

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



Fields of Engineering Represented by Faculty

Aerospace Engineering

Bioengineering

Biological & Agricultural Engineering

Biomedical Engineering

Chemical Engineering

Civil Engineering

Computer Engineering

Electrical Engineering

Engineering Education

Engineering Management

Engineering Mechanics

Engineering Science & Mechanics

Environmental Engineering

General Engineering

Industrial Engineering

Information & Communication Engineering

Materials Engineering

MBA

Mechanical Engineering

Nuclear Engineering

Polymer Engineering

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

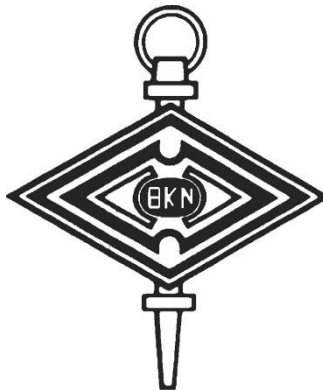
- Laboratory-intensive curriculum
 - Many more labs than most engineering programs
- Active partnerships with industry
 - Engineering Advisory Board made up of 50+ members of local and regional industry representatives
 - Industry, Brody School of Medicine, School of Dental Medicine, other ECU department 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

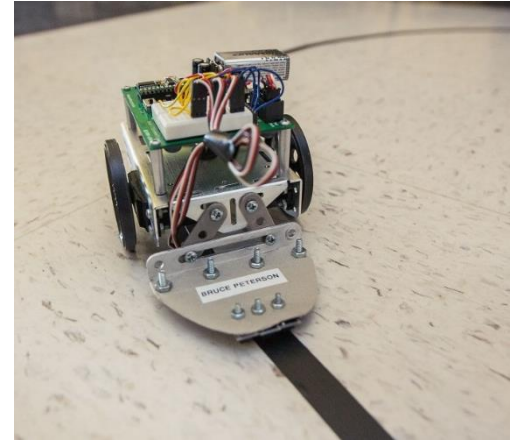
- All students complete an engineering “core”
- Students select a concentration for specialized study junior and senior years
 - Biomedical Engineering
 - Bioprocess Engineering
 - Electrical Engineering
 - Environmental Engineering
 - Industrial and Systems Engineering
 - Mechanical Engineering

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



Senior Year

- General Education Curriculum:
 - Health
 - Social Science Electives
 - Humanities and Fine Arts Electives

BSE – Mechanical Engineering (MENG) Concentration – 2017

Engineering: 43 core hours + 22 concentration hours

Math/Science : 33 hours

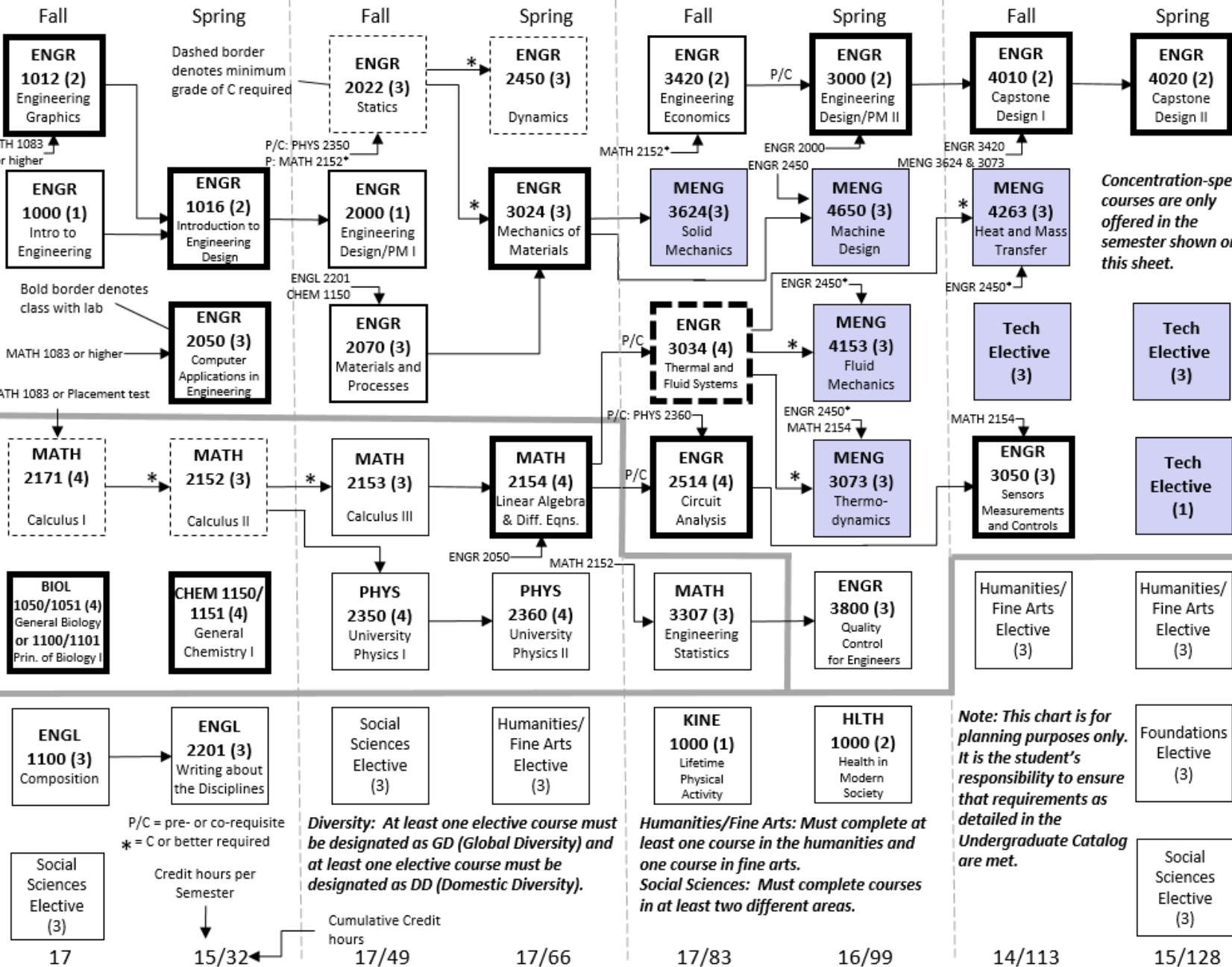
General: 30 hours

FRESHMAN

SOPHOMORE

JUNIOR

SENIOR



Diversity: At least one elective course must be designated as GD (Global Diversity) and at least one elective course must be designated as DD (Domestic Diversity).

Humanities/Fine Arts: Must complete at least one course in the humanities and one course in fine arts.
Social Sciences: Must complete courses in at least two different areas.

Note: This chart is for planning purposes only. It is the student's responsibility to ensure that requirements as detailed in the Undergraduate Catalog are met.

Revision Date: March 30, 2017

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



Biomechanical



Patient-Specific
New Organ
or Tissue



Tissue Engineering
& Biomaterials



Bioelectricity & Signals

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

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:

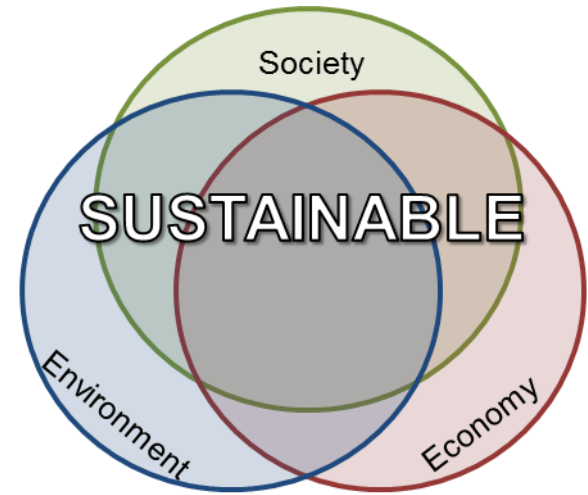
- Cellular Phones
- Electric Power
- Computers
- Space Exploration and Communication
- Radio
- Television



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

Year	Graduates	Men	Women
2014	69	58	11
2015	84	75	9
2016	106	82	24

Year	Biomedical	Bioprocess	Electrical (new)	Industrial & Systems	Mechanical
2014	16	3	6	11	33
2015	12	3	11	9	49
2016	19	6	14	10	57

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
- 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

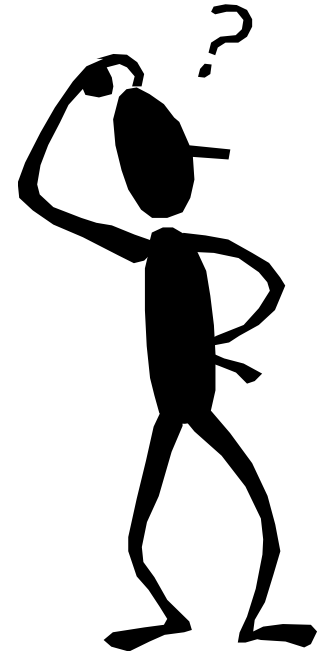
- We are looking for a 620 math SAT, 3.0 unweighted high school GPA, top third of graduating class.
- We look at the students individually and evaluate individually.
- The essay is a MINIMUM of 250 words. The essay is an important element in our decision.
- Application deadline is April 30.
- Earliest 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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