

FALL  
2004

**Engineering Undergraduate Handbook**



For Students Entering in the Fall 2004 Semester or Later

[www.engineering.cornell.edu](http://www.engineering.cornell.edu)

Engineering

Name: \_\_\_\_\_

Campus Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

**College of Engineering  
Cornell University  
2004**

ABET (Accreditation Board for Engineering and Technology) is recognized by the Council for Higher Education Accreditation (CHEA) as the organization responsible for the accreditation of educational programs leading to degrees in engineering, engineering technology, computing and applied science.

The following undergraduate-degree Majors are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700:

Biological Engineering  
Chemical Engineering  
Civil Engineering  
Electrical and Computer Engineering (under the title Electrical Engineering)  
Engineering Physics  
Materials Science and Engineering  
Mechanical Engineering  
Operations Research and Engineering

# Preface

This handbook is intended to support you as an entering and continuing undergraduate in the College of Engineering at Cornell University. (Some curriculum requirements may not be relevant to continuing students.) It has been prepared as a handy reference guide to the requirements, programs, policies, and procedures of the college. We hope that you will find the information you need for both planning and understanding your engineering education.

The College of Engineering would also like to emphasize the importance of the social and ethical implications of the work of engineers as a contribution to the improvement of society. You are fortunate to be a part of an educational community composed of people from many different parts of the world and from diverse ethnic groups in the United States. This diversity gives Cornell a rich multicultural character, and living in the Cornell community can be an opportunity to learn respect for the customs of others and to experience cultural pluralism in today's world. We encourage you to seek out and explore courses and activities that address issues of race, gender, and ethnic diversity to gain a more valuable educational experience and to prepare for the practice of engineering.

Although this handbook embraces the development of an undergraduate engineering education, it does not constitute a complete or definitive statement of the policies of Cornell University and the College of Engineering. The University Announcement, *Courses of Study* is the official document of the university for defining academic programs and requirements. In addition, the final authority for academic degree requirements of the College of Engineering is jointly administered by the College of Engineering faculty, the College Curriculum Governing Board, and the faculty of the individual Majors of engineering. For more complete information, consult the sources mentioned in this handbook, *Courses of Study*, and Engineering Advising in 167 Olin Hall.

We hope you find this handbook a useful resource as you progress through your years at Cornell. We wish you much success and welcome your suggestions for improvement of the handbook.

**Rich Robbins**

Director, Engineering Advising

**Dan J. Maloney Hahn**

Senior Academic Advisor

# Responsibility for Meeting Degree Requirements

Ultimately, it is the responsibility of the student to understand degree requirements for their major and to plan the course of study accordingly. Students should consult the appropriate undergraduate office (listed on page 9) for specific information. The major will provide a consultant who can answer specific questions and make binding decisions relating to the fulfillment of degree requirements. Faculty advisors will assist in course selection, but they are not responsible for ensuring that the courses selected meet degree requirements. That is the responsibility of the student.

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# Program Educational Objectives

## Cornell University's Mission and Values

Cornell is a learning community that seeks to serve society by educating the leaders of tomorrow and extending the frontiers of knowledge.

In keeping with the founding vision of Ezra Cornell, our community fosters personal discovery and growth, nurtures scholarship and creativity across a broad range of common knowledge, and engages men and women from every segment of society in this quest. We pursue understanding beyond the limitations of existing knowledge, ideology, and disciplinary structure. We affirm the value to individuals and society of the cultivation and enrichment of the human mind and spirit.

Our faculty, students, alumni, and staff strive toward these objectives in a context of freedom with responsibility. We foster initiative, integrity, and excellence, in an environment of collegiality, civility, and responsible stewardship. As the land grant University of the State of New York, we apply the results of our endeavors in service to our alumni, the community, the state, the nation, and the world.

"I would found an institution where any person can find instruction in any study."  
Ezra Cornell, 1865.

## College of Engineering Undergraduate Programs Mission

The Engineering College is dedicated to the transformation of our excellence in research and design to a correspondingly outstanding educational experience in engineering and applied science for a diverse group of baccalaureate students.

Specific missions are to:

1. Enroll and graduate a highly qualified and diverse undergraduate student body and enable their success.
2. Continuously improve the quality of the undergraduate education by ongoing evaluation of the common curriculum, assessment of teaching, learning and implementation of improvements to the program based on those results.
3. Infuse the results of ongoing research, the capabilities of technology, the excitement of hands-on learning, and the experience of design projects into the undergraduate curricula.
4. Provide high-quality information and guidance to undergraduate students about the college, about curricula, and about future employment possibilities.
5. Oversee the educational progress of all students and encourage and enhance their success, both prior to affiliation with a major and within the majors.
6. Collaborate with the faculty and administration of other Cornell colleges and organizations external to Cornell to efficiently provide the best possible undergraduate education.

### Vision

Cornell Engineering will utilize the world-class intellectual resources and interdisciplinary opportunities of the college and university to prepare our undergraduate students for lifelong creation of knowledge and solutions to complex real-world problems.

### Values

We believe that all students who enroll in the Engineering College undergraduate program are capable of successfully graduating with a B. S. degree. We understand that young people in the typical undergraduate age range are maturing rapidly and therefore may change their

professional and personal aspirations and may struggle with adjustments to campus life and academic expectations. It is our responsibility to maintain a curricular schedule that allows students to change directions and services to assist them in making informed decisions. We respect the variability of learning styles spanned by our students and faculty. We embrace the responsibilities of Cornell faculty members, to preeminent research as well as to excellent undergraduate education. Furthermore, we highly value the need of everyone in our college community to balance work load and personal life. We prize an inclusive, respectful college environment in which community bonds and community responsibility exceed competitiveness.

study and professional development activities.

### **Educational Objectives**

College of Engineering graduates will demonstrate early in their careers an ability to:

- Apply their general educational experience and specific knowledge of math, science, and engineering to a wide variety of careers including industry, advanced engineering study, or non-traditional engineering related career paths or graduate study.
- Perform in a modern diverse working environment in which they will work in multidisciplinary teams and communicate effectively with both professional colleagues and the public.
- Lead design processes that include consideration of the impact designs have on people, societies, and nature.
- Model, analyze, and solve complex problems from a systems perspective.
- Recognize contemporary global issues and their professional and ethical responsibility to contribute to solutions for the social, economic, and environmental challenges faced by humanity.
- Engage in self-directed learning including the pursuit of graduate

# Guide to Important Resources

## College of Engineering

Office of the Dean, 242 Carpenter Hall, 255-9679  
Associate Dean for Undergraduate Programs, 167 Olin Hall, 255-8240  
Assistant Dean for Student Services, 167 Olin Hall, 255-8240  
Career Services, 201 Carpenter Hall, 255-5006  
Cooperative Program, 201 Carpenter Hall, 255-5006  
Engineering Advising, 167 Olin Hall, 255-7414; [adv\\_engineering@cornell.edu](mailto:adv_engineering@cornell.edu)  
Engineering Communications Program, 425 Hollister Hall, 255-8558  
Engineering Diversity Program, 146 Olin Hall, 255-0735  
Engineering Library, Carpenter Hall, 255-5933  
Learning Initiatives for Future Engineers (LIFE), 167 Olin Hall, 255-9622  
Minority Programs, 146 Olin Hall, 255-6403  
Registrar, 158 Olin Hall, 255-7140  
Women's Programs, 146 Olin Hall, 255-0735

## Personal Counseling Services

Cornell United Religious Work, Anabel Taylor Hall, 255-4214  
Counseling and Psychological Services, ground floor, Gannett Health Center,  
255-5208  
EARS (Empathy, Assistance, and Referral Service), 211 Willard Straight Hall,  
255-EARS  
Engineering Advising, 167 Olin Hall, 255-7414  
Engineering Minority Programs, 146 Olin Hall, 255-6403  
International Students and Scholars Office, B50 Caldwell Hall, 255-5243  
Office of Equal Opportunity, 234 Day Hall, 255-3976  
Residence Life Central Office, 2336 South Balch Hall, 255-5511  
Student Life Union, 401 Willard Straight Hall, 255-6839  
Suicide Prevention and Crisis Service, Ithaca, NY 14850, 272-1616 (24 hrs.)  
Women's Programs, 146 Olin Hall, 255-0735

## Tutorial and Academic Support Services

Behrman Biology Center, 216 Stimson Hall, 255-7429  
Center for Learning and Teaching, 420 Computing and Communications Center,  
255-6310  
Computer Science Department, 303 Upson Hall, 255-0982  
Engineering Advising, 167 Olin Hall, 255-7414  
Engineering Minority Programs, 146 Olin Hall, 255-6403  
Learning Initiatives for Future Engineers (LIFE), 167 Olin Hall, 255-9622  
Math Support Center, 256-258 Malott Hall, 255-4658  
Women's Programs, 146 Olin Hall, 255-0735  
Writing Workshop, 174 Rockefeller Hall, 255-6349

## Career and Professional Development Services

Engineering Career Services, 201 Carpenter Hall, 255-5006  
Engineering Cooperative Program, 201 Carpenter Hall, 255-5006  
Master of Engineering, 222 Carpenter Hall, 255-7413  
University Career Center, 103 Barnes Hall, 255-5221

## Other Resources

Bursar's Office, 260 Day Hall, 255-6413, uco-bursar-mailbox@cornell.edu

Campus Life, 2336 Balch Hall, 255-5511

Continuing Education and Summer Session, B20 Day Hall, 255-4987

Dean of Students, 401 Willard Straight Hall, 255-6839

Financial Aid and Student Employment, 203 Day Hall, 255-5145

Gannett Health Center, Gannett Clinic, 255-5155

Housing Office, 201 Robert Purcell Community Center, 255-5368

Internal Transfer Division, 220 Day Hall, 255-4386

International Students and Scholars Office, B50 Caldwell Hall, 255-5243

Judicial Administrator, 500 Day Hall, 255-4680

Office of Minority Educational Affairs (COSEP), 100 Barnes Hall, 255-3841

Ombudsman, 118 Stimson Hall, 255-4321

Student Disability Services, 4th floor, Computing and Communications Center,  
255-4545

University Registrar, B7 Day Hall, 255-4232, univreg@cornell.edu

# Undergraduate Major Consultants

## **Biological Engineering**

Prof. James Bartsch  
jab35@cornell.edu  
Student Services Center  
207 Riley-Robb Hall, 255-2173

## **Chemical Engineering**

Prof. T. Michael Duncan  
tmd10@cornell.edu  
352 Olin Hall, 255-8715

## **Civil Engineering**

Prof. William Philpot  
cee\_assoc\_dir@cornell.edu  
453 Hollister Hall, 255-0801  
Jo Ann Haussler  
jh140@cornell.edu  
221 Hollister Hall, 255-3412

## **Computer Science**

Prof. Keshav Pingali  
pingali@cs.cornell.edu  
R. Daniel Jenkins  
jenkins@cs.cornell.edu  
303 Upson Hall, 255-0982

## **Electrical and Computer Engineering**

Prof. Charles E. Seyler  
ces7@cornell.edu  
222 Phillips Hall, 255-3989

## **Engineering Physics**

Prof. Bruce Kusse  
brk2@cornell.edu  
206 Clark Hall  
Kelli Hulslander  
kjh8@cornell.edu  
212 Clark Hall, 255-0638

## **Environmental Engineering (pending)**

Prof. William Philpot  
cee\_assoc\_dir@cornell.edu  
453 Hollister Hall, 255-0801  
Jo Ann Haussler  
jh140@cornell.edu  
221 Hollister Hall, 255-3412

## **Geological Sciences**

Prof. Bryan Isacks  
bli1@cornell.edu  
3120 Snee Hall, 255-2307

## **Independent Major**

Assoc. Dean David Gries  
enrugrad@cornell.edu  
167 Olin Hall  
255-8240

## **Information Science, Systems, and Technology**

Prof. Claire Cardie  
cardie@cscornell.edu  
Prof. David Shmoys  
dbs10@cornell.edu  
Ugrad Office, 303 Upson Hall  
255-9837

## **Materials Science and Engineering**

Prof. Shefford P. Baker  
spb14@cornell.edu  
129 Bard Hall, 255-6679

## **Mechanical Engineering**

Prof. Michel Louge  
myl3@cornell.edu  
Nanette Peterson  
np18@cornell.edu  
108 Upson Hall, 255-3573

## **Operations Research and Engineering**

Prof. Leslie Trotter  
assocdir@orie.cornell.edu  
Cindy Jay  
cjh6@cornell.edu  
202 Rhodes Hall, 255-5088

# Requirements for the Bachelor of Science Degree

Category	Credits
1. Mathematics	<b>16</b>
MATH 191 (or 190), 192, 293 or 294, and a math course chosen by the major are required.	
2. Physics	<b>8-12</b>
PHYS 112 and 213 are required. Depending on the major, either PHYS 214 is required or a designated math or science course may be substituted. Students in the majors of CHEME, CEE, COM S, the geoscience or science of earth systems options in GEO S, the environmental option in BEE or OR&IE may substitute CHEM 208 for PHYS 214. BEE majors may substitute CHEM 357 for PHYS 214.	
3. Chemistry	<b>4-8</b>
CHEM 211 or 207 is required. Students in the majors of CHEME, the environmental option in CEE, the science of earth systems option in EAS, the environmental option in BEE, or a health-related career should plan to take CHEM 207-208.	
4. First-year writing seminars (two required)	<b>6</b>
5. Technical writing requirement	
Engineering majors must satisfy this requirement. See page 12.	
6. Computer programming (usually COM S 100)	<b>4</b>
7. Engineering distribution	
a. one introduction to engineering (ENGRI) course	<b>3</b>
b. two distribution courses (ENGRD), one of which may be required by the major	<b>6</b>
8. Liberal studies distribution (six courses required)	<b>18</b>
9. Approved electives (two courses required)	<b>6</b>
10. Major program	
a. Major-required courses	<b>≥30</b>
b. Major-approved electives	<b>9</b>
c. Courses outside your major	<b>9</b>

From 123 to 133 credits are required for graduation. The exact number depends on which major is chosen; the specific requirements for each major are given on the following pages. In addition, all students must complete two terms of physical education and pass the swim test, preferably in the freshman year.