Hyster-Yale
- Naval Surface Warfare Center
- PCI Pharmaceutical
- Portsmouth Naval Shipyard
- Roberts Company
- Sequence
- Waukesha Electric Systems

### Representative Graduate Schools
- California State University San Louis Obispo
- Clemson University
- Cornell University
- Duke University
- ECU – (Engineering, SoDM, Allied Health)
- Georgia Tech
- NC A & T University
- NC State University
- Penn State University
- Virginia Commonwealth University
- Virginia Tech
- Wake Forest University
- UCLA
- UNC Chapel Hill (Engineering, Medicine)
- University of Cincinnati (Biomedical, Mech)
- University of Colorado Boulder
- University of Michigan
- University of Tennessee
Admission Requirements

- After admission to ECU, a separate application including an essay must be submitted to the Engineering program – APPLY ONLINE via [www.engineering.ecu.edu](http://www.engineering.ecu.edu)
- Math placement based upon standardized test scores or online placement test
- Most students take Calculus I first semester
- Students placing into pre-calculus first semester will need to take Calculus II during the summer after freshman year to stay on 4-year schedule
Admissions

• We are looking for a 620 math SAT, 3.0 unweighted high school GPA, top third of graduating class.
• We look at the students individually and evaluate individually.
• The essay is a MINIMUM of 250 words. The essay is an important element in our decision.
• Application deadline is April 30.
• Earliest acceptance letters go out late November for Spring, early December for Fall.
Transfer admissions

• Looking for minimum GPA of 3.0 with C or better in Calculus I; English I and II, and chemistry complete.

• We prefer students who have earned the Associate in Engineering degree (note that this degree does not fulfill all of the ECU General Education Curriculum requirements and does not guarantee admission to Engineering)

• For those with AE degree, GPA requirement lowers to 2.7
Thank You for Coming

QUESTIONS?

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