



College of Engineering and Applied Sciences

Stony Brook University is one of America's most dynamic public universities and a magnet for outstanding students, offering more than 200 undergraduate programs, 100 master's programs and 40 doctoral programs. From its beginnings more than a half-century ago, Stony Brook University has been characterized by innovation, energy, and progress, transforming the lives of people who earn degrees, work, and make groundbreaking discoveries here.

Today Stony Brook is one of only 62 members of the prestigious, invitation-only Association of American Universities. Stony Brook University is listed among the top 1 percent in the world by the *Times Higher Education World University Rankings*, and is consistently named one of the best values among public universities by *Kiplinger's Personal Finance*.

www.stonybrook.edu/admissions



Priority Application Deadline:
January 15

E-mail: enroll@stonybrook.edu
Phone: (631) 632-6868

Whether you aspire to be an applied mathematician, computer scientist, engineer, or technical project manager, Stony Brook University's College of Engineering and Applied Sciences can provide you with a solid foundation for your future. CEAS is home to 138 faculty who are experts in their respective fields of research, along with more than 3,000 students enrolled in BE and BS degree programs, 786 in MS degree programs, and 607 in PhD programs.

At Stony Brook, we encourage and prepare you to become a life-long learner. We all acknowledge the dizzying pace of changing technology; surely, a great deal of the equipment and computers we work with today soon will be outdated. Yet the critical thinking skills and invaluable experience of teamwork and intellectual dialogue that will mark your four years at Stony Brook will remain with you forever. Our graduates not only weather the change, but lead the way through change.

UNDERGRADUATE MAJORS, MINORS, AND ACCELERATED-DEGREE PROGRAMS

Applied Mathematics & Statistics
BS, BS/MS, BS/MBA,
BS/MPH, Minor, PhD

Bioengineering Minor, PhD

Biomaterials Minor, PhD

Biomedical Engineering*
BE, BE/MS, PhD

**Chemical & Molecular
Engineering***
BE, BE/MBA, PhD

Civil Engineering
BE, PhD

Computer Engineering*
BE, BE/MS, PhD

Computer Science**
BS, BS/MS, BS/MBA, Minor, PhD

Electrical Engineering*
BE, BE/MS, BE/MBA, Minor, PhD

**** Accredited by the Computing
Accreditation Commission of ABET,
<http://www.abet.org>.**

**Electronic, Optical,
& Magnetic Materials** Minor, PhD

Engineering Composites Minor, PhD

Engineering Science*
BE, BE/MS, PhD

**Engineering & Technology
Entrepreneurship** Minor, PhD

Environmental Engineering Minor, PhD

Information Systems
BS, BS/MBA, Minor, PhD

Manufacturing Engineering Minor, PhD

Materials Science Minor, PhD

Mechanical Engineering*
BE, BE/MS, Minor, PhD

Nanotechnology Studies Minor, PhD

Physical Metallurgy Minor, PhD

Technological Systems Management
BS, BS/MS Minor, PhD

*** Accredited by the Engineering A
ccreditation Commission of ABET,
<http://www.abet.org>.**

EXTRAORDINARY RESEARCH OPPORTUNITIES

Our faculty are top scientists and engineers who conduct cutting-edge research and write your textbooks. Through the senior design projects in the engineering programs, the software design project in computer science, or the interdisciplinary senior project in technological systems management, you will learn project design, planning, modeling, and execution. In addition, you can conduct original research through the Research Experiences for Undergraduates Program and the Undergraduate Research and Creative Activities Program. Additional research opportunities exist at nearby Brookhaven National Lab, which Stony Brook co-manages, and at our Center of Excellence in Wireless and Information Technology.

VALUABLE INTERNSHIP EXPERIENCE

To help you explore career paths and get the experience employers want, CEAS works closely with the University Career Center to receive participating companies' internship requirements, review student records and verify academic qualifications, and forward applications to internship employers. Internships are available with local companies, as well as national or multinational companies such as, Citigroup, Microsoft, or Northrop Grumman.

WOMEN IN SCIENCE & ENGINEERING

WISE is a unique program designed to encourage talented freshman women interested in math, science, or engineer-

ing. WISE offers special enrichment courses, extracurricular activities and interaction with other like-minded women – both students and faculty. WISE is ideal if you are considering a career in the physical sciences, life sciences, computer science, information technology, math medicine, engineering or a similar field. With a limited number of students admitted each year, WISE can offer you scholarships, special classes, early research opportunities at Brookhaven National Lab, personalized academic advising, and small study groups to put you at the heart of a community where you can excel.

BE/MD AND BE/DMD PROGRAMS

The Engineering Scholars for Medicine Program and the Engineering Scholars for Dental Medicine are a highly selective BE/MD and BE/DMD programs for freshman applicants who wish to pursue interests in engineering and the medical or dental fields. Students accepted into these programs are guaranteed admission to Stony Brook University's School of Medicine and School of Dental Medicine, provided they satisfy certain conditions.

HONORS PROGRAM IN COMPUTER SCIENCE

The Honors Program in Computer Science is a highly selective academic program within the major in Computer Science. To be admitted, students must demonstrate overall academic excellence. Honors course offerings include accelerated introductory course sequences in programming and in the

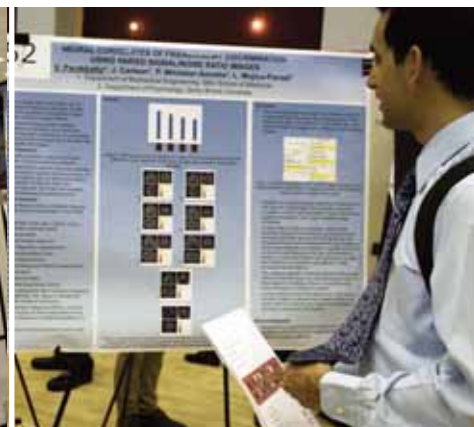
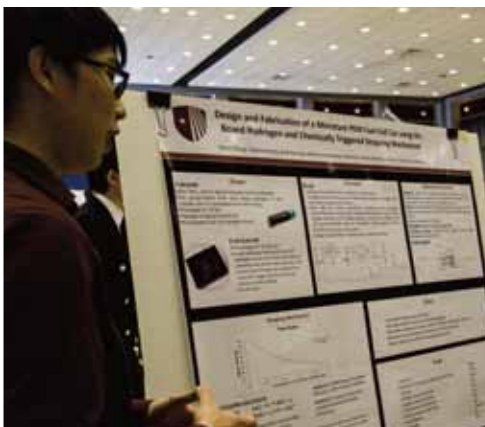
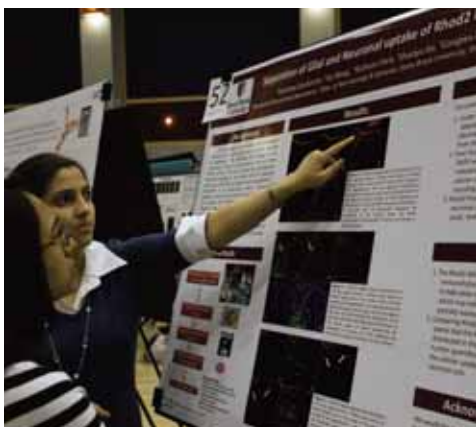
foundations of computing, advanced courses on selected topics, and a senior honors project. Honors students with a grade point average of 3.50 at the end of the junior year will be automatically approved for admission to the five-year accelerated BS/MS program in computer science.

HONORS PROGRAM IN ELECTRICAL AND COMPUTER ENGINEERING

The Honors Program in Electrical and Computer Engineering provides high achieving students an opportunity to receive validation for a meaningful research experience and for a distinguished academic career. A student interested in becoming a candidate for the Honors Program in either Computer or Electrical Engineering may apply to the program at the end of the sophomore year. To be admitted to the Honors Program, students need a minimum cumulative grade point average of 3.50 and a B or better in all major required courses (including math and physics).

ACCELERATED DEGREE PROGRAMS

Stony Brook's College of Engineering and Applied Sciences offers a number of accelerated bachelor/master degree programs, which allow students to use graduate credits taken as an undergraduate toward both the undergraduate and graduate degrees, thus reducing the normal time required to complete both bachelor's and master's degrees. When you enroll in one of our many accelerated degree programs, you'll fast-forward your future.



Applied Mathematics and Statistics

Major (BS), BS/MS, BS/MBA,

BS/MPH, Minor

*Department of Applied Mathematics
& Statistics*

<http://www.ams.stonybrook.edu>

Stony Brook's Department of Applied Mathematics and Statistics is unique among leading research universities in providing a single unified academic home for applied mathematics, statistics and operations research. The department offers a major focusing in core areas of mathematics, including calculus, linear algebra, and discrete mathematics, with opportunities to study computational biology, quantitative finance and operations research.

The major prepares graduates for quantitative careers in business. About half of the program's majors enter graduate or professional programs, primarily in statistics, operations research, computer science, business, and financial engineering. Others go directly into professional careers as actuaries, programmer analysts, management trainees, and secondary school teachers. Employment opportunities exist in government, industry, and the financial sector. One popular career is actuarial science. Many of the program's courses cover material on the actuarial exams, and there is an additional review course for the first actuarial exam.

Bioengineering

Minor

Department of Biomedical Engineering

<http://www.bme.stonybrook.edu/bme>

The Bioengineering minor with track specialization is designed for Biology and Biochemistry majors within College of Arts and Sciences students who wish to obtain a more thorough understanding of how physical forces in the natural world influence biological systems. Coursework introduces these concepts and shows how an engineering approach can be useful in dealing with questions in biology and medicine. The program serves as an excellent background for students who wish to prepare for graduate study in bioengineering or a related field, or for a career in which an understanding of engineering concepts would provide an advantage.

Biomaterials

Minor

Department of Materials Science

& Engineering

<http://www.matscieng.sunysb.edu>

The Biomaterials minor is designed for students enrolled in Bachelor of Engineering (BE) degree programs who wish to obtain an understanding of how materials interact with the human body and how engineering materials can be designed to serve physiological functions. The minor includes a comprehensive selection of courses in materials science, biomechanics, and biology, as well as study of fluids and electricity as they relate to human physiology.

The program serves as an excellent background for engineering students who wish to prepare for graduate education in medicine, bioengineering, and the biosciences or a related field, or for a career in which an understanding of biological concepts is essential.

Biomedical Engineering

Major (BE), BE/MS

Department of Biomedical Engineering

<http://www.bme.stonybrook.edu/bme>

The Biomedical Engineering major provides an engineering education, along with a strong background in the biological and physical sciences. It is designed to enhance the development of creativity and collaboration through study of a specialization within the field of biomedical engineering. Areas of specialization include: Biomechanics, Biomaterials, Bioelectricity/Bioimaging, and Molecular and Cellular Biomedical Engineering. Teamwork, communication skills, and hands-on laboratory and research experience are emphasized.

The curriculum provides students with the underlying engineering principles required to understand how biological organisms are formed and how they respond to their environment. Core courses provide depth within the broad field of biomedical engineering.

Biomedical engineers design and develop materials, processes, and devices to prevent, diagnose, and treat disease, to reha-

bilitate patients, and to generally improve health. Stony Brook's graduates prepare for professions in biomedical engineering, biotechnology, pharmaceuticals, medical technology, academia, and government. Potential employers include colleges and universities, hospitals, government, research institutes and laboratories, and private industry.

Chemical & Molecular Engineering

Major (BE), BE/MBA

Department of Materials Science

& Engineering

<http://www.matscieng.sunysb.edu>

This program meets the expanding demand for chemical engineers in the nanotechnology, neutraceutical, pharmaceutical, environmental, and energy industries. It emphasizes engineering at the molecular level rather than traditional largescale process engineering.

The program provides students with knowledge in the basic physical sciences, mathematical techniques, and computational modeling tools that form the foundation of modern chemical and molecular engineering. Courses prepare students to solve complex problems involving scientific, ethical, and moral considerations, and to communicate effectively as members of interdisciplinary teams. Students can specialize in areas such as Pharmacology, Materials Science, Polymer Science, Tissue Engineering, and Business. Industrial and research-oriented internships are emphasized.

Employment opportunities for graduates of the program include high technology industries and institutions engaged in research and manufacturing related to nanotechnology, pharmaceuticals, biotechnology, future fuels, waste management, and the synthesis of new materials.

Civil Engineering

Major (BE)

Department of Mechanical Engineering

<http://me.eng.stonybrook.edu>

Stony Brook University's new Civil Engineering program began by admitting students into the undergraduate major in the fall of 2012. The B.E. Civil Engineering

degree prepares students with both breadth and depth in technical knowledge so that they can work immediately in most areas of the profession, including: geotechnical engineering; environmental engineering; hydraulics; structural engineering; construction management; and transportation/traffic engineering. The program resides within the Department of Mechanical Engineering.

The undergraduate program offers a balanced approach to Civil Engineering education. Our Civil Engineering courses teach students the fundamentals of engineering design, as well as potential applications. Students are taught how to use computer software to expedite the design process, and they are also taught how to balance engineering designs with economic constraints.

Students take a common core of Civil Engineering courses, and choose from one of the following tracks to complement their depth requirement in Civil Engineering:

- Transportation Engineering Track
- Geotechnical Engineering Track
- Environmental Engineering Track
- Structural Engineering Track

The program is also designed to give students a solid foundation in engineering and science. Students take courses in chemistry, physics, and math, in addition to a core set of engineering courses common to most engineering disciplines. During their senior year, undergraduate students work under supervision on a two-semester design project.

Computer Engineering

Major (BE), BE/MS
Department of Electrical and
Computer Engineering
<http://www.ece.stonybrook.edu>

Computers in the form of microprocessors or microcontrollers are an integral component in almost all modern electronic systems, including those in automobiles, appliances, medical instrumentation, manufacturing automation, consumer electronics, and avionics. Microcontroller-based systems will play a critical role as society transitions to a

“green” economy.

Computer Engineering is based on mathematics, physics, circuit theory, electronics, digital systems, and computer science, and includes the study of embedded microprocessor system design, computer architecture, software engineering, operating systems, and software tools.

Students are prepared for professional careers or graduate studies in the electrical and computer engineering fields. The curriculum provides a solid education in the fundamentals of computer engineering, digital hardware and software, engineering science, engineering design, mathematics, and the natural sciences.

Computer Science

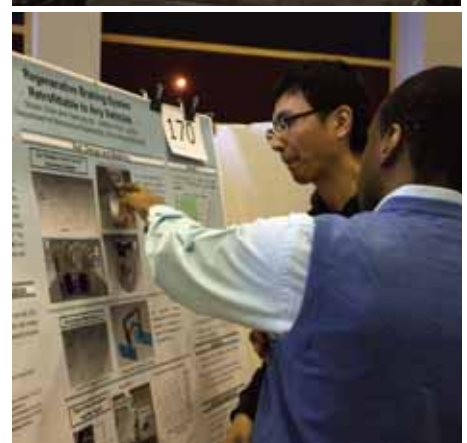
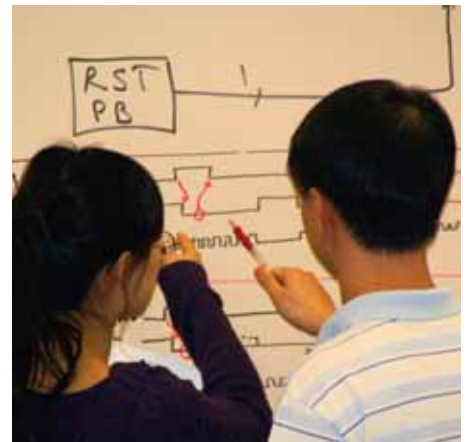
Major (BS), BS/MS, BS/MBA, Minor
Department of Computer Science
<http://www.cs.stonybrook.edu>

Computer science is the study of computer systems, including computer architecture, software development, information processing, computer applications, algorithmic problem-solving, and mathematical foundations. The National Research Council ranked the computer science program at Stony Brook among the nation's top 20 based on research productivity, student support and outcomes.

Students study programming, database systems, software engineering, artificial intelligence, computer architecture, scientific visualization, mobile computing, multimedia, and computer graphics. They are prepared to develop software systems for diverse applications in advanced energy, business, health-care, telecommunications, internet technology, and financial services.

Students majoring in Computer Science have the opportunity to pursue one of four different specializations: human-computer interaction, game programming, information assurance, and systems software development."

Many students prepare for their professional careers through internships at major corporations, as well as local start-up firms. Career opportunities include developing software systems for a diverse range of applications such as:



user interfaces; networks; databases; forecasting; web technologies; and medical, communications, satellite, and embedded systems.

According to payscale.com, the Department of Computer Science at Stony Brook ranked 10th among the nation's top institutions for Return on Investment (ROI).

Electrical Engineering

Major (BE), BE/MS, BE/MBA, Minor
Department of Electrical and Computer Engineering
<http://www.ece.stonybrook.edu>

With the explosion of growth in the high-tech industry, the definition of what it means to be an “electrical engineer” has expanded. Electrical engineering is central to the fast-growing industries of communications, computers, lasers, electro-optics, robotics, and consumer electronics. Current growth areas include telecommunications, signal processing, optoelectronics, microelectronics, pattern recognition, machine vision, artificial intelligence, and robotics.

Students apply fundamental scientific and mathematical principles to learn about the design of communication systems, signal processing, control systems, semiconductor electronics, circuits, microprocessors, and instrumentation. The program provides a sequence of laboratory and design courses and the opportunity to engage in research and industrial projects with faculty.

Students are prepared for professional careers or graduate studies in the electrical engineering field. The program provides students with knowledge in engineering science, engineering design, mathematics, and the natural sciences. Development of non-technical skills such as communication and teamwork is also emphasized. Electrical Engineering students may follow the general track, or choose a specialization in microelectronics or telecommunications.

Electronic, Optical, & Magnetic Materials

Minor

Department of Materials Science & Engineering
<http://www.matscieng.sunysb.edu>

The minor in Electronic, Optical, and Magnetic Materials is for students who seek to obtain a more thorough understanding of the engineering sciences. Emerging technologies in wireless communication, data storage and transmission, sensors, medical diagnostics, and semiconductor manufacturing require graduates with an understanding of electronics design, electromagnetic theory, and electronic and magnetic materials. The courses in the minor provide the student with a broad introduction to the engineering science principles and applications associated with electronic, optical, and magnetic materials.

Engineering Composites

Minor

Department of Mechanical Engineering
<http://me.eng.stonybrook.edu>

The Department of Mechanical Engineering offers the minor in Engineering Composites to Mechanical Engineering students and non-Mechanical Engineering students who seek a strong education in the mechanical behavior of composite materials. This major is intended for students with a strong background in engineering or physical science. Engineering composites are used widely in many industries including aerospace, civil, naval, medical, and automotive; examples can be seen in aircraft, yachts, motor vehicles, dental fillings and a wide range of military equipment.

Engineering composites can be designed with high stiffness, high strength and light weight, making them efficient as structural load bearing components. They constitute an extremely broad and versatile class of materials that encompass a wide range of constituents, length scales and configurations. Examples include fiber reinforced polymer composites, metal matrix composites, particle reinforced composites, nano-reinforced composites. Composites are inherently more complex than monolithic engineering materials that students are used to

(e.g. metals and ceramics). They are heterogeneous, anisotropic and predicting their mechanical behavior and failure is far more challenging than that of conventional structural materials. In comparison to conventional materials, designing with composites admits tremendous possibility, but requires specialized analysis methods.

This minor will provide the students with the background as well as the analysis and design methods to provide a foundation for using engineering composites effectively. To fulfill this outcome, three main topics will be addressed: 1) Theoretical background, analysis and design; 2) Fabrication; and 3) Characterization. Students will learn how to fabricate composites, experimentally measure their relevant mechanical properties, and incorporate them into engineering designs. Students will gain invaluable insight into engineering composites, give them a competitive edge in an engineering market that is becoming increasingly dependent on engineering composites.

Engineering Science

Major (BE), BE/MS

Department of Materials Science & Engineering
<http://www.matscieng.sunysb.edu>

Engineering Science reflects the multidisciplinary nature of 21st century engineering. The sequence of design and technical courses prepares students for careers in a variety of engineering-based industries, including communications, computing, biomaterials, and aerospace.

The first two years of the program provide students with a foundation of scientific and mathematical skills. During the next two years, students choose one of seven specializations: biotechnology, mechanical and manufacturing engineering, electrical engineering, materials science and engineering, civil and environmental engineering, nanoscale engineering, and engineering management.

The program provides an engineering education that covers fundamental aspects of engineering design, physical and chemical sciences, mathematics, and materials science and engineering, while also providing flexibility so that students

can create a track tailored to their particular academic and career interests in a traditional or emerging discipline.

Engineering and Technology Entrepreneurship

Minor

*Department of Electrical and
Computer Engineering*

<http://www.ece.stonybrook.edu>

The purpose of the Engineering and Technology Entrepreneurship minor is to expose engineering students to entrepreneurial skills; and to expose non-engineering students to various technology entrepreneurship skills. A total of 18 credit hours (6 courses) and no grades less than C may be used to meet the requirements for the minor.

Environmental Engineering

Minor

*Department of Materials Science
& Engineering*

<http://www.matscieng.sunysb.edu>

Environmental engineering is the application of science and engineering principles to improving the environment (air, water, and/or land resources), providing healthful water, air and land for human habitation and for other organisms, and investigating the possibilities for remediation of polluted sites. Environmental engineering also involves design and application of technology, including development of new materials, in support of the principles of sustainability and green manufacturing.

This minor emphasizes the chemical mechanisms at work behind environmental processes that govern production and transport of pollutants, bioavailability and toxicity, changing ecological and geochemical factors, and design of remediation and pollution prevention methodologies. It also provides coursework on materials and technology development for sustainable development and manufacturing.

Information Systems

Major (BS), BS/MBA, Minor

Department of Computer Science

<http://www.cs.stonybrook.edu>

The Information Systems major prepares its graduates to design and build computerized data processing and decision support systems. Information Systems students learn how to build the systems that manage the information required in industries including advertising, retail, finance, insurance, manufacturing, biotechnology, pharmaceutical, medical imaging, air traffic control, satellite communications, and national defense. Career opportunities include top level design and supervision of a large variety of software systems, including online internet transactions, security, database management, network design, company internet portals, simulation tools and video games.

The program emphasizes the design and implementation aspects of large-scale information systems as well as managerial and organizational issues, and it balances development of system engineering skills with learning to deliver reliable systems on time and within budget.

Throughout the program, students are exposed to diverse application areas ranging from traditional business, finance, and accounting through telecommunications, networks, multimedia, and database management, to computer aided design and industrial production management systems. Students may design their own specialization, or complete one of the following specializations: Business and Economics; Psychology; or Technological Systems Management.

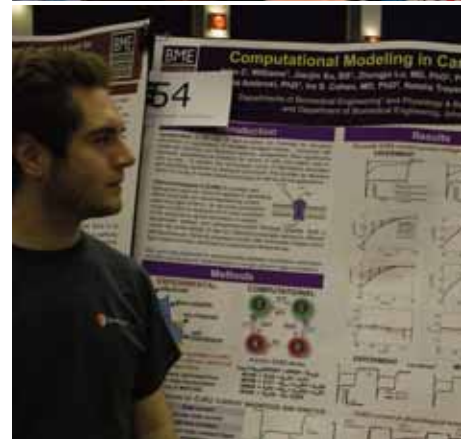
Manufacturing Engineering

Minor

*Department of Materials Science
& Engineering*

<http://www.matscieng.sunysb.edu>

The minor in Manufacturing Engineering is suitable for students who seek to obtain a more thorough understanding of modern manufacturing materials and processes. The rapidly changing nature of technology in manufacturing creates a need for graduates with a background in



such areas as modern materials processing, design, additive manufacturing, rapid prototyping and 3D printing, “green” manufacturing processes, thermodynamics, statistics, and analysis.

Materials Science

Minor

*Department of Materials Science
& Engineering*

<http://www.matscieng.sunysb.edu>

The development of new materials and research into the engineering applications of materials are critical to a wide variety of industries including aerospace, automotive, energy, electronics, environmental, medical instrumentation, advanced computing, and defense-related companies. The sequence of courses included in the minor in Materials Science provides a firm background for students seeking employment in materials-related industries or those who will pursue graduate study in related fields.

Mechanical Engineering

Major (BE), BE/MS, Minor

Department of Mechanical Engineering
<http://me.eng.stonybrook.edu>

Mechanical engineering is one of the core disciplines of engineering and it encompasses a large number of subdisciplines in both traditional and leading edge technologies. It is concerned with activities such as energy conversion, power generation, design, and manufacturing. Mechanical engineers work in areas such as energy, design, transportation, power generation, manufacturing, aerospace, computer, and household product industries.

Emerging technologies in biotechnology, materials science and nanotechnology will create new job opportunities for mechanical engineers. While the majority of our graduates are immediately employed in industry, a significant percentage pursues graduate study. Most of the students entering graduate schools continue with mechanical engineering studies. However, some go to law, business, and medical schools.

The curriculum provides students with a core education in mathematics and the

physical sciences, along with courses covering thermal processes and fluid mechanics, mechanical design, solid mechanics, and the dynamic behavior and control of mechanical systems. Students also take courses that introduce them to the use of advanced computational methods for engineering design and analysis, and data processing and analysis. A series of laboratory courses introduces them to sensors and electronics, modern instrumentation and experimental techniques used in engineering for tasks ranging from product design, evaluation, and testing to research.

The Mechanical Engineering Department supports student-lead groups that build and test an interactive robot, a fully functioning off-road “Baja” vehicle, and a solar powered racing boat. Stony Brook’s Robot Design, Solar Boat, and Motorsports teams have placed high in national and international competitions.

Nanotechnology Studies

Minor

*Department of Materials Science
& Engineering*

<http://www.matscieng.sunysb.edu>

The minor in Nanotechnology Studies (NTS) is an interdisciplinary, research-intensive program for students in the College of Engineering and Applied Sciences or the College of Arts and Sciences. The coursework provides a broad background in the science, design, manufacture, and societal, health, and environmental impacts of nanomaterials and nanoscale structures and their applications in engineering and health related areas.

A minimum of two semesters of research in the students’ own major areas, as well as choice of technical electives, provide knowledge and skills for students planning to seek employment or graduate studies in fields related to engineering, business, policy, or the broader impact of nanotechnology.

Physical Metallurgy

Minor

*Department of Materials Science
and Engineering*

<http://www.matscieng.stonybrook.edu>

This minor is for students seeking a more thorough understanding of the engineering sciences. Physical metallurgy is the study of the structure of metals and its influence on material properties and performance. It is an essential component of many areas of mechanical, manufacturing, civil, and materials engineering in the aerospace, automobile, transportation, energy, environmental, biomedical, and electronics industries as well as in engineering research and design for military and government applications.

Technological Systems Management

Major (BS), BS/MS, Minor

Department of Technology and Society
<http://www.stonybrook.edu/est>

This program integrates a foundation in the natural sciences, engineering, applied sciences, or environmental studies with applications in technology systems, assessment, and management. The Department also offers a minor in Technological Systems Management.

The major prepares students for careers in government, industry, or education in positions such as manager of computer network systems, manager of information systems, quality control specialist, systems or environmental analyst, technical sales representative, or technology trainer/educator. Students are also prepared for advanced study in areas such as business, law, education, policy analysis, and industrial or environmental management.

Students develop understanding of the characteristics, capabilities, and limitations of current and emerging technologies. The Department applies engineering concepts that underlie technological change and that form the bridge from engineering to other disciplines.

Future Career Outlooks

Specific predictions by the U.S. Department of Labor's Bureau of Labor Statistics:

Jobs for civil engineers are expected to grow 19 percent from 2010 to 2020. As infrastructure continues to age, civil engineers will be needed to manage projects to rebuild bridges, repair roads, and upgrade levees and dams. Moreover, a growing population means that water systems must be maintained to reduce or eliminate leaks of drinkable water. Additionally, more waste treatment plants will be needed to help clean the nation's waterways. Civil engineers play a key part in all of this work.

Jobs for actuaries are expected to grow by 27 percent between 2010 and 2020. Students with internship experience who have passed at least one actuarial exam while in school should have the best prospects for entry-level positions. Employment of actuaries in the insurance industry is expected to grow by 25 percent because actuaries will be needed to develop, price, and evaluate a variety of insurance products and calculate the costs of new risks. In health insurance, more actuaries will be needed to evaluate the effects that new healthcare laws, and to develop new products in response. More actuaries will be needed in property and casualty insurance to evaluate the risks posed to property by the effects of climate change.

Jobs for statisticians are projected to increase by 14 percent from 2010 to 2020. Growth will result from more widespread use of statistical analysis to make informed decisions. In addition, the large increase in available data from the Internet will open up new areas for analysis. Government agencies will employ more statisticians to improve the quality of the data available for policy analysis. This occupation will also see growth in research and development in the physical, engineering, and life sciences, where statisticians' skills in designing tests and assessing results prove highly useful.

Biomedical engineers are expected to have employment growth of 62 percent from 2010 to 2020. Demand will be strong because an aging population is likely to need more medical care and because of increased public awareness of biomedical engineering advances and their benefits.

Computer hardware engineers are expected to have employment growth of 9 percent from 2010 to 2020. Most job growth is expected to occur in computer consulting firms as manufacturers increasingly contract out the design of hardware.

Electrical engineers are expected to have employment growth of 6 percent from 2010 to 2020. Growth for electrical and electronics engineers will largely occur in engineering services firms, as more companies are expected to cut costs by contracting engineering services rather than directly employing engineers. These engineers will also experience job growth in computer systems design and wireless telecommunications as these industries continue to implement more powerful portable computing devices. The rapid pace of technological innovation and development will likely drive demand for electrical and electronics engineers in research and development, where their expertise will be needed to develop distribution systems related to new technologies.

Mechanical engineers are expected to have employment growth of 9 percent from 2010 to 2020. Mechanical engineers should experience demand in architectural, engineering, and related services as companies continue to hire temporary engineering services as a cost-cutting measure rather than keeping engineers on staff. Mechanical engineers will also be involved in various manufacturing industries—specifically, transportation equipment and machinery manufacturing. Mechanical engineers often work on the newest industrial pursuits. The fields of alternative energies, remanufacturing, and nanotechnology may offer new directions for occupational growth.

Jobs for computer software engineers are expected to increase by 32 percent through 2018. This occupation will see a large number of new jobs, with more than 295,000 created between 2008 and 2018. Demand for computer software engineers will increase as computer networking continues to grow.

Network and computer systems administrators are expected to have employment growth of 28 percent from 2010 to 2020. Demand for these workers is high and should continue to grow as firms invest in newer, faster technology and mobile networks.

Employment of software developers is projected to grow 30 percent from 2010 to 2020. Employment of applications developers is projected to grow 28 percent, and employment of systems developers is projected to grow 32 percent. The main reason for the rapid growth is a large increase in the demand for computer software.

Database administrators are expected to have employment growth of 31 percent from 2010 to 2020.

Rapid growth in data collection by businesses, as well as increased need for database security measures, will contribute to the growth of this occupation.

Employment of information security analysts, web developers, and computer network architects is projected to grow 22 percent from 2010 to 2020. Demand for information security analysts is expected to be very high. Cyberattacks have grown in frequency and sophistication over the last few years, and many organizations are behind in their ability to detect these attacks. Demand for computer network architects will increase as firms continue to expand their use of wireless and mobile networks. Employment of web developers is expected to grow as ecommerce continues to grow.

Computer and information research scientists are expected to have employment growth of 19 percent from 2010 to 2020. Computer and information research scientists are likely to enjoy excellent job prospects, as many companies report difficulties finding a sufficient number of these highly skilled workers.

Computer systems analysts are expected to have employment growth of 20 percent through 2018. The demand for computer networking, Internet, and intranet functions will drive demand for computer systems analysts who are knowledgeable about systems development and integration.

Environmental engineers are expected to have employment growth of 31 percent through 2018. More environmental engineers will be needed to help companies comply with environmental regulations and to develop methods of cleaning up environmental hazards.

Employment of chemical engineers is projected to grow 6 percent from 2010 to 2020. Many chemical engineers work in industries that have output sought by many manufacturing firms. Therefore, employment is tied to the state of overall manufacturing in the U.S. However, chemical engineering is also migrating into new fields, such as nanotechnology, alternative energies, and biotechnology, which will likely increase demand for engineering services in many manufacturing industries.

Computer and information systems managers are expected to see job growth of 18 percent from 2010 to 2020. Growth will be driven by organizations upgrading their IT systems and switching to newer, faster, and more mobile networks.