

College of Engineering

For more information about this college, including contact information, visit the department (<http://www.engr.ncsu.edu/>).

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People who seek a challenging technical career in research and development, design, construction, production, maintenance, technical sales, management, teaching, or other careers requiring a methodical, creative approach to problem solving, should consider an engineering or computer science education. At NC State, the College of Engineering has a distinguished and internationally recognized faculty, and the College of Engineering offers the opportunity for ambitious students to become the leaders and prime movers of our increasingly technological world. Because of the great influence of science and technology on our everyday lives, today's engineers and computer scientists must be acutely aware of, and responsible for, the effects their creations may have on society. In addition to safety, aesthetics, economics, and energy, today's technologists must consider environmental, sociological, and other "human concern" costs.

College of Engineering graduates work in diverse careers around the world. Most are practicing engineers, but because their education has equipped them well to address problems in a wide variety of fields, many College of Engineering graduates have become corporate presidents, lawyers, medical doctors, and leaders in government. The College of Engineering has engineering degree programs in twelve academic departments and three affiliated departments. These departments include: Biological and Agricultural Engineering; Joint UNC/NC State Department of Biomedical Engineering; Chemical and Biomolecular Engineering; Civil, Construction, and Environmental Engineering; Computer Science; Electrical and Computer Engineering; Edward P. Fitts Department of Industrial and Systems Engineering; Materials Science and Engineering; Mechanical and Aerospace Engineering; Nuclear Engineering; Paper Science and Engineering within the Department of Forest Biomaterials; and Textile Engineering within the Department of Textile Engineering, Chemistry and Science. Eighteen undergraduate degree programs are offered in these twelve departments. In addition, a degree program in Engineering is offered by special arrangement to the very few students who can clearly demonstrate the need for an individualized program of study. All departments also offer advanced studies leading to master's degrees and the Doctor of Philosophy degree. Consult the Graduate Catalog (<http://www.ncsu.edu/grad/catalog/>) for graduate degrees.

Seventeen programs in the College of Engineering are accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org> and are: aerospace engineering; biological engineering; joint UNC/NC State biomedical engineering; chemical engineering; civil engineering; computer engineering; construction engineering; electrical engineering; BS in engineering Mechatronics concentration joint program with UNC Asheville; BS in engineering, Mechanical Engineering Systems concentration; environmental engineering; industrial engineering; materials science and engineering; mechanical engineering; nuclear engineering; paper science and engineering; and textile engineering.

One program in the College of Engineering, computer science, is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org> (<http://www.abet.org/>). Accreditation ensures that these programs satisfy requirements for acceptance by these nationally recognized agencies. All curricula and programs are designed to maintain the college's national and international reputation while meeting the needs of the people and industries of the state and region through effective instruction, competent research, and the development of new and meaningful contributions to scientific knowledge.

The Career Development Center (<https://careers.dasa.ncsu.edu/>) is maintained by the university to assist continuing students and graduating students in achieving their career goals.

High Impact Experiences

The College of Engineering is actively educating and preparing engineers that will impact our world. Student participation in High Impact experiences (<https://www.engr.ncsu.edu/academics/undergrad/firstyear/activities/>) -- work, research, international, and service -- is highly encouraged.

NC State College of Engineering students may, for instance, choose these High Impact experiences:

- International engagement
 - The Study Abroad Office (<https://studyabroad.ncsu.edu/>) offers assorted options based upon interests, location, duration, and areas of study including engineering majors.
 - Opportunities to work abroad, research abroad or volunteer service abroad are available.
- Work
 - The Career Development Center (<https://careers.dasa.ncsu.edu/>), which includes the Cooperative Education Program, offers career advising, support, and resources that allow students to search for job and internship opportunities that lead to gaining real-world experience while pursuing their degrees.
 - The Engineering Career Fair (<https://www.engr.ncsu.edu/careerfair/>) affords students the opportunity to meet with prospective employers and to learn more about the participating companies.
- Service
 - Leadership and Civic Engagement (<https://leadandengage.dasa.ncsu.edu/>) sponsors Alternative Service Break (ASB) (<https://leadandengage.dasa.ncsu.edu/asb/>) and more opportunities for students to learn how to successfully lead teams with an inclusive lens, facilitate change, and maximize success in a multicultural environment.
 - Many engineering student organizations, clubs, and honor societies (<https://getinvolved.ncsu.edu/>) include a service and outreach component for students to volunteer their time and talent.
- Research
 - The Office of Undergraduate Research (<https://undergradresearch.dasa.ncsu.edu/>) works to support and promote discovery-, inquiry-, and creativity-based opportunities through mentored research experiences for students.
 - The College provides opportunities for undergraduate research within its academic departments as well as through its many Engineering Centers and Institutes (<https://www.engr.ncsu.edu/research/centers/>).

Students interested in High Impact experiences may learn more through the primary resource (listed above) or Office of Academic Affairs.

Cooperative Education Program

This optional program is structured so that the student will alternate semesters of study with semesters of practical work as sophomores and juniors. The first and senior years are spent on campus, while sophomore and junior academic work is spread over a three-year period to permit alternating academic semesters with work-experience semesters. Students earn a salary while they are in industry. This income can prove useful in offsetting college expenses. The Co-op plan can be completed in five years, during which time the student receives 12 to 18 months of industrial experience.

Students in all curricula in the College of Engineering may apply for the Co-op program if they have a grade point average of 2.5 or better. Application for admission into the Co-op program should be made early in the spring semester of the freshman year. Students must be accepted into an engineering degree program prior to beginning the first Co-op assignment.

Further information may be obtained from:

Cooperative Education Program (<https://careers.dasa.ncsu.edu/overview/>)

Career Development Center
2100 Pullen Hall

Recognition of Graduates

All graduating students in the College of Engineering are invited to participate in the Recognition of the Graduates Event (<https://www.engr.ncsu.edu/academics/undergrad/rings/>), held annually in the spring semester. The event acknowledges the fellowship of engineers and computer scientists who are trained in science and technology and who are dedicated to the ethical practice, teaching, or administration of their profession. Students who are within 24 credits of graduation, or have recently graduated, are eligible.

The event includes a commitment to the "Obligation" and acceptance of a stainless steel ring to be worn on the little finger of the working hand. Only those who have met the high standards of professional engineering and computer science training or experience are invited to accept the Obligation, which is voluntarily received for life. This commitment is not a trivial act but is, rather, like the Hippocratic Oath, a promise to practice the profession ethically, with integrity, tolerance and respect. The ring is worn as a visual symbol to attest to the wearer's calling and symbolizes the unity of the profession in its goal of benefiting humankind. The stainless steel from which the ring is made depicts the strength of the profession.

Benjamin Franklin Scholars Program

A limited number of freshmen in the College of Engineering apply and are selected to participate in the Benjamin Franklin Scholars Program (<https://ids.chass.ncsu.edu/dual/franklin.php>). Students completing the program earn a Bachelor of Science in an engineering discipline or in computer science and a bachelor's degree in humanities or social sciences.

This double-degree program, a joint undertaking of the College of Engineering and the College of Humanities and Social Sciences, provides a unique opportunity to integrate a solid base of knowledge in technology or science with a broad humanistic and social perspective.

The curriculum for the double-degree program has four main components:

1. a strong general education,
2. specially designed interdisciplinary courses,
3. all technical course requirements associated with the engineering or computer science degree, and
4. and a second major in the humanities and social sciences chosen from among the traditional majors or an interdisciplinary major.

Students who have been accepted into a College of Engineering degree program, have declared a major in the College of Humanities and Social Sciences or Economics, and have at least a 3.0 GPA are generally eligible for scholarships from the program. With careful planning, the program can be completed in five years.

For more information, contact:

Dr. Ross Bassett, Program Director
ross_bassett@ncsu.edu (ross_bassett@ncsu.edu)
or the Office of Academic Affairs (118 Page Hall)

Grand Challenge Scholars Program

The National Academy of Engineering's list of fourteen Grand Challenges for Engineering in the 21st century is a call to action and a means of focusing society's attention on the opportunities and challenges affecting our quality of life. E 102 Engineering in the 21st Century is an interdisciplinary course for first-year students to explore the Grand Challenges and how engineers are actively designing and implementing technological solutions.

The mission of the Grand Challenge Scholars Program is to increase the awareness of future engineers about the challenges that face our world today. The College of Engineering, in partnership with the National Academy of Engineering, established this program, which aims to progressively develop undergraduate scholars of diverse engineering disciplines and backgrounds focused on solutions to the Grand Challenges by broadening their outlook on societal concerns, promoting social responsibility, lifelong learning, and on-going engagement in the problems facing the 21st century world.

There are five core competencies that guide all Grand Challenge Scholars in choosing their curricular and complementary high impact experiences:

- **Talent Competency:** mentored research/creative experience on a Grand Challenge-like topic
- **Multidisciplinary Competency:** understanding the multiple disciplines of engineering systems solutions developed through personal engagement
- **Entrepreneurship Competency:** understanding, preferably developed through experience, of the necessity of a viable business model for solution implementation
- **Multicultural Competency:** understanding different cultures, preferably through multicultural experiences, to ensure cultural acceptance of proposed engineering solutions
- **Social Consciousness Competency:** understanding that the engineering solutions should primarily serve people and society reflecting social consciousness

Students who have been accepted into a College of Engineering degree program and have at least a 3.0 GPA are generally eligible to apply to the program.

For more information, visit the Grand Challenge Scholars Program website (<http://go.ncsu.edu/grandchallenges/>), e-mail grandchallenges@ncsu.edu with Grand Challenge Scholars Program in the subject field, or contact the Office of Academic Affairs (118 Page Hall).

Computers

Computers, both lab-based and student-owned, are central to engineering education in the college. The College of Engineering recommends that all incoming students own a desktop, laptop, or similarly powerful tablet to use in classroom, lab, and mobile settings. If students plan to purchase one, then Engineering Information Technology provides advice and guidance on purchasing student-owned computing on their website (<https://it.engr.ncsu.edu/>).

The College of Engineering also provides its students with a large number of workstation labs for the purpose of running high-end engineering applications. The first-year computer lab course, E 115 Introduction to Computing Environments, instructs students in the use of their own computers to interface effectively with the vast resources of the college computing environment. The course emphasizes students' responsibility for their own computer, including security and hands-on maintenance.

Transfer Programs

Every year, more than 25 percent of the students receiving a degree in engineering at NC State University are students who began their education at another institution. Students with non-engineering degrees or one or more years of academic work completed at other institutions may apply for transfer admission to the College of Engineering (<https://www.engr.ncsu.edu/admissions/transfer-admissions/>) through the Office of Undergraduate Admissions (<https://admissions.ncsu.edu/apply/transfers/>).

Transfer Admissions into the College of Engineering

Students are admitted from community colleges, four-year colleges and universities, and foreign institutions. Students currently attending or anticipating attendance at other institutions are advised to contact the Office of Academic Affairs for information on transfer requirements, transfer course credit and admission to NC State.

Undergraduate Engineering Partnerships with Other Institutions

The College of Engineering at NC State University has extended engineering degree opportunities through formal partnership agreements with a number of North Carolina institutions to increase diversity and to enhance access to populations who would not otherwise easily have access to an engineering discipline.

In most programs, you begin your instruction at a partner institution and then transfer to and attend NC State in Raleigh to complete your engineering degree. However, site-based degree programs allow transfer students to earn an undergraduate engineering degree from NC State without having to move to Raleigh. Both types of programs are ABET-accredited programs. Visit the College's website (<https://www.engr.ncsu.edu/admissions/transfer-admissions/partnerships/>) to learn more about our partnerships or the home institutions.

www.engr.ncsu.edu/admissions/transfer-admissions/partnerships/) to learn more about our partnerships or the home institutions.

Golden LEAF Biomanufacturing Training and Education Center

Biomanufacturing is the production of useful products such as penicillin through the use of biological molecules and living organisms. The Golden LEAF Biomanufacturing Training and Education Center (BTEC) simulates a biomanufacturing pilot plant capable of producing biopharmaceutical products and packaging them in a sterile, current Good Manufacturing Practices (cGMP)-like environment, and is the only facility of its kind in the nation and one of only a few in the world.

The BTEC hands-on, laboratory-intensive academic program is provided using large-scale equipment, including bioreactors, downstream separation and purification processes, bioreactor control systems, and aseptic processing operations. In addition to undergraduate and graduate courses, the BTEC educational program includes an undergraduate Minor in Biomanufacturing, and a University Certificate in Biomanufacturing. A Post-baccalaureate Certificate in Biomanufacturing is available for students who have earned a bachelor's level degree. Undergraduate students majoring in chemical engineering may elect to complete a concentration in biomanufacturing sciences. The BTEC graduate program will include a Minor in Biomanufacturing, a Master of Science degree, and a Professional Science Masters in Biomanufacturing.

For additional information, please visit the BTEC website (<http://www.btec.ncsu.edu/>).

Faculty

Dean

Louis A. Martin-Vega

Executive Associate Dean, Research and Graduate Programs

John G. Gilligan

Associate Dean, Academic Affairs

Jerome P. Lavelle

Associate Dean, Faculty Advancement

Christine S. Grant

Associate Dean, Graduate Programs

Douglas S. Reeves

Assistant Dean, Academic Affairs

David W. Parish

Teaching Assistant Professor

Tameshia Ballard Baldwin

Director, Women in Engineering and Outreach

Laura Bottomley

Director, Minority Engineering Programs

Angelitha Daniel

Director, Recruiting, Enrollment Management, and Educational Partnerships

Kim Roberts

Director, Student Engagement

Brian Koehler

Director, Women in Science and Engineering

Katherine Titus-Becker

Director, Engineering Village

Niko Brown

Director, Assessment

Matt Stimpson

Coordinator of Advising

Mary Clare Robbins

Coordinator, Engineering First Year Programs

Hailey Queen

Departments

- Department of Biological and Agricultural Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/biological-agricultural/>)
- Department of Chemical and Biomolecular Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/>)
- Department of Civil, Construction, and Environmental Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/civil-construction-environmental/>)
- Department of Computer Science (<http://catalog.ncsu.edu/undergraduate/engineering/computer-science/>)
- Department of Electrical and Computer Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/>)
- Department of Materials Science and Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/>)
- Department of Mechanical and Aerospace Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/mechanical-aerospace/>)
- Department of Nuclear Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/>)
- Edward P. Fitts Department of Industrial and Systems Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/industrial-systems/>)
- Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs/>)
- Engineering (BS): Mechanical Engineering Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs-mechanical-engineering-systems-concentration/>)
- Engineering (BS): Mechatronics Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs-mechatronics-concentration/>)
- Engineering (BS): Nuclear Power Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs-nuclear-power-concentration/>)
- Engineering Education (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-education-minor/>)
- Engineering First Year (<http://catalog.ncsu.edu/undergraduate/engineering/firstyear/>)
- Joint Department of Biomedical Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/biomedical/>)
- Nano-Science and Technology (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/nano-science-technology-minor/>)
- Textile Engineering Program (<http://catalog.ncsu.edu/undergraduate/engineering/textile-program/>)

Majors

- Aerospace Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/mechanical-aerospace/aerospace-engineering-bs/>)
- Biomedical Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/biomedical/biomedical-engineering-bs/>)
- Chemical Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs/>)
- Chemical Engineering (BS): Biomanufacturing Sciences Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs-biomanufacturing-sciences-concentration/>)

- Chemical Engineering (BS): Biomolecular Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs-biomolecular-concentration/>)
- Chemical Engineering (BS): CHE/TE Dual Major (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs-textile-dual-major/>)
- Chemical Engineering (BS): Honors Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs-honors-concentration/>)
- Chemical Engineering (BS): Nanoscience Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs-nanoscience-concentration/>)
- Chemical Engineering (BS): Sustainable Engineering, Energy, and the Environment (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-bs-sustainable-engineering-energy-environment/>)
- Civil Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/civil-construction-environmental/civil-engineering-bs/>)
- Computer Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/computer-engineering-bs/>)
- Computer Science (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/computer-science/computer-science-bs/>)
- Computer Science (BS): Cybersecurity Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/computer-science/computer-science-bs-cybersecurity-concentration/>)
- Computer Science (BS): Game Development Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/computer-science/computer-science-bs-game-development-concentration/>)
- Construction Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/civil-construction-environmental/construction-engineering-bs/>)
- Electrical Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs/>)
- Electrical Engineering (BS): Renewable Electric Energy Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/electrical-computer/electrical-engineering-bs-renewable-electric-energy-systems-concentration/>)
- Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs/>)
- Engineering (BS): Mechanical Engineering Systems Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs-mechanical-engineering-systems-concentration/>)
- Engineering (BS): Mechatronics Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs-mechatronics-concentration/>)
- Engineering (BS): Nuclear Power Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-bs-nuclear-power-concentration/>)
- Engineering First Year (<http://catalog.ncsu.edu/undergraduate/engineering/firstyear/>)
- Environmental Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/civil-construction-environmental/environmental-engineering-bs/>)
- Industrial Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/industrial-systems/industrial-engineering-bs/>)
- Materials Science and Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-bs/>)
- Materials Science and Engineering (BS): Biomaterials Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-bs-biomaterials-concentration/>)
- Materials Science and Engineering (BS): Nanomaterials Concentration (<http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-bs-nanomaterials-concentration/>)
- Mechanical Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/mechanical-aerospace/mechanical-engineering-bs/>)
- Nuclear Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-bs/>)
- Paper Science and Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/natural-resources/forest-biomaterials/paper-science-engineering-bs/>)
- Paper Science and Engineering (BS): Dual Major (<http://catalog.ncsu.edu/undergraduate/natural-resources/forest-biomaterials/paper-science-engineering-bs-dual-major/>)

Minors

- Biomanufacturing (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/biomanufacturing-minor/>)
- Chemical Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/chemical-engineering-minor/>)
- Computer Programming (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/computer-science/computer-programming-minor/>)
- Engineering Education (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/engineering-education-minor/>)
- Health Physics (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/health-physics-minor/>)
- Industrial Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/industrial-systems/industrial-engineering-minor/>)
- Materials Science and Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/materials-science-engineering/materials-science-engineering-minor/>)
- Nano-Science and Technology (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/nano-science-technology-minor/>)
- Nuclear Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-minor/>)
- Supply Chain Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/industrial-systems/supply-chain-engineering-minor/>)
- Tissue Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/biomedical/tissue-engineering-minor/>)

Certificates

- Biomanufacturing (Certificate) (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/biomanufacturing-certificate/>)
- Biomanufacturing (Certificate) (For Post-Baccalaureate Students) (<http://catalog.ncsu.edu/undergraduate/engineering/chemical-biomolecular/biomanufacturing-certificate-post-baccalaureate/>)
- Computer Programming (Certificate) (For Post-Baccalaureate Students, Distance Education) (<http://catalog.ncsu.edu/>)

undergraduate/engineering/computer-science/computer-programming-certificate-distance-education/)

Honors Programs

- Biomedical Engineering Honors Program (Honors) (<http://catalog.ncsu.edu/undergraduate/engineering/biomedical/biomedical-honors-program/>)