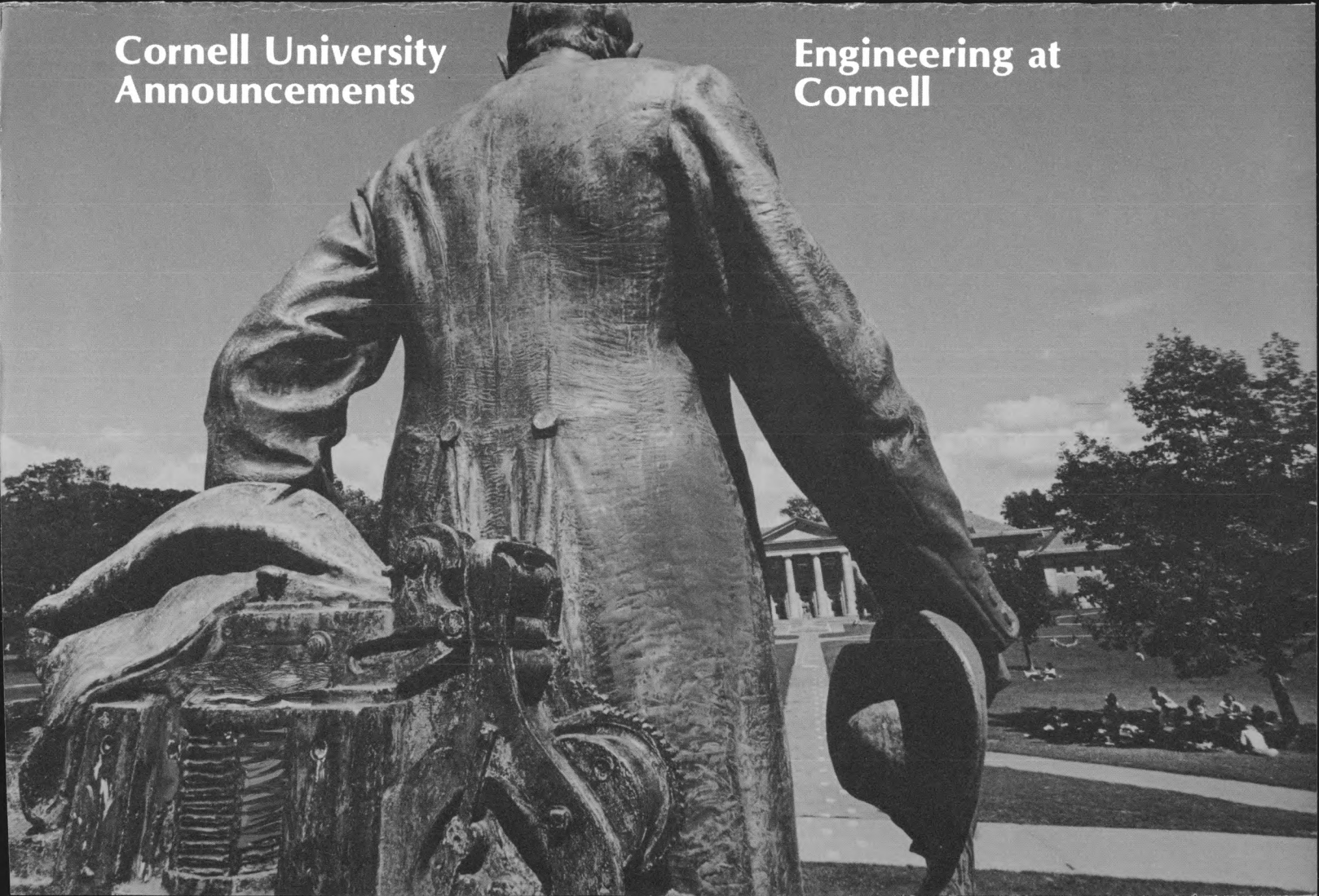


**Cornell University
Announcements**

**Engineering at
Cornell**



On the Cover:

The statue of founder Ezra Cornell on the University campus depicts him with a hand resting on part of the Morse telegraph instrument. Cornell, an early associate of Samuel F. B. Morse, supervised the construction of the first telegraph lines and helped form the Western Union Telegraph Company, the source of the capital used to establish the University. The statue symbolizes the character of engineering at Cornell, where technical study is a vital part of a broad university program.



Engineering at Cornell

Cornell University Announcements (USPS 132-860)

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If you are inclined toward a science-oriented profession with substance and significance—and good job opportunities—engineering may be the right career choice for you.

If you want a sound, practical, and well-rounded education at a diverse university of international reputation, Cornell may be the right school for you.

Cornell is a special place to study engineering. Part of this university's appeal lies in its excellent academic programs, its vitality, and its interesting people. Part comes from its unique setting: an outstanding campus in a beautiful countryside overlooking an attractive city of just the right size to enhance university life.

With this booklet, we hope to give you an idea of what it is like to study engineering at Cornell. This isn't a course catalog or a complete handbook of information—these publications are available if you want them—but we hope it will help you decide whether the Cornell College of Engineering is the place for you.

About You

You have the qualifications to be a successful engineering student if you like and are good in science and mathematics and are willing to work hard.

You have the makings of an engineer if, in addition, you have the potential for applying knowledge creatively; for problem solving is the hallmark of the engineering approach. You will also need the willingness to adapt to change—to keep up with technical advances and respond to current needs of society. Management and decision-making abilities are assets, for engineers often assume leadership positions in industry. And any other special abilities or aptitudes you may have can be well utilized in the diverse profession of engineering.

If you have a nonengineering field in mind or are uncertain of your goals but are attracted by the engineering approach, you may do well to choose an engineering undergraduate program. The discipline and orientation of the curriculum make it an excellent preparation for many careers. As your abilities and interests develop, you will be able to direct your education in the way that is best for you.

You, Engineering, and Cornell



About Engineering

The traditional purpose of engineering has been to serve mankind through technology. And today engineers are as important as ever in providing goods and services. Our society needs people who can design agricultural equipment, build power plants, plan transportation systems, devise methods for pollution control, manufacture products, and fill leadership and management roles.

Yet today this is not enough. The growing influence of technology on all aspects of modern life requires that an engineer work within a broader context than ever before. The building of a highway or power plant, for example, involves a range of economic, social, and environmental factors in addition to the technical ones. There is an increasing necessity for society to make choices, to consider what engineers and economists call trade-offs: At what cost should our environment be protected—or left unprotected? Do the advantages of nuclear energy production offset the hazards? What is the best balance between conservation of energy and increased production, and what are the best ways of achieving it? Engineers must be prepared to help make such decisions, for the fact is that none of the

urgent problems of modern society can be solved without technological contributions.

As the scope of engineering expands, new disciplines and interdisciplinary fields are emerging; these changes are reflected, and often anticipated or encouraged, by progressive engineering schools. In addition to such long-established specialties as civil, mechanical, chemical, industrial, and electrical engineering, there are more recently emerged fields such as agricultural engineering, environmental engineering, bioengineering, geological sciences, computer science, materials science, and operations research. Interdisciplinary work may involve several different engineering disciplines, or it may entail team efforts by engineers and other specialists such as physicians, theoretical physicists, economists, or government officials.

Engineering today is a diverse and vital profession, offering more opportunity than ever before for interesting and meaningful work.





About Cornell

When Cornell was founded more than one hundred years ago, a radical idea in education was introduced: Traditional academic studies would be combined with practical subjects such as engineering and agriculture so that, in the words of the founder, Ezra Cornell, "any person can find instruction in any study." Over the years, scholarship, the arts and sciences, and the more practical studies have flourished together and made Cornell a vital institution and a true university.

From the beginning, then, engineering has been an integral part of Cornell. Early instruction in civil engineering and the "mechanic arts" expanded as new fields opened up, and Cornell took and maintained a leadership role in engineering education. It developed the first undergraduate electrical engineering program in the nation, for example, and it pioneered the development of curricula in industrial engineering, mechanical engineering, engineering physics, and operations research. Today the College of Engineering maintains its place as an active and important division of the University.

It is equally true that the University environment has been and is an important part of Cornell engineering education. Those who graduate as Cornell engineers have had not only an excellent professional or preprofessional education. They also have had the opportunity to draw upon the richness of the University curricula, including offerings of the College of Arts and Sciences, the School of Industrial and Labor Relations, and the College of Agriculture and Life Sciences. They have lived and worked with people of many interests, from all over the world. They have participated in the life of a great university.

When you come to Cornell as a freshman, you will be housed with students from seven undergraduate colleges. Many of your activities will be centered on the Engineering Quadrangle, but you will take some of your classes at other colleges and attend meetings and events all over the campus. You can shape your education and your college life to suit your inclinations. The whole University will be your province.

"There is the opportunity here for a student to do whatever he really wants to."

Cornell Engineering Enrollments*

Basic Studies (first two years)	1,195
Agricultural Engineering	15
Chemical Engineering	151
Civil and Environmental Engineering	121
College Program	24
Computer Science	†
Electrical Engineering	315
Engineering Physics	72
Geological Sciences	7
Materials Science and Engineering	45
Mechanical Engineering	241
Operations Research and Industrial Engineering	141
Total Undergraduate	2,327
M.Eng. candidates	165
M.S. and Ph.D. candidates	513

Cornell Engineering Degrees Granted**

Bachelor of Science	508
Master of Engineering	137
Master of Science	97
Doctor of Philosophy	75

*Fall 1978.

†Field Program had not yet become available.

Cornell University Enrollments*

Ithaca divisions

College of Agriculture and Life Sciences	2,981
College of Architecture, Art, and Planning	444
College of Arts and Sciences	3,735
College of Engineering	2,327
School of Hotel Administration	648
College of Human Ecology	1,137
School of Industrial and Labor Relations	621
Unclassified	131
Total Undergraduate	12,024
College of Veterinary Medicine	308
Graduate School (most disciplines)	3,381
Graduate School of Business and Public Administration	483
Law School	504
Total graduate and professional	4,676

Cornell Faculty††

Total for Ithaca divisions	1,505
College of Engineering	220

**1977-78.

††Professorial ranks in Ithaca divisions,
February 1978.

Enrollments and Faculty



Cornell's main campus is on a hillside overlooking Cayuga Lake and the city of Ithaca in the Finger Lakes Region of New York State. The campus is large, but buildings are grouped according to academic areas, and each college has a physical as well as a functional identity. The Engineering Quadrangle, with its ten modern buildings, is one of the newest areas of the campus.

The Cornell campus is rightly celebrated for its natural beauty. Among its unique features are two gorges: Fall Creek Gorge, which opens out below Beebe Lake near the north end of the campus, and Cascadilla Gorge, which borders the Engineering Quadrangle on the south edge. Just walking around the campus—crossing the bridges and looking out over the hills—is part of the Cornell experience. Of course, no one will deny that the dash up Library Slope from the dorms to the engineering campus can be quite a challenge on a snowy morning.

Below the campus lies the town, a city of forty thousand with a new and attractive central mall, theaters, restaurants, stores—the amenities students often welcome. And beyond the campus and town lies the beautiful countryside—lakes, forests, state parks, even a nearby ski area. It's no wonder that Cornellians are notorious for their

attachment to the campus and the Ithaca area.

The essential purpose of the physical plant, of course, is to provide for the educational and scholarly needs of the students and faculty. As a student in the College of Engineering, you will be aware of the spacious and well-equipped classrooms and laboratories, and impressed with the excellence of the library system (which includes a large undergraduate library and a special engineering library). You will probably make extensive use of the University's computer facilities, which include a satellite station in one of the engineering buildings.

The Place

"The day I received notice of admission, my parents and I took off for Cornell and fell in love with the campus."

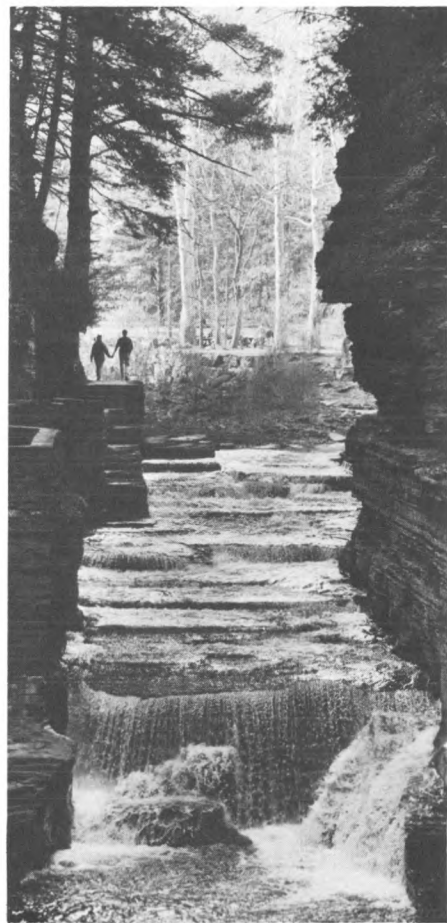
Beebe Lake on the Cornell campus



A winter aspect of the campus



Gorge in a state park near Cornell



As a student, you will be concerned also with the nonacademic facilities. There is a wide range of housing accommodations to suit individual tastes, and a variety of eating places. Provisions for extracurricular activities include three student unions and ample recreational facilities.

Important to many students are the athletic programs, both the Ivy League interscholastic sports and the vigorous intramural program. Facilities include a stadium, two practice fields, gymnasiums, bowling alleys, squash courts, swimming pools, tennis courts, a golf course, and an ice-skating rink.

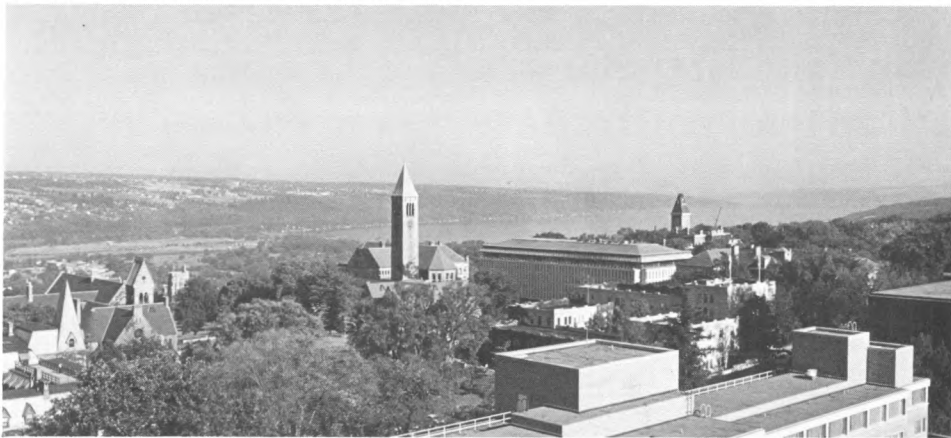
Facilities appropriate to the cultural and intellectual life of a great university are abundant. The new art museum is an architecturally exciting place that provides an interesting environment for the visual arts. Large and small auditoriums and theaters permit varied offerings in drama, music, cinema, and

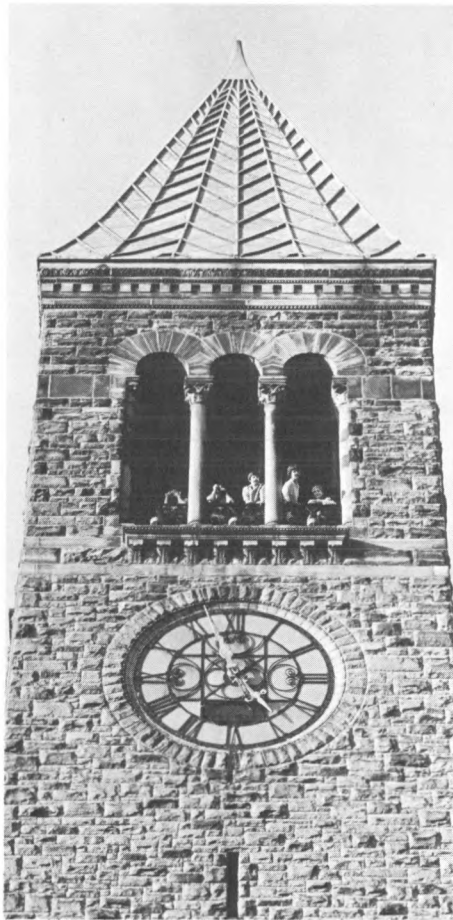
"I chose Cornell because of the good engineering curriculum, the advantages of attending a university rather than a technical school, and the small-town setting."

"The Hill": the Cornell campus seen from Ithaca



The lake and countryside seen from the campus





dance, as well as lectures and conferences. Chapels and meeting rooms provide for a variety of religious activities and events.

The campus has many different kinds of places to study or just relax. You may soon find a favorite corner in one of the libraries. You may like to take a mid-morning break in one of the lounges in the engineering buildings to have a cup of coffee and informal discussion with faculty members and fellow students. You may enjoy dropping in at the coffeehouses on campus, where there is sometimes live music or poetry.

Special places include the Arts Quadrangle, site of the original University buildings; the huge campus of the College of Agriculture and Life Sciences, including fields and pastures; and the veterinary college facilities. There are gardens, experimental plantations, and a bird sanctuary. There are the wooded paths around Beebe Lake. There is a bell tower with chimes.

The heart of any university is its academic programs, but its character and meaning stem also from its physical presence. At Cornell, students find an environment that becomes an intrinsic part of their college experience.

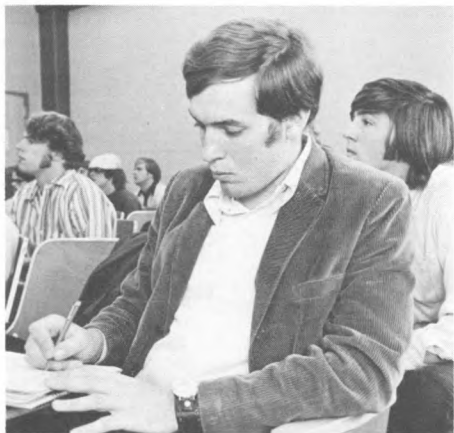
The Cornell undergraduate engineering program is based on the idea that the best preparation for any engineering specialty is a solid foundation in science, mathematics, and basic engineering skills, as well as communications skills and a broad general educational background. Accordingly, all freshmen and sophomores are enrolled in the Division of Basic Studies in the College of Engineering. This plan provides a good base for more specialized study during the upperclass years. It also gives students the opportunity to gain some exposure to the many branches of engineering before they make a choice, and the chance to consider career possibilities in interdisciplinary or nonengineering fields for which a curriculum directed toward science and mathematics is good preparation.

At the upperclass level, there are ten field programs in engineering specialties to choose from, and most of them are integrated with an optional fifth-year professional master's degree program. Particularly in these years, group or individual engineering design or research projects are an important element of the program. As an engineering student, you will be able to experience the excitement and challenge of actually applying your skills while you are still in school.

Another option is the College Program, which provides the opportunity to pursue a novel or interdisciplinary course of study. A student whose career objectives cannot be satisfied by one of the field programs may develop, with the help of advisers, a College Program curriculum consisting of an engineering major and a minor selected from another engineering discipline or a non-engineering subject offered by another unit of the University. Most students work out individualized courses of study, but some enroll in partially structured College Program curricula sponsored by groups of engineering faculty members interested in particular areas of study.

All the undergraduate programs have the same general degree requirements, such as a total of forty courses, including a minimum number of engineering, mathematics, and science courses and at least eight liberal studies electives. A typical Basic Studies curriculum is listed on the gold page following this section. The upperclass programs include twelve field-designated courses, as well as technical, free, and liberal studies electives. Courses offered by the College of Engineering number at least six hundred. In addition, the courses offered by other colleges and schools of the University are available to all students.

The Program



The First Two Years: Basic Studies

What specific course might you be taking during your initial years as a Cornell engineering student? Typical curricula are as follows:

Term 1, Freshman Year

Calculus for Engineers
General Chemistry
Elements of Engineering
Communication

Natural or social science elective
Freshman Seminar (liberal studies elective)

Term 2, Freshman Year

Calculus for Engineers
Physics I
Engineering Perspectives
Natural or social science elective
Freshman Seminar (liberal studies elective)

Term 3, Sophomore Year

Engineering Mathematics
Physics II
Engineering core science elective
Engineering core science elective
Liberal studies elective

Term 4, Sophomore Year

Engineering Mathematics
Physics III
Engineering core science elective
Engineering core science elective
Liberal studies elective

An important and unique feature of the freshman curriculum is the course in Engineering Perspectives. This popular course is designed to give students an overview of the engineering profession and also detailed study in a few specific areas. All students attend a series of lectures by Cornell and visiting experts on a technological subject of current importance. In addition, each freshman selects two six-week "mini-courses" from more than twenty offered by faculty members on subjects of particular interest to them. There is also opportunity for participating in ongoing research projects directed by engineering professors.

In the sophomore year, students select four engineering core sciences from at least three of four groups:

I. Systems Analysis and Design; Engineering Probability; Basic Engineering Statistics; Computers and Programming

II. Electrical Systems; Digital Systems; Electrical Properties of Materials; Contemporary Topics in Applied Physics; The Physics of Life

III. Applied Mechanics; Mechanics of Solids; Dynamics; Mechanical Properties of Materials

IV. Physical Chemistry; Organic Chemistry; Thermodynamics; Mass and Energy Balances

Upperclass Field Programs

(Major Subjects)

Agricultural Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science
Electrical Engineering
Engineering Physics
Geological Sciences
Materials Science and Engineering
Mechanical Engineering
Operations Research and Industrial Engineering

Individualized College Programs

(see p. 25)

Master of Engineering Degree Programs

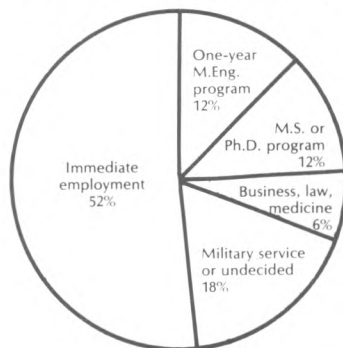
Aerospace Engineering
Agricultural Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Mechanics
Engineering Physics
Materials Engineering
Mechanical Engineering
Nuclear Engineering
Operations Research and Industrial Engineering

What You Can Study

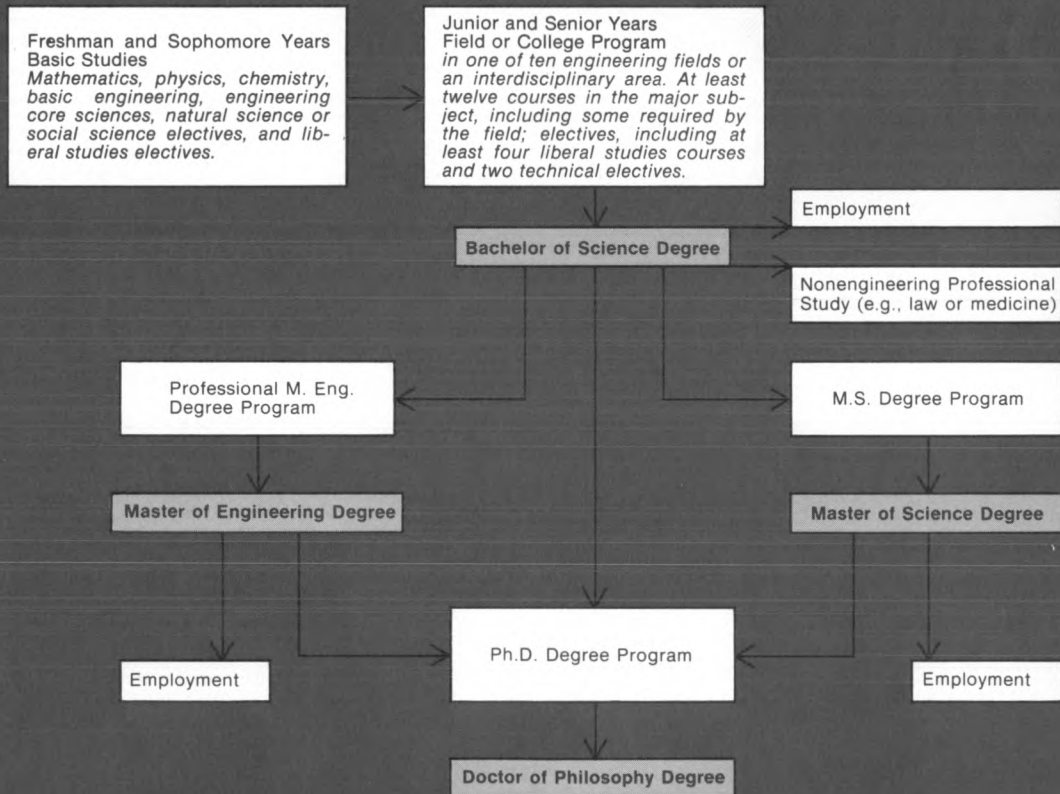
Graduate Fields

Aerospace Engineering
Agricultural Engineering
Applied Mathematics
Applied Physics
Chemical Engineering
Civil and Environmental Engineering
Computer Science
Electrical Engineering
Geological Sciences
Materials Science and Engineering
Mechanical Engineering
Nuclear Science and Engineering
Operations Research
Theoretical and Applied Mechanics
Water Resources

Postgraduate Plans of Seniors
Cornell College of Engineering



PROGRAMS AND OPTIONS IN CORNELL ENGINEERING EDUCATION



Upperclass Fields of Study

Agricultural Engineering

At Cornell, agricultural engineering is offered as a cooperative program: students are enrolled in the College of Agriculture and Life Sciences for three years and in the College of Engineering for the senior year. This plan gives students the opportunity to support and extend their primary engineering interest with course work in biological and agricultural sciences.

Areas of specialization include power, energy, structures and environments for plants and animals, agricultural machinery, food engineering, agricultural waste management, agricultural material handling and processing, bioengineering, and secondary roads. Graduates find good employment opportunities in industry and government; some develop careers related to teaching, research, and extension functions.

The four-year program includes about sixteen engineering courses; six biological and agricultural science courses; mathematics; physics; chemistry; and eight liberal studies electives. Application should be made through the College of Agriculture and Life Sciences, Roberts Hall.

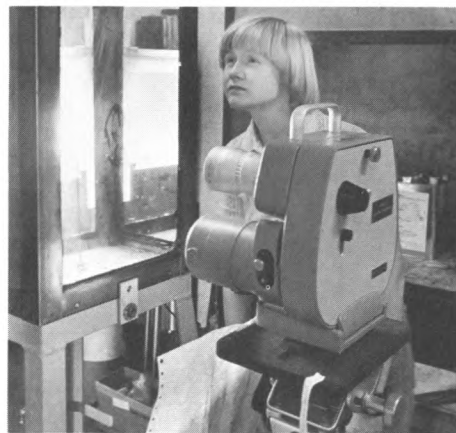
Chemical Engineering

Preparation for careers in a wide range of process industries is a major concern of the Field Program in Chemical Engineering. The program is also suitable for students who wish to prepare for work in such areas as energy systems, synthetic fuel production, biochemical and biomedical engineering, waste disposal, and pollution abatement.

The Field Program in Chemical Engineering provides a sequence of coordinated courses beginning in the sophomore year. While still in the underclass Division of Basic Studies, those who plan to study chemical engineering take one term of chemistry and the course in Mass and Energy Balances as two of their engineering core sciences.

The upperclass program includes the following courses: Organic Chemistry, Equilibria and Staged Reactions, Rate Processes, Separation Processes, Chemical Engineering Laboratory, Chemical Engineering Thermodynamics, Chemical Process Evaluation, Chemical Process Synthesis, and Reaction Kinetics and Reactor Design.

Project work in chemical engineering



Advanced laboratory instrumentation





Terminals for microprogrammable system



Civil and Environmental Engineering

At Cornell, study in this diverse field is centered in a school with three units. The Department of Structural Engineering offers programs in such areas as soil mechanics and geotechnical engineering, engineering materials, and structural analysis and design. The Department of Environmental Engineering is concerned with environmental quality engineering, fluid mechanics and hydrology, public systems and environmental systems engineering, transportation, and water resources. There is also the Program in Environmental Sensing, Measurement, and Evaluation.

The upperclass curriculum provides an introduction to several areas, as well as more detailed study in at least one specialty field. Required courses are Dynamics, Fluid Mechanics, Structural Engineering, Engineering Probability, Mechanical Properties of Materials, Environmental Quality Engineering, Soil Mechanics, Engineering Economics and Systems Analysis, and four field distribution courses. Many graduates continue in the integrated fifth-year Master of Engineering (Civil) degree program, which includes an unusual intensive period of on-campus work on the design of "real life" projects with practicing engineers as consultants.

Computer Science

Because the use of computers is crucial in all branches of engineering today, every engineering student at Cornell learns to program a computer in the first year. There are many opportunities to use this ability during the upperclass years, but for students who are specifically interested in advancing the development of the computer per se, rather than using it in some other engineering field, there is an upperclass program in computer science.

This is a flexible program that can either concentrate on the mathematical and software aspects of computing or be combined with course work in electrical engineering to cover computer hardware as well. There are required courses in advanced programming, digital systems, computer organization, numerical analysis, data structures, systems programming, theory of algorithms, and theory of automata. The students are also required to elect, from the offerings in some other engineering field, a sequence of three courses that complement their computer work.

Electrical Engineering

Reflecting the large scope of this engineering discipline, the undergraduate Field Program in Electrical Engineering provides a foundation in a number of important areas in addition to specialization in one of these areas.

Students can choose, for example, to concentrate in bioengineering; computer engineering; control systems; electronic circuit design; information, communications, and decision theory; microwave electronics; plasma physics; power and energy systems; quantum and optical electronics; radio and atmospheric physics; or semiconductor devices and applications. All programs include basic work in the areas of electrophysics and systems.

Required courses are Electrical Signals and Systems, Electromagnetic Theory, Electrical Laboratory I and II, Introduction to Digital Systems, and Quantum and Solid-State Electronics. The core program is completed with six electrical engineering electives that provide the specialization. These are selected from the more than sixty offerings of the school.



Electronics laboratory



A PDP 11/40 minicomputer





Engineering Physics

The undergraduate Field Program in Engineering Physics is designed to develop proficiency in physics and mathematics, and it emphasizes applicability.

Although some baccalaureate graduates go directly to industrial positions, many go on to graduate work in various fields, including astrophysics, atmospheric sciences, biophysics, energy conversion, environmental science, geophysics, materials science and engineering, nuclear engineering, nuclear physics, quantum optics, and solid-state electronics. Some graduates have gone into law or medicine. Another option is entry into a Master of Engineering degree program in engineering physics, nuclear engineering, or another engineering discipline.

A typical field program includes the following courses: Applied Mathematics (four courses), Electromagnetism, Electrodynamics, Electronic Circuits, Mechanics of Particles and Solid Bodies, Quantum Mechanics, Applications of Quantum Mechanics, Statistical Thermodynamics, Continuum Physics, and Advanced Experimental Physics. In the senior year, the student may work closely with a faculty member in special studies or a research project.

Geological Sciences

Preparation for careers in solid earth science is provided by the Field Program in Geological Sciences. Areas of specialization include geophysics, geochemistry, biology, and applied geology. The program is also suitable for those who wish to combine geological sciences with other subjects such as agronomy, astronomy and space science, biology, chemistry, physics, economics, mathematics, or engineering. A College Program curriculum with a geology major or minor is a further possibility.

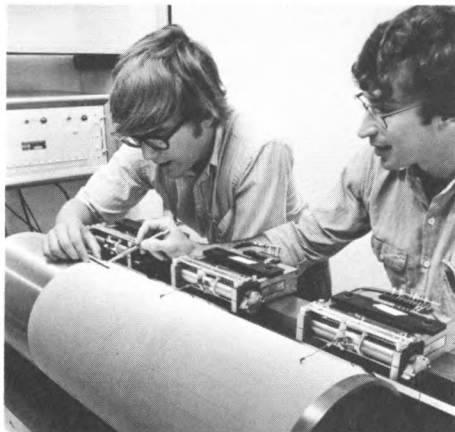
The field program includes six core courses, four advanced courses in science, engineering, or mathematics, and a summer field course. The core courses are Structural Geology and Sedimentation; Geomorphology; Mineralogy, Petrology, and Geochemistry I and II; Historical Geology and Stratigraphy; and Geophysics and Geotectonics. A recommended field course includes a 38-day western United States trip, with a five-day raft trip on the Green River.

The department has a variety of field equipment and maintains a very active research program at various localities throughout the world.

Rock identification



Study in seismology

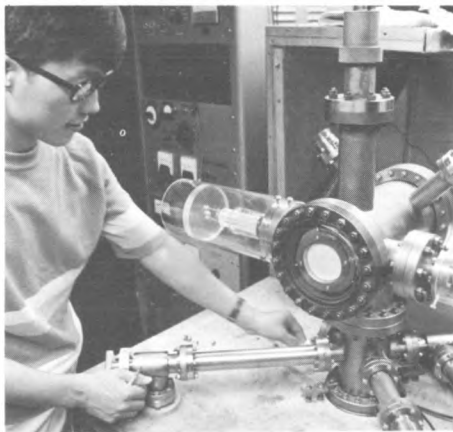


Geology field trip





Field ion microscopy



Materials Science and Engineering

Because technological advances today are usually critically dependent on improvements in materials, the study of the science and engineering of materials is increasing in importance. This discipline, which originated in the study of metallurgy, has expanded to encompass a wide range of materials, including ceramics, glasses, polymers, and semiconductors, as well as metals. Of chief concern is the relation between the structure of these materials and their properties and uses.

A typical undergraduate Field Program in Materials Science and Engineering includes the following courses: Structure and Properties of Materials; Thermodynamics of Condensed Systems; Kinetics, Diffusion, and Phase Transformations; Microprocessing of Materials; Macroprocessing of Materials; Electrical and Magnetic Properties of Materials; Current Topics; and Senior Laboratory. A special feature is an optional research involvement sequence.

An important facility is the University's unique, interdisciplinary Materials Science Center.

Mechanical Engineering

Energy—its transformation and utilization—and *mechanical systems*—their design and production—are the two mainstays of technology in mechanical engineering today. The Cornell undergraduate program provides a basic background in this field, as well as specialized study in areas selected by the student.

Since mechanical engineering is a basic engineering study, the field program is good preparation for advanced work in other specialties as well. Some mechanical engineering majors enter graduate programs in such related fields as aerospace engineering, industrial engineering, nuclear science and engineering, or bioengineering.

Required courses in the field program are Dynamics; either Mechanical Properties of Materials or Materials and Manufacturing Processes; Electrical Systems; Thermodynamics; Fluid Dynamics; Heat Transfer and Transport Processes; Mechanical Design and Analysis; Systems Dynamics; and Mechanical Engineering Laboratory. Elective courses include one in mathematics and two in mechanical engineering.

Project to design a planetary roving vehicle



Testing engine with hydrogen as the fuel



Ultrasonic welding of plastics





Design project in biomechanics



Operations Research and Industrial Engineering

Successful operation of organizations today requires analytical techniques for management and decision making. Operations research and industrial engineering is concerned with methods of designing integrated, cost-effective systems of people, materials, and equipment. Specialists in this area are employed by manufacturing industries, public and private service organizations (e.g., utility, health, transportation), and consulting firms.

Course work involves extensive use of mathematical and analytical techniques. Required junior-year courses include Optimization Methods I and II; Cost Accounting, Analysis, and Control; Statistical Theory with Engineering Applications; Computers and Programming; Introductory Engineering Stochastic Processes; and Introduction to File Processing and Simulation. In the senior year, students select two two-course sequences, including at least one in OR/IE: industrial systems, information systems, optimization methods, or applied statistics. Other specialty areas are computer science, environmental systems, manufacturing processes, and public systems.

Other Curricula

Bioengineering

An undergraduate specialty in bioengineering is often used as preparation for a career in medicine, biology, or ecology or for specialized work in engineering or an interdisciplinary field.

At Cornell study in bioengineering is not organized as a field program. Rather, it is available as a specialty in a number of the regular field programs or in the College Program. Normally, students interested in bioengineering complete their engineering and basic science prerequisites, including biology and organic chemistry, during their freshman and sophomore years; as upperclass students, they enter an engineering field and develop their bioengineering programs through appropriate selection of elective courses. An advantage of this plan is that students have several options when they graduate: they can undertake graduate work in a biological field, or they can seek employment or continue study in engineering.

Bioengineering at Cornell, available upon request, provides detailed information on possible programs.

College Program

A student who wishes to pursue a course of study that does not fall within one of the regular field programs may request admission to the College Program to develop an individually planned curriculum. Each program must be endorsed by professors in the proposed areas of study and approved by a special faculty committee.

Each curriculum under the College Program consists of an engineering major and a supporting minor, which can be another engineering field or a suitable nonengineering subject. Examples of College Program majors and minors that engineering students have taken recently are aerial photograph interpretation and conservation or geology; electrical systems and biological sciences; environmental quality engineering and ecology; environmental systems and city or regional planning; transportation and regional planning; and materials science and chemistry.

Several College Program curricula have been worked out in some detail and are supported by groups of interested faculty members. They are:

Energy Conversion: elements of nuclear, thermal, and electrical engineering

Engineering Science: a curriculum with emphasis on mathematics, physics, mechanics, and engineering analysis (sponsored by the Department of Theoretical and Applied Mechanics)

Environmental and Public Systems: water resources, ecosystem management, transportation, or other studies of public systems

Regional Science: economics, statistics, planning, and engineering as applied to engineering works and to the assessment of their environmental impact

College Program project in mechanics





Special Academic Programs

Several special programs offered in cooperation with other units of the University are available to College of Engineering students. For example, agricultural engineering can be studied by enrolling for the first three years in the College of Agriculture and Life Sciences and then completing the baccalaureate program in the College of Engineering. Dual registration in the College of Engineering and the College of Arts and Sciences allows well-qualified students to earn both Bachelor of Science and Bachelor of Arts degrees. Preparation for a career in technologically based business is available through a cooperative program with the Graduate School of Business and Public Administration: a student specializing in operations research and industrial engineering may apply for the program and, through appropriate choice of courses, qualify for the Master of Business Administration degree in one additional year of study at the business school.

Engineering Cooperative Program

A particularly popular option is the Engineering Cooperative Program, which provides almost a full year of paid

professional experience to qualified students without extending the date of their graduation. Students apply for the Co-op Program near the end of the sophomore year, spend the following summer on campus taking courses they would otherwise study as first-term juniors, and begin a series of work periods during the fall semester. Subsequent work periods, with the same employer, are during the summer. Co-op assignments are available with about forty companies and are arranged on the basis of mutual selection.

Preparation for Graduate Study

Although many students enter employment after they have earned the Bachelor of Science degree, others undertake graduate studies. A large number of the graduating seniors enter the one-year, professional Master of Engineering degree program, which continues the undergraduate specialty curricula. Others enroll in research-oriented Master of Science or Doctor of Philosophy degree programs in an engineering or applied science at Cornell or elsewhere. Some enter graduate programs in nonengineering areas such as theoretical or experimental science, education, law, business, public administration, city and regional planning, or medicine.

The people of a university or college are the students, the faculty, the administrators, and the nonacademic personnel. At this university, the people are sometimes referred to as the Cornell community. It is a large group and as interesting a group as can be found anywhere.

Your first concern will be with your fellow students. They represent a variety of ethnic and social groups and come to Cornell from all over the United States and from some ninety foreign countries to study everything from arts to zoology. Besides future engineers, you will meet aspiring agriculturalists, scientists, architects, linguists, lawyers, physicians, hotel administrators, writers, businessmen, veterinarians—future members of practically any profession you can name. Your roommate may be from Butte, Montana. Your lab partner may be on the soccer team. Your classmates, some of whom will probably become your lifelong friends, will be future leaders and workers in the whole spectrum of occupations.

You will also be concerned with the faculty. Perhaps your first encounter will be with your adviser, selected for you from the engineering faculty. Your next close contacts may be with your teachers from the College of Engineering and from faculties in science, mathematics, social sciences, and lib-

eral studies. As you continue through your undergraduate and perhaps graduate years, you will get to know many professors, especially those in your chosen field of concentration. And in a university like Cornell, the young and enthusiastic graduate teaching assistants are an important complement to the older faculty.

The diversity of the faculty, even within a single college, is striking. In engineering there are more than two hundred professors, representing fifteen or so major disciplines and dozens of specialties. Some are experienced in professional engineering and some are theoretical scientists. Many serve as industrial or professional consultants or are concerned with technological problems and projects on the local, national, or international scale. Some

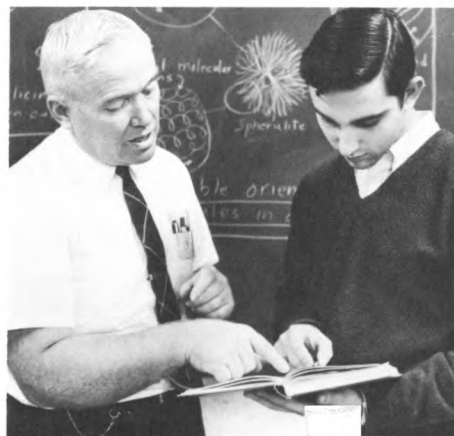
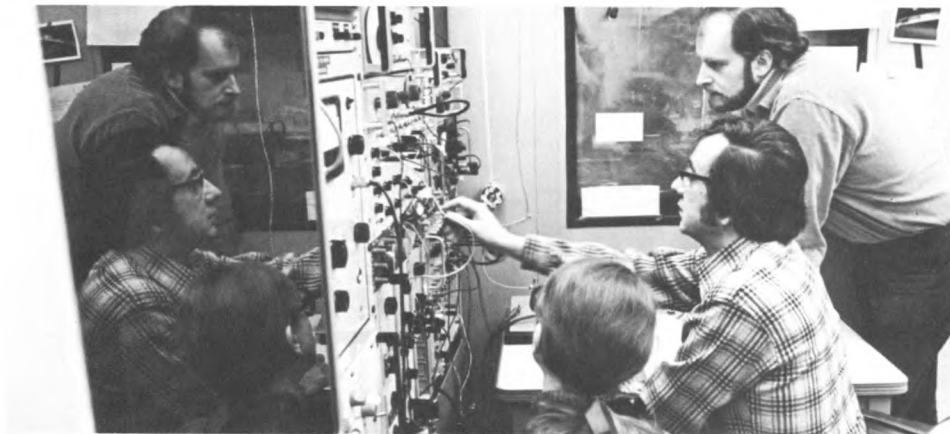
The People

"The main point of Cornell is that it offers so much and has such diversity. It is a good environment for an engineering student because an engineer can't isolate himself—not in real life and not here."



participate in interdisciplinary projects with people from other fields such as physics, chemistry, biology, medicine, economics, planning, ecology, or law.

Faculty research interests range from highly technical studies to broad areas of public policy or technology assessment, and from theoretical investigations to applicable technology or industrial management. There are specialists in high-power lasers, X-ray diffraction, electron microscopy, and thermonuclear fusion. In celestial mechanics and ionospheric physics. In bioengineering, bioelectronics, and robots. In microwave communication devices, electric cars, planetary rovers, and magnetically levitated vehicles. In high-power electricity transmission, energy conversion, the hydrogen economy, radiation damage of materials, and nuclear engineering. In aerial photography, remote sensing, and photogrammetry. In seismology, tectonics, and geophysical prospecting. In water quality control, land-use planning, and transportation systems. In chemical processing, polymeric materials, and artificial kidney machines. In waste treatment, automotive pollution control, thermal pollution, and sonic boom. In operations research, game theory, information systems, and computer programming. The list goes on.





As an engineering student, you will have contact with faculty members in many areas of engineering and applied science, as well as with experts in whatever field you decide to make your specialty. As a University student, you will be exposed to an even broader spectrum of faculty interests, activities, and attitudes. The Cornell faculty, it goes without saying, is excellent. The special relationship of teacher and student is one of the rewarding aspects of college life, and at Cornell it is enhanced by the quality of the teaching staff and fostered by the high faculty-student ratio.

People are an important part of any education. As a Cornell student, you will be part of a stimulating, varied, and vital academic community.

"One of the reasons I came to Cornell is that I thought there would be a cosmopolitan and stimulating atmosphere, with people of many backgrounds working in a variety of fields of great interest to them—and this expectation has been realized."





Administrative Staff Members

Dean: Thomas E. Everhart

Associate Deans: Malcolm S. Burton,
Richard H. Lance, Paul R. McIsaac,
John F. McManus

Assistant Dean and Director of
Admissions and Placement:
David C. Johnson

Assistant Dean (Minority Affairs):
Ron W. Simmons

Director of Advising and Counseling:
Robert E. Gardner

Directors of Engineering Cooperative
Program: Donald F. Berth and
Richard H. Lance

Engineering Registrar: Jane H. Pirko

Academic Units

Division of Basic Studies

Department of Agricultural Engineering

School of Applied and Engineering
Physics

School of Chemical Engineering

School of Civil and Environmental
Engineering

Department of Environmental
Engineering

Department of Structural Engineering

Program in Environmental Sensing,
Measurement, and Evaluation

Department of Computer Science

School of Electrical Engineering

Department of Geological Sciences

Department of Materials Science
and Engineering

Sibley School of Mechanical and
Aerospace Engineering

Program in Nuclear Science and
Engineering

School of Operations Research and
Industrial Engineering

Department of Theoretical and
Applied Mechanics

Organization of the College

Special Facilities and Programs

Engineering Buildings

Ten modern buildings on the Engineering Quadrangle for most of the academic units of the College of Engineering; facilities for applied and engineering physics in Clark Hall on the Arts and Sciences campus

Special Facilities, Centers, and Programs

Center for Applied Mathematics

Coordinates study and research programs

Center for Environmental Research

Provides an interdisciplinary focus

Cornell Computing Facility

Principally an IBM 370/168 system, including a central facility, five satellite stations, and teletypewriter terminals

Cornell High Energy Synchrotron Source

A national radiation laboratory at the University's Wilson synchrotron

Laboratory of Plasma Studies

A center for interdisciplinary research in plasma physics and lasers

Materials Science Center

Provides highly sophisticated equipment for interdisciplinary research

National Astronomy and Ionosphere Center (Arecibo)

The world's largest radio-radar telescope facility, operated by Cornell in Puerto Rico

National Research and Resource Facility for Submicron Structures

A national center for research leading to ultrasmall structures, including a new generation of electronic devices

Program of Computer Graphics

An interdisciplinary center for the development and use of computer graphics

Program on Science, Technology, and Society

Stimulates and initiates interdisciplinary studies

Ward Laboratory of Nuclear Engineering

Irradiation, isotope production, and activation analysis facilities

Library Resources

Uris Library: for undergraduate studies

Olin Library: for research

Fourteen specialized libraries, including the Engineering Library

Total holdings of more than four million volumes

Advising and Counseling

Perhaps in the first confusing days on campus, or later in the term when your math work seems to be slipping behind, when you are trying to decide on a major, or when a personal crisis develops—you will feel the need for help or at least conversation.

For an engineering student with a problem, the first recourse may be the faculty adviser. If he or she can't provide sufficient help of the right kind, a referral can be made. For academic or career problems, there is also the Engineering Advising and Counseling Center, where students may consult with the director or staff members. Special programs to assist students in selecting their upperclass fields are offered by the center at various times of the year. The center also maintains a list of tutors and arranges group tutorials as the need arises. Printed material, including a newsletter for engineering underclass students, is available.

The advising program of the College is supplemented by extensive resources of the University. These include the Office of the Dean of Students, the University Health Services, the Reading-Study Center, the Learning Skills Center, the Career Center, the Health Careers Advisory Committee, Cornell United

Religious Work, and the Office of Admissions and Financial Aid. Students not only have access to these organized counseling services, but are welcome to confer informally with residential advisers or staff and faculty members on any educational or personal matter.

Professional Orientation

Help in choosing careers is offered from the freshman year on. This begins with the required freshman course Engineering Perspectives, which includes a series of lectures by professional engineers in different specialty fields. Then there are Decision Days, when the various upperclass engineering fields hold open house for underclass students. Freshmen and sophomores have the opportunity to participate in Engineering Expo, a series of one-day trips to industries and engineering establishments.

Special career problems of women are

Special Services for Engineering Students

"I looked, listened, and asked questions. I got an overall view of the industrial engineer as he functions in the company. I consulted with the personnel manager, the plant manager, and the department heads."



explored in an annual panel discussion, "Industry and the Woman Engineer"; panelists include professional women in the field. Sophomore women are invited to participate in a special program of industrial assignments during the winter recess.

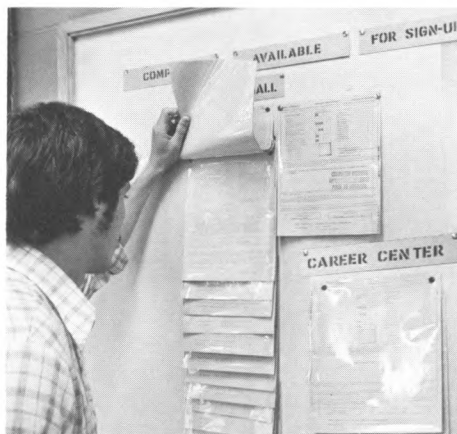
Program for Minority Students

Because engineering-bound minority students may have extra needs in preparing for college work, special counseling and academic support services are offered to these students. An enrichment program, which is offered during the summer before freshman matriculation, is designed to strengthen skills in mathematics, the physical sciences, computer science, and communications arts. During the regular academic year, advising and tutoring services are available.

In addition, two programs to help orient the students to engineering as a profession are offered. One brings practicing minority-group engineers to the campus in a series of lectures and discussions, and the other provides sophomores with the opportunity to obtain on-the-job industrial experience for a short period between academic terms.

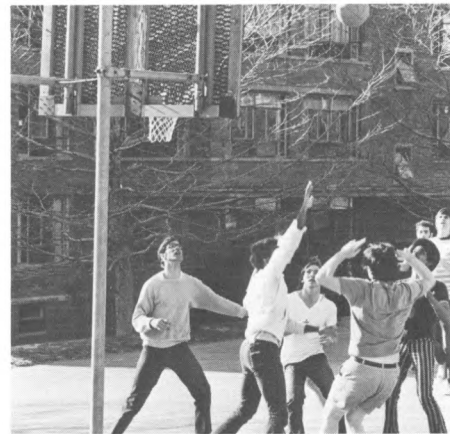
Placement Services

Help in obtaining permanent or summer employment is offered by the University Career Center and by the Placement Office at the College of Engineering. Interviews between students and prospective employers are arranged during two-week periods in the fall and in the spring; last year recruiters from more than two hundred companies visited the campus. Workshops for students who will be looking for jobs are arranged by the Placement Office, and information about companies and employment opportunities is available. Members of the engineering faculty also serve as placement advisers in the different specialty fields.



"The attractions of an engineering job are the same for a woman as for a man: interesting, challenging, and socially useful work that provides a good salary."





As a new Cornellian, one of your first concerns, aside from academic ones, will be your living arrangements. There are no rules about where Cornell students may live, but there are a number of options. At some point, a student may decide to live in a fraternity or sorority house, or a cooperative, or a shared apartment in the city or surrounding countryside. But almost all incoming students, and a growing number of others, choose to live on campus in University housing.

Dormitory living itself offers a number of possibilities. Some dorms are reserved for men or for women only, but most are coeducational (usually segregated by floor or corridor). Most are traditional in design, but a group of recently built and popular dormitories are arranged on a suite plan. Single rooms, double rooms, suites, and a few apartments are available at various rates. Special facilities such as lounges, kitchenettes, and laundries are available. House rules are minimal; at Cornell college students are considered adults capable of ordering their own lives.

The University offers several "special project houses" to enhance the educational experience of groups of students with special shared interests. These include Ecology House, the International

Living Center, and Sperry Community (where the emphasis is on community development and dynamics). There are also two "residential colleges": Risley, for those interested in the performing and creative arts (some engineering students with interests in these areas elect to live there), and Ujamaa, for those especially concerned with studying the problems of developing communities. More detailed information on these accommodations is sent to students who are admitted to Cornell.

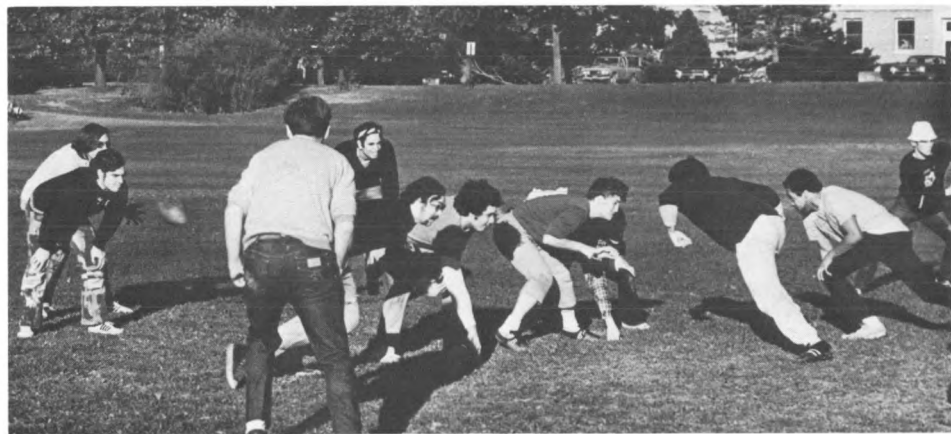
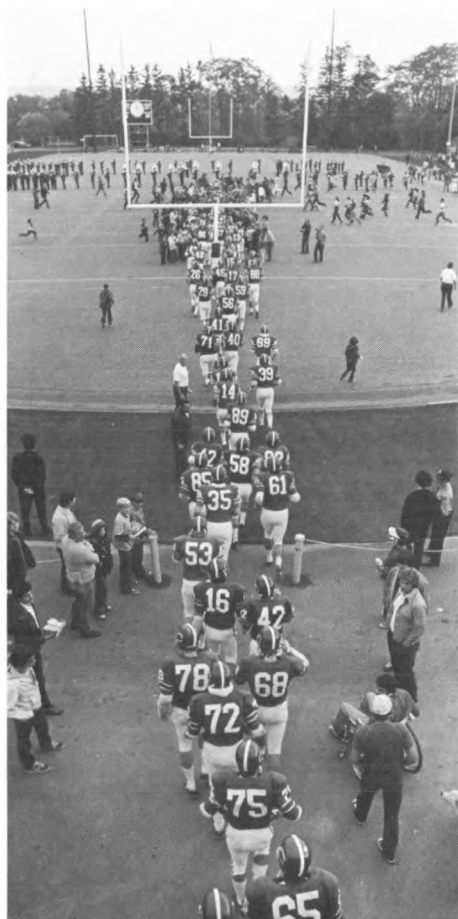
The dorms are located in two areas of the campus, and each is served by a student union with dining facilities, meeting and recreational rooms, music and study rooms, lounges, and special facilities (such as the darkroom in the North Campus Union). The centrally located union, Willard Straight Hall, is a

Student Life

"There are lots of people around and things going on in the dorm all the time."

"I believe that fraternity living encourages maturity because you must adapt to the other people. You can't just move out."

"I like sharing an apartment, partly because we can work and eat when it suits us."



focal point for many campus activities. Besides having a variety of special-purpose and assembly rooms, the Straight has cafeterias, a theatre, a browsing library, a newsstand, a ticket office, even a barbershop.

The arrangements for dining are as optional as those for housing. Although there is an extensive and flexible dining plan available, it is not required. Dining rooms, cafeterias, and coffee shops are located in various places on campus, and students can patronize them according to their convenience and preferences. Some people do their own cooking, at least occasionally, especially if they live in co-ops or private housing.

Student life is, of course, considerably more than going to classes, studying, and eating and sleeping. Extracurricular activities are numerous and varied, and every student has a virtually unlimited opportunity to work out a congenial program. Some four hundred student organizations foster a wide spectrum of cultural, recreational, intellectual, political, social, and religious interests. Students can participate in campus affairs and policy making through the Campus Council and various committees. They can participate in interscholastic or intramural sports (engineers are well represented on Cornell's athletic teams); join a theater

Willard Straight Hall, student union





group; sing with the Glee Club, Sage Chapel Choir, or University Chorus; play in the University orchestra; work on the student newspaper or a special publication like the *Cornell Engineer*; or be on the radio station staff. They can attend any of the hundreds of programs, lectures, religious services, and special events that crowd the Cornell calendar. They can even spend most of their time in classrooms, libraries, and laboratories and count on informal social gatherings with friends for respite.

Other publications will provide you with detailed information on all these aspects of University life. But what you actually do, and how you do it, is up to you. The Cornell experience is what you make it.

"I will always remember my years at Cornell as a time in which I obtained much knowledge, not only academic, but in other areas of life vital for coping successfully with the world today."

Where Cornell Undergraduates Live

Dormitories	43%
West campus: Baker Halls (nine buildings, including some for men, some for women, and some for coeducational occupancy by floors); University Halls (six buildings with coeducational occupancy, mostly by floors)	
North campus: North Campus Student Residences (seven buildings with coeducational units, each comprising six suites for men or women only); Balch Halls (four connected buildings for women); Anna Comstock House (two buildings for upper-class men and women); Clara Dickson Hall (coeducational, mostly by corridor); Mary Donlon Hall (coeducational by corridor)	
Fraternities and sororities	15%
About fifty houses	
Cooperatives and small living units	2%
Eleven houses on and just off campus	
Private apartments and houses	40%

Special Organizations for Engineering Student Participation

Cornell Campus Council
Policy Committee of the College of Engineering (four student members)
Engineering Student Ambassadors (hosting and advisory functions)
Tau Beta Pi and Sigma Xi, national honorary societies
Cornell Engineer, student magazine
American Institute of Aeronautics and Astronautics
American Institute of Chemical Engineers
American Institute of Industrial Engineers
American Society of Agricultural Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
Geology Club
Institute of Electrical & Electronics Engineers
National Society of Black Engineers
Society of Automotive Engineers
Society of Exploration Geophysicists
Society of Women Engineers

Outside the Classroom

Admissions and Financial Aid Information

Dates and Deadlines

Admissions Applications Due

Regular: January 15

Transfer: for fall term, March 15; for midyear admission, November 1

Early Decision Plan: November 1

Admission Decisions Announced

Regular: as decisions are made in February, March, and early April

Transfer: by early May

Early Decision Plan: December 1 (except that those who are considered on the basis of November SAT scores will be notified by January 1)

Financial Aid Applications Due

Regular and Transfer: January 15

Early Decision Plan: November 1

Financial Aid Decisions Announced

Regular: by mid-April

Transfer: by mid-May

Early Decision Plan: by January 1

Date Applicant Must Advise Cornell of His or Her Decision

Regular: May 1

Transfer: June 1

Early Decision Plan: applicants will be advised

Financial Aid Summary

■ Financial aid is awarded almost entirely on the basis of need, as a package of scholarship, loan, and occasionally an on-campus job. A package is offered only if the full amount calculated as needed can be provided.

■ More than two-thirds of all Cornell undergraduate engineering students receive some amount of financial aid.

■ More than \$600,000 in scholarship grants is awarded each year to engineering freshmen. Loans and on-campus jobs bring the total amount of financial aid to about \$800,000.

Estimated Expenses at Cornell Endowed Colleges*

Tuition	\$5,256
Matriculation fee (entering students)	50
Room and board	2,250
Books and supplies	240
Personal expenses	574
	<hr/>
	\$8,370

*1979-80.

If you are interested in entering an engineering program at Cornell, a good first step is to mail the information request card at the back of this booklet. A visit to the College is recommended, and if it is feasible for you and your parents to come, you may make arrangements with the Office of Engineering Admissions for an interview and guided campus tour. Appointments are strongly recommended. The address is 223 Carpenter Hall; the telephone number is 607/256-5008.

Among the printed materials you will want is the *Announcement of General Information*. Also useful is the *Information for Applicants*, a leaflet sent along with each requested application form.

Admission

Although the College of Engineering is highly selective, there are no absolute standards for admission. The aim is to enroll students who evidence strong prospects for academic success, and who will both benefit from and contribute to the diversity that characterizes Cornell. An important factor taken into consideration by the Engineering Admissions Committee is, of course, academic achievement and aptitude. College entrance examination scores are looked at, as are high school grades, class rank, and other available informa-

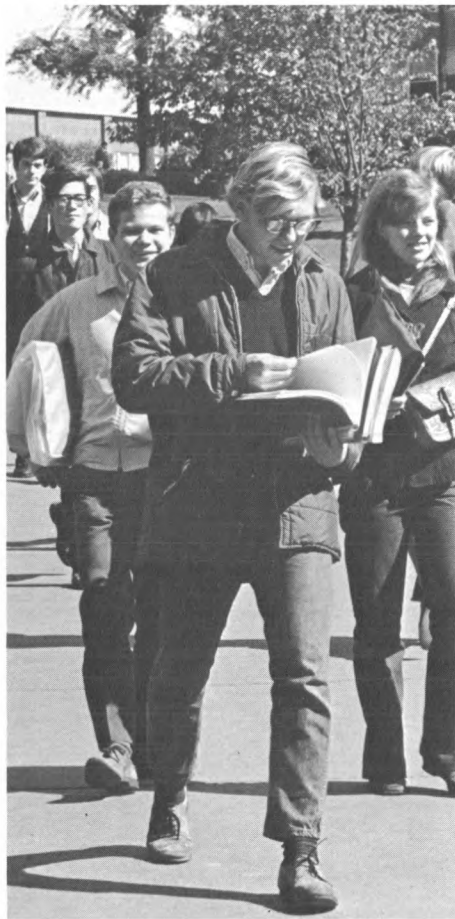
tion. Personal qualities such as maturity, good work and study habits, leadership capability, and intellectual creativity are also considered; these may be assessed through the high school record or from the recommendations of counselors. Another important factor is the applicant's motivation and awareness of the educational and professional possibilities in engineering.

There are, of course, certain admission requirements. The basic requirement for freshman admission is the completion of sixteen units, or years of study, of college-preparatory subjects. The following six units must be included: four of mathematics, one of physics, and one of chemistry. Those who are interested in bioengineering are advised to complete at least one unit of biology.

The College also welcomes inquiries from students who wish to transfer from other universities and colleges, especially two-year schools with engineering science programs. Admission is usually offered only to those who have excelled in academic programs comparable, in both content and rigor, to Cornell's.

A number of students from foreign countries enter the College. Such candidates should communicate with the International Student Office in Barnes Hall.

Becoming a Student



The timetable for the admissions process is summarized on the gold page. The Early Decision Plan (EDP) is intended for highly qualified applicants whose college preference is Cornell; acceptance under this plan eliminates the need for making application to other colleges. Those candidates not offered EDP admission are considered again, without prejudice, under the normal admissions review procedure.

College Entrance Examinations

Each freshman candidate is required to take standardized admissions tests. The preferred procedure is to take the College Entrance Examination Board Scholastic Aptitude Test (SAT), and the accompanying achievement tests in mathematics (level I or level II) and in either chemistry or physics. *These must be taken not later than January of the last year in high school.* Generally, it is recommended that the achievement test in science be taken in May of the junior year, in that science in which the applicant is then enrolled. The other alternative is to submit American College Testing examination (ACT) scores. These tests should be taken not later than the October test date.

Advanced Placement

About one-third of the students entering the College of Engineering as freshmen receive advanced placement and credit toward the B.S. degree. This is earned most often in mathematics, physics, and chemistry, but it is also received in other subjects such as biology, computer science, and history. A publication about advanced placement may be requested from the Office of Engineering Admissions, 223 Carpenter Hall.

Early in the summer, the Division of Basic Studies offers a series of programs for entering students and their parents, with the idea of introducing them to Cornell and at the same time giving the students an opportunity to take the Cornell advanced placement examinations and arrange their fall programs. As an entering freshman, you should find these sessions not only helpful in getting started academically, but a good chance to explore the campus, meet other new students, and become acquainted with members of the College staff. Your parents will be able to attend informational programs and meet University staff members in such areas as medical care, counseling, and finances. These sessions are an alternative to standardized advanced placement testing and their cost is modest—equivalent to that of a College Board Examination.

Finances

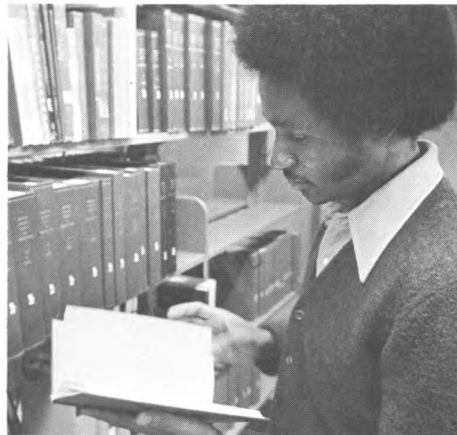
No one should refrain from applying for admission because of financial circumstances. Admissions decisions are made without regard for financial aid requirements; after admission has been granted, applicants for financial aid are considered for the available funds. Those who wish to be considered should submit an application for student aid along with the admission application (the form is included in the application packet). In addition, candidates for financial aid must file the Financial Aid Form (FAF) with the College Scholarship Service no later than January 1. The FAF form may be obtained from secondary school counselors.

"My scholarship made it possible for me to come here. Actually, it is cheaper for me to go here than to the state university at home."

Opportunity for All

There are some "qualifications" you don't need in order to study engineering at Cornell: you don't need to be male, or a member of any particular social or economic group. The College encourages and facilitates the enrollment of women and members of racial and ethnic minorities. Nine or ten years ago only one or two women entered each year, but in 1978 women constituted about 16 percent of the freshman class. Minority students now constitute about 10 percent of the entering class.

Cornell University administers a variety of special opportunity programs designed to provide financial aid and other forms of assistance to (1) minority students and (2) low-income students meeting program guidelines. The emphasis of these special programs is to aid in increasing representation of students from minority groups present in New York State who historically have been underrepresented in higher education. However, participation is also available to those residing outside New York State. For details, prospective students should consult *Information for Applicants*, which accompanies each undergraduate application or will be sent upon request by the Office of Admissions, 410 Thurston Avenue, Ithaca, New York 14850.





It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age, or handicap. The University is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

Cornell University is committed to assisting those handicapped students who have special needs. A brochure describing services for the handicapped student may be obtained by writing to the Office of the Dean of Students, Cornell University, 103 Barnes Hall, Ithaca, New York 14853. Other questions or requests for special assistance may also be directed to that office.

Further Information

An overall picture of Cornell programs, facilities, services, living arrangements, and academic and extracurricular activities is given in the University's *Announcement of General Information*. More information about curricula, and the content of courses, is included in *Cornell University: Description of Courses*. These publications may be obtained by writing to Cornell University Announcements, Research Park, Building #7, Ithaca, New York 14853, or by mailing the request form attached to the cover of this booklet, with the appropriate boxes checked.

The admissions staff of the College of Engineering is helpful in answering questions and providing reading material about engineering fields in general and Cornell programs in particular. Staff members are also ready to discuss individual problems in such matters as entrance qualifications and finances. The address is Engineering Admissions Office, Cornell University, 223 Carpenter Hall, Ithaca, New York 14853.

Office of University Publications
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