

COLLEGE OF ENGINEERING

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HISTORY

The second degree granting unit inaugurated at Villanova University was the College of Engineering, which began instruction in 1905 under the name of the School of Technology. It was the fourth engineering program to be established at a Catholic school of higher education in the United States (after The Catholic University of America, 1896, Manhattan College, 1896, and the University of Notre Dame, 1897). Dr. A.B. Carpenter, a graduate of Lehigh University, was hired in 1904 to organize and direct the School. He was ably assisted by Rev. James J. Dean, a young faculty member in the sciences. It was their responsibility to develop the curricula, hire faculty and plan the facilities needed. Programs in Civil and Electrical Engineering were the first to be initiated, with a total of twelve students enrolled. In 1908, an undergraduate program in Mechanical Engineering was established; and in 1909, the first engineering bachelor's degrees were awarded. An undergraduate program in Chemical Engineering was established in 1919. In the years following the Second World War, the College expanded its degree offerings to the masters level, establishing graduate programs in each of its four engineering departments. A fifth undergraduate degree program in Computer Engineering was added in 1993. A combined Bachelors/Masters Program is available in all programs. In 2003, an Interdisciplinary Doctoral Program was instituted, which today has evolved into a traditional PhD program. The undergraduate programs of Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering (all of the undergraduate engineering programs at Villanova) are accredited by the Accreditation Commission (EAC) of ABET (Accreditation Board for Engineering and Technology), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone (410) 347-7700. The College of Engineering is dedicated to supporting the research activities of its faculty and students. This research is conducted through cooperation with government and industry. The college has three research centers: Center for Advanced Communications (CAC), Center for Nonlinear Dynamics and Control (CENDAC), and Villanova Center for the Advancement of Sustainability in Engineering (VCASE). The college also has extensive research programs in the thermal and fluid sciences, structural engineering, nanotechnology, biotechnology, and storm water management.

MISSION STATEMENT

Villanova University's College of Engineering is committed to an educational program that emphasizes technical excellence and a liberal education within the framework of the University's Augustinian and Catholic traditions. As a community of scholars, we seek to educate students to pursue both knowledge and wisdom, and to aspire to ethical and moral leadership within their chosen careers, their community, and the world.

We value a spirit of community among all members of the college that respects academic freedom and inquiry, the discovery and cultivation of new knowledge, and continued innovation in all that we do.

OBJECTIVES

The College of Engineering strives to prepare its graduates to understand their roles in and make constructive contributions to a technological society, and to provide ethical and moral leadership in their profession and communities. These objectives are accomplished by various methods, but primarily by integrating into the curriculum the values and morality of the University's Augustinian heritage. In addition to being professionally competent, graduates are expected to have an understanding of their professional and ethical responsibilities, the

impact on engineering solutions in a global and societal context, knowledge of contemporary issues, and an appreciation of humanistic concepts in literature, the arts, and philosophy.

The College pursues these objectives by stressing:

- Excellence in teaching
- Faculty development through research and professional activities
- Emphasis on design and the design process so that the students are exposed to real-world situations
- Graduating students with the following attributes:
 - Ability to apply scientific and mathematical concepts and principles to identify, formulate, and solve problems in real-world context
 - Ability to plan and conduct experimental investigations, and to analyze and interpret their results
 - Ability to be an effective member of a project team
 - Ability to communicate ideas and information
 - Understanding of the role of the engineering profession and technology, including appreciation of concepts drawn from the humanities and social sciences
 - Development of high professional and ethical standards
 - Motivation and capability to acquire, evaluate, and assimilate knowledge and continue the learning experience
 - Access to service-learning and service-learning travel to the U.S. and many parts of the world.

DEGREES OFFERED

The College of Engineering offers full-time (day) academic programs leading to the following degrees: Bachelor of Science in Chemical Engineering, Bachelor of Science in Civil Engineering, Bachelor of Science in Computer Engineering, Bachelor of Science in Electrical Engineering, and Bachelor of Science in Mechanical Engineering.

The undergraduate programs of Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering (all of the undergraduate engineering programs at Villanova) are accredited by the Accreditation Commission (EAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone (410) 347-7700.

DEGREE REQUIREMENTS

The undergraduate engineering curriculum provides the foundation for careers in engineering as well as the basis for further study in engineering and other professions such as law, medicine, business and management. Courses of study concentrate on mathematics, physics, chemistry, engineering science, and engineering analysis and design within a particular engineering discipline.

The curriculum places special emphasis upon developing oral and written communication skills, and it offers opportunities to develop an appreciation of the social sciences and humanities, and the flexibility to pursue minors. Courses in the humanities are included in each curriculum to make the student engineer more fully aware of social responsibilities and better able to consider non-technical factors in the engineering decision making process. Extensive hands-on laboratory experience leads to required projects for all seniors to ensure professional preparation in the fundamentals of the design process within the real constraints of problem solving. In order to qualify for a bachelor's degree in the College of Engineering, undergraduate engineering students must successfully complete all of the first year core curriculum courses, those major courses required for the particular engineering degree sought, and a series of electives, as indicated in the following sections. They must also achieve cumulative overall and technical grade point averages of at least 2.00 in their course work.

At least half of all the engineering courses and, normally, the final 30 credits of an engineering bachelor's degree program, must be taken at Villanova University. All undergraduate degree requirements should normally be completed within a six-year period. NOTE: It is the responsibility of each student to know and to fulfill all degree requirements. In order to keep the curriculum abreast of the latest engineering developments, Villanova University reserves the right to change the program requirements without prior notice.

CORE CURRICULUM FOR STUDENTS ENTERING IN FALL 2011 OR LATER

Freshman Year						
First Semester		C redits		Second Semester		C redits
CHM 1151	General Chemistry	4		CHM 1156	General Chemistry II for Engineers ²	4
CHM 1103	General Chemistry Laboratory I	1		ACS 1001 ¹	Modernity and Its Discontents	3
ACS 1000 ¹	Traditions in Conversation	3		EGR 1205	Interdiscipli nary Projects II	3
EGR 1200	Interdiscip linary Projects I	3		MAT 1505	Calculus II	4
MAT 1500	Calculus I	4		PHY 2400	Physics I, Mechanics	3
THL 1000	Christian Faith and Life	3				

NOTE ¹: This course may be taken in either semester.

NOTE ²: Students electing to major in Electrical Engineering or Computer Engineering are required to substitute ECE 1620 Engineering Programming & Applications in place of CHM 1156.

ENGINEERING CURRICULUM ELECTIVE REQUIREMENTS IN HUMANITIES AND SOCIAL SCIENCE

In addition to required Freshman Year courses and specified courses for each degree program, candidates for degrees in engineering must successfully complete 12 credits from the following:

- THL 1000 Christian Faith and Life, normally taken in Freshman Year as part of the Core Curriculum.
- One 3-credit Theology course at the 2000 level or above.
- Two additional 3-credit courses chosen from among the following:
 - o Theology (THL) courses at the 2000 level or above
 - o Any Philosophy (PHI) course
 - o Any Peace and Justice (PJ) course
 - o ETH 2050 Ethical Traditions and Contemporary Life
 - o EGR 2001 Engineering: The Humanistic Context

Note: one of these two 3 credit courses must be fulfilled by an Ethics course. Refer to departments' specific lists of Ethics courses for options.

ELECTIVES

All students select their remaining humanities and social science electives from among the courses listed in the University catalog and offered by the following departments.

Humanities	Social Sciences
Arab & Islamic Studies Art History (except skills courses) Classical Studies Communication (except skills courses) English (Literature) History Honors Program: eligible Students only Humanities Modern Languages (except speaking courses in native language) Philosophy Theatre (except skills courses) Theology (2000 and above)	Economics Geography and the Environment * Humanities: HUM designated PSC Peace and Justice Political Science Psychology Sociology Gender and Women's Studies * * Selected courses

Courses primarily emphasizing skills (such as acting, painting, sculpting, public speaking, etc.) are not acceptable. Students should consult their Department Chair.

DECLARATION OF MAJOR

All engineering students are enrolled in a common freshman year curriculum with the exception of a second semester science requirement which is program dependent. By the end of February of freshman year, all freshman engineering students are required to declare their major field of study, i.e., Chemical, Civil, Computer, Electrical, or Mechanical Engineering.

Engineering students who wish to change their major within the College of Engineering must contact the chairperson of the department in which they are interested. The Chair will arrange for the review of the student's academic record and notify the student of the decision. The department will then notify the College of the change for its records. Students who are unsure of which major they would like to enroll in should arrange to meet with their academic adviser to discuss their options.

Engineering students who wish to change their major to an area outside of engineering must apply for admission to the dean of the college offering that program.

Students who wish to change their major to Engineering from another college within the university must contact the Associate Dean of Academic Affairs in the College of Engineering.

DEGREE PROGRAMS

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

The chemical engineer typically uses the principles of mathematics, chemistry, physics and engineering sciences often with biology to creatively solve technical and commercial problems arising in industries which manufacture products by chemical reactions. These solutions must respond to economic constraints as well as social, ethical, environmental and safety implications. The chemical engineer may also apply these principles in related fields where the management of chemical transformations is important, such as preservation of the environment,

pharmaceutical manufacturing, bio-engineering or the creation of new medical technology. Finally, the chemical engineer can apply understanding of fundamental principles to fields that interact indirectly with chemical technology, such as industrial management and patent law.

Program Educational Objectives - Consistent with the University's Augustinian Mission that values broadly-educated, and well-rounded individuals, the Program Educational Objectives of the Chemical Engineering Department are to produce Chemical Engineering graduates who:

- Apply the scientific principles underlying technology and possess the technical skills needed to contribute to the chemical engineering profession immediately at an entry level.
- Enter related professions, should they choose to do so, including professions that require further education.
- Display personal and interpersonal skills, such as effective communication and multidisciplinary team interactions, that facilitate the effective practice of their profession.
- Recognize the importance of, and have the ability to, engage in lifelong learning.
- Continue to learn and grow professionally, and who take advantage of professional opportunities as they arise to enhance their career.

Curricular Philosophy. The early years of the chemical engineering curriculum emphasize the basic principles of natural and engineering sciences. Later courses use these principles to develop skill in chemical engineering design - the solving of non-routine, open-ended problems requiring the exercise of judgment, and constrained by economic, safety, reliability or other requirements. Courses gradually develop the students' abilities, with the complexity of design experiences systematically increasing throughout the required courses in chemical engineering science, and culminating in the senior process design and process controls courses.

Electives in the sophomore, junior, and senior years allow the student to tailor the program toward career goals. In the senior year, the student can develop the ability to work independently by carrying out a chemical engineering research project. All stages of the curriculum apply computers in various modes, ranging from programming personal computers for the solution of simple problems, through the use of computers for process monitoring and control, to the use of sophisticated software packages for process design.

The curriculum includes several chemical engineering and science electives, to be chosen from a list of approved courses under the guidance of a faculty member designated as the student's academic adviser.

More information on the Chemical Engineering program can be found at the Department website www.engineering.villanova.edu/che/.

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Civil engineers are involved in the planning, design, construction, and operation of facilities essential to modern life such as dams, bridges, highways, buildings, airports, harbors, river and shore protection, drinking water supplies, wastewater treatment, solid and hazardous waste management and disposal, offshore structures, and space platforms. Because these projects are often of a magnitude that affects large segments of the population, the responsibility of the civil engineer extends beyond mere physical facilities into the social, political, and economic welfare of those they serve.

Mission Statement: Our mission is to provide our students with a high quality, contemporary, broad-based civil engineering education within a Judaeo-Christian, humanistic context preparing our students for professional practice, graduate study, and life-long learning.

Program Educational Objectives - Upon graduation from the Civil Engineering program at Villanova University, graduates are prepared to:

- Use their broad-based civil engineering backgrounds to perform as entry-level engineers in general civil engineering or in environmental, geotechnical, structural, transportation, or water resources engineering.
- Enter graduate school in the disciplines listed above or closely related disciplines, as well as other fields such as business and law.
- Continue the process of life-long learning as required for long-term personal and professional growth.
- Recognize their professional and ethical responsibilities to society as members of the engineering professional community.
- Use communication, computer, and teamwork skills to help themselves and their employers succeed.
- Relate their personal and professional lives to the Judaeo-Christian, humanistic tradition.

The broad-based curriculum provides flexibility and meets student needs through a selection of electives.

More information on the Civil Engineering program can be found at the Department website www.villanova.edu/engineering/departments/civil/.

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

The Program Educational Objectives of the Computer Engineering program are to produce graduates who:

- can use their knowledge, analytical, and design skills to generate and validate appropriate solutions to practical real world problems.
- can communicate and work effectively with others having different roles or responsibilities.
- continue to develop their professional knowledge and skills throughout their career.
- have successful careers, and practice their chosen discipline with professionalism, care, and integrity.

The curriculum is structured to provide a thorough foundation in the fundamentals of computer engineering. Design and analysis are emphasized throughout the curriculum, using a project-based structure to teach students how to learn on their own and in teams, and synthesize new engineering solutions by using their knowledge and analytical skills. Great importance is placed on developing oral and written communications skills. The curriculum also provides opportunities for an increased awareness of the broader implications of technology and of the social responsibilities of the profession. These Program Educational Objectives are met by satisfying the following outcomes:

- A. An ability to apply knowledge of mathematics, science, and engineering
- B. An ability to design and conduct experiments, as well as to analyze and interpret data
- C. An ability to design a system, component, or process to meet desired needs
- D. An ability to function on multi-disciplinary teams
- E. An ability to identify, formulate, and solve engineering problems
- F. An understanding of professional and ethical responsibility
- G. An ability communicate effectively
- H. The broad education necessary to understand the impact of engineering solutions in a global and societal context
- I. A recognition of the need for, and an ability to engage in life-long learning
- J. A knowledge of contemporary issues
- K. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Further details of these educational objectives and the program outcomes are available at the website of the Electrical and Computer Engineering Department.

The curriculum is structured to provide a thorough foundation in the fundamentals of electrical and computer engineering. Analysis and design are emphasized throughout the curriculum, using a project-based structure to teach students how to work on their own and in teams and to synthesize engineering solutions by utilizing their analytical skills and knowledge. Heavy emphasis is placed on developing oral and written communication skills. The curriculum also provides opportunities for an increased awareness of the broader implications of technology and of the social responsibilities of the profession. The design process is emphasized throughout all four years, and design projects are included in the laboratory courses. The sophomore and junior years include core courses that provide a foundation for the senior year, which includes technical and professional electives and an in-depth design project.

The computer engineering curriculum not only provides a solid foundation in the core fundamentals but offers the flexibility for students to pursue other professional interests. The curriculum includes professional electives, free elective, science/math elective, computer engineering track electives, and humanities electives to serve this purpose. Students have used this flexibility to pursue minors in business, mechatronics, computer science, cognitive science, physics, astronomy, mathematics, foreign languages, history, and theology, to name a few; although, applying these electives towards a minor/concentration is not a requirement. In addition, students have used the flexibility of the curriculum to prepare for post-graduate study in medicine, law, business, education, and engineering.

The computer engineering program offers technical elective courses in the following specialized areas: computer architecture, digital signal processing, computer networks, multimedia systems, microcontrollers, digital integrated electronics and microfabrication, embedded systems, and computer security.

Students in the computer engineering program acquire experience with computers and their engineering applications, beginning with the engineering programming and applications course in the freshman year and

continuing throughout the curriculum in the sophomore-level fundamentals courses, junior-level core courses, and senior-level technical electives.

In addition to the activities and services offered by the university and the College of Engineering, the Electrical and Computer Engineering (ECE) Department provides the following additional services and activities for its students: an academic adviser, to assist students with the implementations of their academic plans; the annual ECE Day program and dinner, to highlight state-of-art topics in the electrical and computer engineering professions; the ECE Walk-in Tutoring Office, to assist ECE students with their upper-level courses; and college-level and departmental student organizations.

More information on the Computer Engineering program can be found at the Department website: www.engineering.villanova.edu/ec/

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

The Program Educational Objectives of the Electrical Engineering program are to produce graduates who:

- can use their knowledge, analytical, and design skills to generate and validate appropriate solutions to practical real world problems.
- can communicate and work effectively with others having different roles or responsibilities.
- continue to develop their professional knowledge and skills throughout their career.
- have successful careers, and practice their chosen discipline with profession-alism, care, and integrity.

The curriculum is structured to provide a thorough foundation in the fundamentals of computer engineering. Design and analysis are emphasized throughout the curriculum, using a project-based structure to teach students how to learn on their own and in teams, and synthesize new engineering solutions by using their knowledge and analytical skills. Great importance is placed on developing oral and written communications skills. The curriculum also provides opportunities for an increased awareness of the broader implications of technology and of the social responsibilities of the profession. These Program Educational Objectives are met by satisfying the following outcomes:

- A. An ability to apply knowledge of mathematics, science, and engineering
- B. An ability to design and conduct experiments, as well as to analyze and interpret data
- C. An ability to design a system, component, or process to meet desired needs
- D. An ability to function on multi-disciplinary teams
- E. E. An ability to identify, formulate, and solve engineering problems
- F. F. An understanding of professional and ethical responsibility
- G. G. An ability communicate effectively
- H. The broad education necessary to understand the impact of engineering solutions in a global and societal context
- I. A recognition of the need for, and an ability to engage in life-long learning
- J. A knowledge of contemporary issues
- K. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Further details of these educational objectives and the program outcomes are available at the website of the Electrical and Computer Engineering Department.

The curriculum is structured to provide a thorough foundation in the fundamentals of electrical and computer engineering. Analysis and design are emphasized throughout the curriculum, using a project-based structure to teach students how to work on their own and in teams and to synthesize engineering solutions by utilizing their analytical skills and knowledge. Heavy emphasis is placed on developing oral and written communication skills. The curriculum also provides opportunities for an increased awareness of the broader implications of technology and of the social responsibilities of the profession. The design process is emphasized throughout all four years, and design projects are included in the laboratory courses. The sophomore and junior years include core courses that provide a foundation for the senior year, which includes technical and professional electives and an in-depth design project.

The electrical engineering program offers technical elective courses in the following specialized areas: microwave networks and high-frequency circuit design, digital signal processing, linear integrated electronics, communication electronics, optoelectronics, digital integrated electronics and microfabrication, embedded systems, control systems, electric machines and power systems, electronic measurement and conversion, and renewable energy systems.

Students in the electrical engineering program acquire experience with computers and their engineering applications, beginning with the engineering programming and applications course in the freshman year and continuing throughout the curriculum in the sophomore-level fundamentals courses, junior-level core courses, and senior-level technical electives.

In addition to the activities and services offered by the university and the College of Engineering, the Electrical and Computer Engineering (ECE) Department provides the following additional services and activities for its students: an academic adviser, to assist students with the implementations of their academic plans; the annual ECE Day program and dinner, to highlight state-of-art topics in the electrical and computer engineering professions; the ECE Walk-in Tutoring Office, to assist ECE students with their upper-level courses; and college-level and departmental student organizations.

More information on the Electrical Engineering program can be found at the Department website: www.engineering.villanova.edu/ec/

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Mechanical Engineers are concerned with applying the principles of solid mechanics, fluid mechanics, thermodynamics, heat transfer, material science, dynamics and control to the analysis and design of machines and systems of all types. In applying this technical knowledge, the mechanical engineer must consider economic constraints and the social and ecological implications of solutions imposed. The mechanical engineering curriculum offers the student an opportunity to pursue educational objectives within the framework of this broad theme.

Mission Statement The department is committed to provide a strong educational experience in the discipline of mechanical engineering, which at the same time, is sufficiently broad to prepare the students adequately for the societal and professional aspects of their careers. Students will be educated to be professionally competent and socially responsible.

Program Educational Objective

Our graduates will:

- be valued members of their organizations because of their skills and abilities as mechanical engineers;
- solve complex technical problems and/or design systems that are useful to society by applying the fundamental scientific principles that underpin the mechanical engineering profession;
- apply their knowledge and skills to successfully practice professions other than mechanical engineering if they desire;
- advance in their chosen career paths by utilizing their technical, communication, interpersonal, and leadership skills;
- demonstrate the desire for enhancing their personal and professional growth by making progress toward, or successfully completing an advanced degree, and/or professional development courses, and/or engineering certification;
- be actively engaged in service to their profession and their communities, consistent with the tradition of St. Augustine.

The first two years of the mechanical engineering program are devoted to laying a foundation of mathematics, physical science, and the general engineering sciences. The junior and senior years are devoted primarily to mechanical engineering topics. The required courses span the field of mechanical engineering, and career/ME electives provide the opportunity to pursue specific areas of the discipline in greater depth. The student chooses three courses (9 credit hours) of technical electives plus an additional three credits of a career/free elective. The design process is emphasized throughout the program and culminates with a senior year project that requires a synthesis of basic principles learned in previous courses.

All mechanical engineering students are required to take at least two of the elective courses offered by the department, designated as the ME elective in the program of studies. Ordinarily students will take three or more such courses, designated career/ME electives and one other course, designated the career/free elective, which can be any three credit course. However, the career/ME and the career/free elective slots may be applied to a minor or concentration in Liberal Arts & Sciences or to a minor in Business. The specific courses must be selected in conjunction with the appropriate departmental office and the student's academic adviser. Requirements for a minor are set by the appropriate department. All concentrations and minors must be approved by the Chair of Mechanical

Engineering. Any course which meets a mechanical engineering curriculum requirement and also a requirement for a concentration or minor may be counted for both.

Throughout the curriculum the technical courses are balanced by a careful selection of humanities courses to ensure that the effects of technology on society are given due consideration in design.

A faculty adviser is assigned to each student at the beginning of his/her freshman year to provide academic and career guidance for the remainder of the student's years in the program until graduation. The adviser should be consulted regarding such topics as career electives, minors or concentrations, graduate studies, undergraduate research, and completion of degree requirements for graduation.

More information on the Mechanical Engineering program can be found at the Department website: www.engineering.villanova.edu/me/

ACADEMIC POLICIES & GENERAL INFORMATION

POLICIES, PROCEDURES AND FORMS

Unless otherwise noted, the College of Engineering follows the general academic policies and regulations listed in the University section of this Bulletin. It is the responsibility of the student to know and comply with all academic policies and regulations of the University and of the College of Engineering. Such policies may change without prior notice.

Policies specific to the College of Engineering can be found at www.villanova.edu/engineering/resources/policies/

- Academic Standing
- Advanced Placement, Pre-Matriculated and International Baccalaureate Credit
- CAPP – Degree Evaluation
- Course Overload
- Course Elsewhere
- Course Withdrawal
- Change of Major
- Dean's List
- Declaration of Major
- Dual Degrees
- Graduate Courses/Programs
- Graduation
- International Studies
- Leave of Absence
- Minors
- Registration
- Repeat Freshman Year
- Resolution of Academic Problems
- Satisfactory/Unsatisfactory Grades
- Undergraduate Students Taking a Graduate Course

ADVISING

As a freshman, each student is assigned an academic adviser. The academic adviser is a full-time faculty member of the department of the student's chosen major. If the student continues with the major s/he chose as an incoming freshman, the faculty adviser will remain unchanged for the full term of the program with a few exceptions. *Thus, it is incumbent upon students to get to know their academic adviser.* The academic adviser can help students adjust to university life or point them in the right direction for answers. Students should consult with their adviser at least once a semester during pre-registration to ensure proper course selection and advancement in the academic program. The academic adviser can assist in helping the student select minors and concentrations, and answer questions about career choices, internships, post-graduation employment, and graduate school. It is important to note that while a student's academic adviser may be called upon for assistance in making decisions, *it is*

ultimately the student's responsibility to understand the requirements of the chosen degree program and to plan for the orderly fulfillment of graduation requirements. To this end, at pre-registration time each semester the academic adviser will provide the student with a up-to-date summary of the courses s/he has taken and will be required to take in the future to obtain the target degree.

During the freshman year a student is especially encouraged to speak with his/her academic adviser to learn about the engineering profession in order to make a more-informed choice of a major field of study. Given the common freshman year in the College of Engineering, students select their majors just before pre-registration in the Spring semester. In addition to the academic adviser who can provide career planning advisement and referrals when appropriate, the College of Engineering provides information about the engineering profession through annual sponsorship of programs that inform freshman students about career opportunities available in each major field of engineering. In addition, all freshmen are required to take EGR 1200 (Interdisciplinary Projects I) and EGR 1205 (Interdisciplinary Projects II). These courses provide both an overview and hands-on experience in all fields of engineering offered by the College.

AWARDS AND HONORS

Dean's List: A student who has earned a semester GPA of 3.50 or above; is a full-time student; has completed 12 or more credits in the semester; and has no N or unreported grades is placed on the Dean's List. Approximately two months after the end of the semester, an appropriate letter of acknowledgement is sent to the student at the permanent address on file with the University.

Dean's Award for Academic Achievement: This award was established to recognize the outstanding academic performance of undergraduate engineering students. To be eligible an undergraduate student must be a senior, majoring in engineering, with a cumulative grade point average of at least 3.50 at the end of the Fall term, who will graduate within the current academic year.

Dean's Award for Meritorious Service: This award was established to recognize exceptional service to the College of Engineering by undergraduate engineering students. To be eligible nominees must be senior engineering students who are involved in extra-curricular and/or service activities within the College for a sustained period. Preference is given to students who demonstrate noteworthy leadership in one or more activities.

National Honorary Engineering Societies: In order to recognize and encourage excellence in scholarship, chapters of the following national honorary engineering societies are maintained by the college: Tau Beta Pi, for all engineers; Chi Epsilon, for Civil Engineers; Eta Kappa Nu, for Electrical Engineers and Computer Engineers; and Pi Tau Sigma, for Mechanical Engineers.

COMPUTING

College and University Computing. The entire campus is linked via a high-speed network and is connected to the internet. The College has computer labs reserved for use exclusively by engineering students. Access to the workstations in these labs is provided 24 hours a day, 7 days a week, with proper authorization of the student's Wildcard. The College also provides Terminal Services which allows students to run Engineering software remotely. Students are issued wireless laptop computers as part of their curricula. New computers are issued every two years. Support of the program is provided by UNIT, the University's IT group, as well as the College's IT group with a walk-in, on-line, and telephone help desk system.

Software and Departmental Computing. The analysis and simulation software Matlab and Mathcad, spreadsheet package Excel, drawing packages SolidWorks and AutoCad, and data acquisition software LabView are installed on each of the student's laptop computers for his/her use throughout their programs. In addition to this, each department has its own computers and workstations in classrooms and laboratories. Besides computers for data acquisition and control in the laboratories, special purpose computer software is installed on these computers throughout the College. For example, the Chemical Engineering Department uses ASPEN-PLUS for simulation of its process systems. The Civil Engineering Department has a number of industry-specific software packages installed on its computers including STAAD and SIM_Traffic. SIMULINK and PSpice are used among many other packages in the Electrical and Computer Engineering Department. In the Mechanical Engineering Department the students use ANSYS, Fluent, and ADAMS for finite element, computational fluid dynamics, and solid-body simulations.

LABORATORY FACILITIES

Dedication of the Center for Engineering Education and Research (CEER) took place in June 1998. The multi-million dollar facility provides leading edge technological support for teaching and research in the College of Engineering.

The 88,400-square-foot structure houses 30 instructional and research laboratories, a computer-aided engineering center, an interdisciplinary student projects laboratory, student group study rooms, a multi-media lecture hall seating 140, and conference rooms.

The Chemical Engineering Department maintains modern laboratory facilities to support the Bachelor of Science in Chemical Engineering curriculum. Experiments in the two Chemical Engineering Laboratory courses range from the demonstration of fundamental principles in bench-scale or pilot plant equipment, to hands-on experience with fully integrated, industrial scale process equipment. In addition, the department maintains extensive general-purpose laboratory capabilities for those students who carry out an experimental investigation as part of their Senior Research project.

The Civil and Environmental Engineering Department is committed to “hands-on” education in its experimental, computational, and design laboratories. Facilities are currently dedicated to instruction and research capabilities in materials (soils, concrete, and steel), the environment, geology, structures, fluid mechanics and hydraulics. The department’s newest facility, the Structural Engineering Teaching and Research Lab, opened in May 2005. The building provides 5,000 sq ft of useable floor space to test full-scale structural members up to 90 feet in length. The building includes two smaller laboratories for testing construction materials under various environmental conditions. The facility supports undergraduate instruction as well as both undergraduate and graduate research.

The Electrical and Computer Engineering Department laboratory facilities are available to serve as important components of study in specialized areas as well as for core studies. Laboratories are currently in place for instruction and research in Control Systems, Digital Systems and Microprocessors, Electronics, Signal Processing, Intelligent Systems, Solid State Devices, Microwaves, Microcontrollers, Advanced Electronics, Advanced Computer Systems, Antenna Anechoic Chamber, Antenna Research, Communications, and Student Projects.

The Mechanical Engineering Department laboratories provide an environment for students to reinforce their understanding of the fundamental principles of mechanical engineering and apply that knowledge in experimental analysis and problem-solving. Their laboratories include Manufacturing Processes, Thermodynamics, Engine Testing, Materials Testing and Material Science, Control, Vibration, Stress, Heat Transfer, Fluid Mechanics, and Wind Tunnel.

STUDENT ORGANIZATIONS

In order to encourage close contact between our engineering students and practicing professional engineers, and to assist students in establishing their engineering identity, the College of Engineering maintains student chapters of many engineering professional societies. These groups, with the cooperation and support of the faculty and practicing professional engineers, organize and sponsor meetings, guest speakers, and field trips of interest to engineering students.

Refer to the website: www.engineering.villanova.edu/organizations/ for information on the many student organizations.

The broader professional and social interests of all engineering students are served by the Villanova University Engineering Student Council. Membership in this organization is open to all undergraduate engineering students.

DEPARTMENTS

CHEMICAL ENGINEERING

Chair: Dr. Randy Weinstein
Office: 217 White Hall, tel. 610-519-4950
Website: www.villanova.edu/engineering/departments/chemical/
Courses: www.villanova.edu/engineering/departments/chemical/undergrad/catalog.htm

CIVIL AND ENVIRONMENTAL ENGINEERING

Chair: Dr. Ronald A. Chadderton
Office: 139 Tolentine Hall, tel. 610-519-4960
Website: www.villanova.edu/engineering/departments/civil/
Courses: www.villanova.edu/engineering/departments/civil/undergrad/catalog.htm

ELECTRICAL AND COMPUTER ENGINEERING

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Website: www.villanova.edu/engineering/departments/electrical/
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MECHANICAL ENGINEERING

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