

The Bachelor of Science Degree
in
MECHANICAL ENGINEERING
at
NORTHWESTERN UNIVERSITY

September 2016



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in
Mechanical Engineering
at
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INTRODUCING MECHANICAL ENGINEERING AT NORTHWESTERN UNIVERSITY

Mechanical engineering today is a rapidly diversifying field, encompassing areas such as robotics, automated manufacturing, biological molecular machines, thermodynamics, fluid dynamics, computational mechanics, composite materials, and tribology. Mechanical engineering plays a dominant role in a wide spectrum of industries, among them the transportation industry (automotive, rail, air, and marine), heavy machinery (machines producing other machines), the power industry, the environmental industry (heating, ventilation, and air-conditioning), the light precision-machine enterprises (optical and prosthetic devices, mechanical instruments, and the like), and numerous commercial product industries. Preparation for a career in mechanical engineering requires a basic understanding of the mathematical, physical, and engineering principles essential to planning, designing, and manufacturing new equipment. Mechanical engineering students also go on to professional schools in medicine, law, and business, and the mechanical engineering program at Northwestern gives students the flexibility to tailor their academic program to their own interests.

Mechanical Engineering Undergraduate Mission:

To educate undergraduates in the basic principles underlying the field of mechanical engineering, to train students to think independently and to work in teams, to instill a systematic approach to problem solving, and to promote a keen awareness of the role of engineering in a modern society.

ABET STUDENT OUTCOMES:

Northwestern University Mechanical Engineering undergraduates must attain:

- a. an ability to apply knowledge of math, engineering, and science
- 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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. an ability to function on multidisciplinary teams
- e. an ability to identify, formulate, and solve engineering problems
- f. an understanding of professional and ethical responsibility
- g. an ability to communicate effectively
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, 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

PROGRAM EDUCATIONAL OBJECTIVES:

The Educational Objectives of the Northwestern University Mechanical Engineering undergraduate curriculum are to enable graduates to achieve the following career and professional accomplishments:

1. Knowledge – application – innovation:

Graduates will use their foundational knowledge and understanding of fundamental mathematics and physical science, skill and expertise in practical tools, and hands-on experience in design, manufacturing and engineering science. Graduates will use their knowledge to think critically, formulate problems, and find innovative solutions in engineering practice in industry or academia, or in pursuit of other fields.

2. Leadership, teamwork, and broader contribution:

Graduates will employ their interpersonal and team skills to enable leadership in multidisciplinary settings. Their careers will reflect their liberal education with a well-rounded and multi-dimensional educational experience, particularly, with regard to an understanding of the societal, ethical, and professional implications of engineering decisions.

3. Intellectual curiosity – continuous learning – professional adaptability:

Graduates will demonstrate intellectual curiosity as they continually learn new concepts and tackle new challenges and opportunities. Graduates will identify new directions and adapt in response to the needs of an evolving, professional and social environment.

THE PROGRAM IN MECHANICAL ENGINEERING

The curriculum in Mechanical Engineering at Northwestern University provides a broad, fundamental education preparing a student for direct entry into industry as well as further professional study. The first part of the curriculum is devoted to mathematics, physics and chemistry. With this background, fundamental mechanical engineering subjects are studied. These include dynamics, solid mechanics, fluid mechanics and thermodynamics followed by specialized subjects such as manufacturing, heat transfer and automatic control. During the final two years, design courses, laboratory courses and project courses allow students to acquire a taste for the complex task of designing, analyzing and building a piece of hardware. In particular, students become aware of the coupling between conceptual design, subsequent analysis (mathematical modeling), manufacturing, systematic experimentation and final testing. Supporting courses in allied fields of science and engineering broaden the technical proficiency of mechanical engineering, while the elective courses in social sciences, fine arts, history and philosophy enlarge their background in the problems of humanity. Details of the requirements for a Bachelor of Science in Mechanical Engineering degree are as follows:

MECHANICAL ENGINEERING CURRICULUM

Total requirement - 48 courses

MATHEMATICS - 4 courses

Math 220, 224, 230 Calculus

Math 234 Multiple Integration and Vector Calculus

ENGINEERING ANALYSIS AND COMPUTER PROFICIENCY - 4 courses

Gen Eng 205-1, 2, 3, 4 Engineering Analysis

BASIC SCIENCES - 4 courses

Phys 135-2, 3 General Physics

Chemistry through Chem 102 General Inorganic Chemistry or Chem 171 Accelerated General Inorganic Chemistry

DESIGN AND COMMUNICATIONS - 3 courses

Dsgn 106-1, 2 Design Thinking, and Communication and

English 106-1, 2 Writing in Special Contexts

Gen Comm 102 or 103

BASIC ENGINEERING - 5 courses

Thermodynamics:

ME 222 Thermodynamics

Fluids and Solids:

ME 241 Fluid Mechanics

CEE 216 Mechanics of Materials

Materials Science:

MSc 201 Principles of the Properties of Materials

Electrical Science:

ME 233 Electronics Design

(Students planning to take advanced EECS courses as electives may substitute EECS 221 Fundamentals of Circuits)

SOCIAL SCIENCES/HUMANITIES THEME REQUIREMENT - 7 courses

UNRESTRICTED ELECTIVES - 5 courses

Note:

Design 245-1 (½ credit class) is not allowed to count towards ME degree because its content is included within ME 240

Design 246 (½ credit class) often follows Design 245-1 and it is allowed to count towards ME degree, but you may be left over with an extra ½ credit.

MECHANICAL ENGINEERING DEPARTMENTAL PROGRAM - 16 courses

Required - 7 courses

ME 202 Mechanics II

ME 224 Experimental Engineering

ME 240 Intro. to Mech. Design and Manufacturing

ME 315 Theory of Machines - Design of Elements

ME 340-1 Computer Integrated Manufacturing

ME 377 Heat Transfer

ME 390 Introduction to Dynamic Systems

Advanced Study - 3 courses

One course from

ME 314 Theory of Machines – Dynamics

ME 363 Mechanical Vibrations

EECS 360 Introduction to Feedback Systems

One course from

- ME 362 Stress Analysis
- ME 327 Finite Elements for Stress Analysis
- CEE 327 Finite Element Methods in Mechanics

One course from

- ME 322 Thermodynamics and Statistical Mechanics II
- ME 373 Engineering Fluid Mechanics

Engineering Design (Capstone)– 2 courses.

These 2 courses may be taken only within the last 12 units prior to graduation (typically senior year)

These 2 courses must be taken in consecutive quarters (either fall-winter or winter-spring)

ME398-1: Engineering Design I

ME398-2: Engineering Design II

Technical Electives – 4 300-level or higher courses

- Two 300-level or higher Mechanical Engineering courses
- One 300-level course or higher in mathematics or basic sciences. This class may be:
 - any 300-level or higher course in Mathematics, Applied Mathematics, or Statistics
 - Any 300-level or higher class listed as 100% “Mathematics & Basic Science Topics” on this website:
<http://www.mccormick.northwestern.edu/undergraduates/bachelors-degree-curriculum/abet-outcomes/abet-course-partitioning.php>
- One other 300-level or higher technical course
 - This course can be either a math, a science, or an engineering class

Notes on technical electives:

- DSGN 360 (design competition) must be taken in two sequential years to count as one credit towards the degree. Although DSGN 360 may be taken multiple times while at Northwestern, only one credit of DSGN 360 may be used as a technical elective. Only two credits of DSGN 360 total may be used towards the degree.
- Only two 399 (independent study) courses may count towards the degree.
- Students are encouraged to concentrate technical electives in an area of interest. Several areas of concentration, including appropriate courses and descriptions, are listed on the Mechanical Engineering website. <http://www.mccormick.northwestern.edu/mechanical/undergraduate/curriculum/index.html>
 - In the case that the student wishes to count as technical electives four courses that do not satisfy the conditions above, the student must file a petition with the department. The petition should list the four courses to be counted toward the technical electives. Petitions must be approved by the ME Undergraduate Chair, Professor Manohar Kulkarni. All curriculum petitions must be filed and approved no later than the quarter before the student wishes to take the course.
 - If the four courses satisfy the requirements of one of the suggested areas of concentration and meet the basic science requirement, the petition will be granted automatically.

SUGGESTED COURSE SCHEDULING

The course flowchart identifies courses that are prerequisites for other courses

“Theme” = Social sciences/humanities theme requirement (7 courses required)

A number of required courses are only offered one quarter per year.

Be sure to check current time tables (online) to ensure course availability

	FALL	WINTER	SPRING
Freshman	Gen Eng 205-1 Math 220 Chem 101 DSGN 106-1 or Theme or Unrestricted Elective	Gen Eng 205-2 Math 224 Chem 102 DSGN 106-1 or DSGN 106-2	Gen Eng 205-3 Math 230 Theme or Unrestricted Elective DSGN 106-2 or Theme or Unrestricted Elective
Sophomore	Gen Eng 205-4 Math 234 MSc 201, or CEE 216, or ME 233 Theme or Unrestricted Elective	Phys 135-2 ME 202 MSc 201, or CEE 216, or ME 222 Theme or Unrestricted Elective	Phys 135-3 ME 240 MSc 201, or CEE 216, or ME 241 Theme or Unrestricted Elective
Junior	ME 233 or ME 241 ME 340-1 ME 315 or Theme or Unrestricted Elective	Tech. Elective or Advanced Study Tech. Elective or Advanced Study Theme or Unrestricted Elective ME 377	ME 224 Tech. Elective or Advanced Study Theme or Unrestricted Elective ME 315 or ME 377
Senior	ME 398-1: Capstone Design or Tech. Elective or Advanced Study ME 224 or Tech. Elective or Advanced Study ME 390 Tech. Elective or Advanced Study or Theme or Unrestricted Elective	ME 398-1 or -2: Capstone Design Tech. Elective or Advanced Study Tech. Elective or Advanced Study Tech. Elective or Advanced Study or Theme or Unrestricted Elective	ME 398-2: Capstone Design or Tech. Elective or Advanced Study Tech. Elective or Advanced Study Tech. Elective or Advanced Study Tech. Elective or Advanced Study or Theme or Unrestricted Elective
Co-Op Junior	ME 233 or ME 241 ME 340-1 ME 315 or Theme or Unrestricted Elective	Tech. Elective or Advanced Study Tech. Elective or Advanced Study Theme or Unrestricted Elective ME 377	CO-OP
Co-Op Pre-Senior	ME 224 or Tech. Elective or Advanced Study ME 390 Tech. Elective or Advanced Study Theme or Unrestricted Elective	CO-OP	ME 224 or Tech. Elective or Advanced Study Tech. Elective or Advanced Study Theme or Unrestricted Elective ME 315 or ME 377
Co-Op Senior	CO-OP	ME 398-1 Capstone Design Tech. Elective or Advanced Study Tech. Elective or Advanced Study Tech. Elective or Advanced Study or Theme or Unrestricted Elective	ME 398-2 Capstone Design Tech. Elective or Advanced Study Tech. Elective or Advanced Study Tech. Elective or Advanced Study or Theme or Unrestricted Elective

OTHER INFORMATION ABOUT COURSES

Electives and Non-Technical Courses

In addition to the required math, science, and engineering courses, all students take a number of non-technical and elective courses to satisfy the McCormick School requirements.

Social Science - Humanities Requirements

Please see the requirements in McCormick Advising System <https://mas.mccormick.northwestern.edu/>.

Unrestricted Electives

Unrestricted electives can be selected from any course offered for credit in the University. These courses are valuable in permitting the student to concentrate in a particular area. For example, the student may use some or all of these in conjunction with the 7 Social Science-Humanities Requirements to achieve an in-depth undergraduate preparation in a particular non-engineering discipline, such as music or business. As a second example, the student may use the unrestricted electives in conjunction with the four technical electives to attain an undergraduate specialization in a particular area of Mechanical Engineering. With suitable advanced placement credit, summer work, or a fifth year, it is possible in this manner to structure a curriculum that achieves two B.S. Degrees, one in Mechanical Engineering and one in another major. Students should interact closely with their advisors to plan their unrestricted electives to achieve the maximum benefit from their undergraduate program.

Communications Requirement

All McCormick School students are required to develop proficiency in writing and speaking before graduation, because effective communication is essential in any career in engineering, management, or academia. Accordingly, students must demonstrate proficiency or take one unit in both writing and speech. Courses that will satisfy the communications requirement are:

Writing	DSGN 106-1, 2	Design Thinking and Communication
	English 106-1, 2	Writing in Special Contexts
Speaking	Gen Comm	Public Speaking
	Gen Comm	Analysis and Performance of Literature

These courses are usually taken during the freshman year. Some upper level junior and/or senior courses may also satisfy this requirement and can be approved on an individual basis.

Transfer into Mechanical Engineering from another Engineering Major

Because the course requirements for the freshman year are very similar across all engineering curricula, transferring into Mechanical Engineering during the freshman year does not typically require the student to “catch up” on any required Mechanical Engineering courses. Transferring during the sophomore year is generally straight-forward as well, especially if the student has AP (Advanced Placement) credit. Transfer into Mechanical Engineering after the sophomore year is usually more difficult and may require extra coursework to complete the departmental requirements. Students may change departments by filling out the appropriate form in the Academic Services Office (Room L269).

Transfer into Mechanical Engineering from another Northwestern School (e.g., WCAS)

Transferring into ME from WCAS is possible during either the freshman or sophomore years, however the student will have to work with her or his advisor to tailor an individual curriculum to meet all requirements, and extra coursework may be necessary. Many students have achieved this transfer successfully.

Grade Requirements for BS in Mechanical Engineering

Students must earn a grade average of not less than 2.0 for all courses presented for the degree. Students must also earn a grade average of not less than 2.0 for all 16 Mechanical Engineering Departmental Program courses. Further, no more than two of these courses may carry a grade of D.

P/N (Pass/No Credit) Grade Option

A maximum of eight quarter courses may be taken under the P/N option and used toward the degree. During the Freshman and Sophomore years, only one course may be taken under the P/N option in any quarter. Junior, Pre-Senior, and Senior students are not subject to this limitation. The P/N option rules are as follows for the Mechanical Engineering undergraduate program:

Social Sciences/Humanities

P/N may be used here for any 300 level course and a maximum of four 100-200 level courses applied toward the nine required Social Science/Humanities Theme and the Communications courses.

Unrestricted Electives

P/N may be used for any unrestricted electives.

Other Courses

No other courses may be taken P/N.

Course Levels

Courses are labeled with three-digit numbers. The first digit represents the course level as follows:

100 - Introductory (Freshman level)

200 - Intermediate (Sophomore level)

300 - Advanced (Junior, Senior, and Graduate level)

400 & 500 - Graduate level

Our undergraduate curriculum (i.e., 100, 200, and 300 level courses) is designed to provide the student with adequate breadth in their field. 400 & 500 level courses are primarily for graduate students, but may be open to undergraduate students with permission.

ME 399 Projects Credit

Students may work on special projects with a particular faculty advisor for credit. Before registering for ME 399, students should contact a professor to coordinate an appropriate project and confirm that the professor is able to serve as faculty advisor. 399 credit is subject to the following restrictions and criteria:

- 1) 399 credit will be provided in the home department of the faculty advisor for the project. Thus, ME students working with an EECS advisor will receive EECS 399 credit.
- 2) 399 may not be substituted for the Capstone Design requirement in the ME curriculum.
- 3) ME 399 may be used as a 300 level mechanical engineering technical elective in fulfilling the ME curriculum requirements.
- 4) 399 in a department other than ME may be used as a 300 level technical elective course in fulfilling the ME curriculum requirements.
- 5) Students may not use more than two 399 courses to fulfill the ME curriculum requirements. The remaining technical electives should be formal structured courses.

AP (Advanced Placement) Credit

Many engineering students enter Northwestern with Advance Placement (AP) credit, usually in mathematics or chemistry, granted on the basis of College Entrance Examination Board (CEEB) advanced placement tests. AP credits directly substitute for equivalent required Theme courses and unrestricted elective courses. As a result, AP credit will reduce the course requirements for the BS by the number of AP credits, thereby reducing the total number of classes required for a degree. Most students take advantage of Advanced Placement Credit to take required courses earlier than the scheduled quarter or to take additional unrestricted elective courses.

ABET Accreditation

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET (www.abet.org). Fulfilling the requirements set forth in the Mechanical Engineering Curriculum automatically satisfies ABET requirements.

Petitions

Students may petition to substitute courses to fulfill curriculum requirements or transfer courses from other universities. The petition form, which is available from the McCormick Academic Services Office (Room L269), requires an explanation of the request and the reasons for the request. After filling out the petition, the student should obtain the signature of her or his advisor, and then the signature of the ME Undergraduate Chair, Professor Manohar Kulkarni. The ME undergraduate chair will either approve or reject the petition in consultation with the undergraduate curriculum committee, and the petition then goes to the Dean's Office. Upon final action by the Dean's Office, the student and the advisor receive copies of the original petition and, if approved, the petition is incorporated into the student's record.

All curriculum petitions must be filed and approved by the ME undergraduate chair no later than the quarter **before** the student wishes to take the course.

SPECIAL PROGRAMS FOR MECHANICAL ENGINEERING STUDENTS

Cooperative Engineering Education Program

Many mechanical engineering undergraduates elect to participate in the five-year Cooperative Engineering Education Program (Co-op), which provides alternate periods of on-the-job industrial experience with regular classwork at Northwestern. Those students completing the Co-op program (three quarters of work experience related to their major or two work experiences that are six-month long each) receive a Co-op Certificate at graduation. During the industrial employment, a student is afforded the opportunity of applying theory while gaining practical experience. The perspective gained enables students to develop an understanding of the responsibilities of their future professional career.

Students in good academic standing normally elect the Co-op program in the Fall of the Sophomore year by contacting the McCormick Cooperative Engineering Education Office, Ford Engineering Building, 2nd Floor Room 350. The office works with students to obtain a cooperative work assignment related to the student's professional objectives.

Generally, the first work experience for Co-op students occurs during the summer between their Sophomore and Junior years. Co-op experience for Junior transfer students and others with two years of academic credit begins in the spring of their Junior year. If necessary, special schedules can be worked out with the help of the student's academic advisor that will enable the student to fulfill special academic requirements as well as Co-op. These include four-year Co-op programs for students with advanced placement, and combined BS/MS programs. Co-op students are required to register at Northwestern for their work quarters, but no tuition or fee is charged.

Although emphasis is placed upon the experience gained from Co-op work rather than upon the income, Co-op students may earn a sizable portion of their educational expenses.

In addition to the academic degree, the faculty of the McCormick School awards the Co-op student a certificate in recognition of successful completion of the Cooperative Engineering Education Program.

Two BS Degrees

Students with a wide range of interests may work toward two Bachelor of Science degrees in engineering, or a BS in engineering and a second bachelor's degree from one of Northwestern's other schools. In either case all requirements for both degrees must be satisfied, double counting courses that apply to both degrees. In the case of two engineering degrees, at least 54 course units must be completed, along with the 12 quarter Undergraduate Residency Requirement (URR). If one of the degrees is outside of engineering then the student must meet a 15 quarter URR. Advanced placement, transfer credit, or other means may be used to reduce the URR as described in detail in the undergraduate catalog. The catalog may be found at http://www.registrar.northwestern.edu/courses/undergrad_catalog.html

BS/MS Program

An option open to mechanical engineering undergraduates is the combined BS/MS program. Integrated planning of course work allows simultaneous study in undergraduate and graduate courses and early entrance into project or research work. Advanced placement, course exemption, and/or demonstrated proficiency may make it possible to complete the combined program in less than the normal five years. Students seeking a Bachelor of Science degree and a Master of Science degree should contact the Mechanical Engineering Department Assistant Chair, and the McCormick School of Engineering Assistant Dean for Graduate Studies.

McCormick School of Engineering and Applied Science Scholars Program

A high school student admitted into this program is almost immediately involved in the research program of an active faculty. Generally, the student will engage in research both during the academic year and during the summer, when he or she would be supported by the faculty or the McCormick School. Students in this program follow an accelerated academic curriculum, capitalizing upon advanced placement credits. Depending upon the advanced standing and record at Northwestern the student might be admitted to the Graduate School in the Ph.D. program as early as the third academic year. Support for the student (full tuition and stipend) would then be provided by the university through a Cabell or Murphy Fellowship. This program provides an opportunity for outstanding high school students to obtain their Ph.D. degrees in as little as six years after their high school graduation. The students are provided with continuous opportunities to interact directly with active researchers and to publish in recognized scientific journals at an early age.

Undergraduate Honors Program

A student with a good scholastic record may be admitted to the Undergraduate Honors Program anytime during the junior or pre-senior year. At the time of admission, the student must have a cumulative grade point average of 3.5 or better. An honors student participating in the program must complete at least three units of approved advanced study (including courses normally accepted at the graduate level) with an average grade of B or better, and complete an extended independent study project (at least two quarters on the same topic) leading to an acceptable report. Successful completion of the Honors program will be noted on the student's transcript. Recognition will also be given in the commencement program. If a student's individually evaluated performance is not judged to meet the standards of success, the student will only receive course grades and credit as earned.

Business Enterprise Certificate

Since many McCormick graduates choose to enter the business world, McCormick offers a Business Enterprise Certificate for Engineers. The requirements for non Co-op students include course work (six courses from a list of approved courses), six months of work experience, and an Industry Experience Report on the student's preparation for a business-oriented career. A total of 52 course units are required (four in addition to the degree requirements). The requirements for co-op students includes course work (four courses from a list of approved courses) and a co-

op certificate. A total of 50 course units are required (two courses in addition to the degree requirements). For additional information see http://www.mccormick.northwestern.edu/undergraduates/curriculum/non_degree_programs/business_enterprise_certificate.html.

Certificate in Engineering Design

The Certificate in Engineering Design program helps McCormick undergraduates develop a set of design skills that will prove valuable in their careers. The program focuses on innovative engineering design in a team-based, cross-disciplinary setting. "Innovative design" here implies both identifying and solving real-world problems. The Certificate in Engineering Design requirements include 2.5 course units in required DSGN courses, 3.5 units from a list of approved courses, and the preparation of an Engineering Design Portfolio. At least five of the courses needed for the Certificate in Engineering Design may not also be used to fulfill the requirements in the "Major Program" of your BS degree as described in the undergraduate catalog. No certificate courses may be taken P/N. For additional information see <http://www.segal.northwestern.edu/undergraduate/certificate/>

STUDENT ADVISING

Each student is assigned a faculty member as an advisor. Students meet with their advisors on a regular basis at least once each quarter, usually during the fifth or sixth week of the quarter. Advisors help students select appropriate courses to satisfy both the departmental and McCormick requirements, and the student's own interests. In the Spring Quarter, the student and advisor in a group advising, design a tentative schedule of courses for the following academic year. In each of the remaining quarters, the advisor and student discuss the student's progress individually and verify or modify the schedule for the next quarter. Students are also invited to meet with their advisors at any time during the year to discuss academic problems, academic goals, professional development, and career goals. Advisors are assigned by the department, however, students can request a change of advisor by filling out a form in the Academic Services Office (Room L269). The Dean may require a student having academic difficulties to meet with his or her advisor to discuss those difficulties.

Certain faculty have been designated as resources regarding undergraduate curriculum questions in each listed program. Contact the Academic Services Office (L269) for contact information.

PEOPLE AND PLACES TO KNOW

Undergraduate Engineering:

Wesley Burghardt, Associate Dean	Room L268	467-1401
Nga Du, Accounting Specialist	Room L268	491-7379

The McCormick Office of Undergraduate Engineering works as a liaison between students and the engineering faculty.

Counseling:

Ellen Worsdall, Assistant Dean for Student Affairs	Room L275	491-5173
Joseph Holtgreive, Assistant Dean	Room L270	491-3332
Jennifer Henry, Program Assistant to Dean Worsdall	Room L269	491-5195

In addition to the University's Counseling and Guidance Office, McCormick has its own counseling offices, augmented by faculty advisors, the Freshman Program Office, and Dean Burghardt's office. Interest (career) testing can also be arranged by McCormick counselors.

McCormick Academic Services Office:

Ann Anderson, Business Administrator	Room L277	491-3120
Heather Bacon, Assistant Director of Advising and Student Development	Room L269	491-5261
TBD, Scheduling Assistant	Room L269	491-4363

The Academic Services Office keeps track of all academically-related data on McCormick students. The office maintains the McCormick Advising System (MAS) that records classes already taken, still required, and grades received; maintains current lists of locations and meeting times for classes; handles change-of-majors; petitions to take course work at other institutions; drop/adds; etc.

Northwestern Engineering Career Development:

Helen Oloroso, Assistant Dean and Director	Ford Bldg., 2-350	491-8669
Tameca Lyons, Associate Director	Ford Bldg., 2-350	491-5303
Katie Harvey, Assistant Director	Ford Bldg., 2-350	467-3031
Amanda Stasinski, Assistant Director	Ford Bldg., 2-350	467-5644
Allison Berger, Manager, Employer Relations	Ford Bldg., 2-350	491-2613
Michelle Bledsoe, Recruitment Coordinator	Ford Bldg., 2-350	491-5994
Anna Kraemer, Communications Coordinator	Ford Bldg., 2-350	491-3366

The Co-operative Education Program Office provides information and arranges contacts with potential employers for students participating in the Co-op program.

Student Activities:

Ellen Worsdall, Assistant Dean for Student Affairs	Room L275	491-5173
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The Assistant Dean for Student Affairs is a consultant and facilitator to assist engineering organization officers in planning various student activities. These diverse activities are designed primarily to provide professional information to members of the organization as well as personal development for future career choices.

Study Abroad:

Joseph Holtgreive, Assistant Dean	Room L270	491-3332
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Students interested in studying abroad for a quarter or more should see Dean Holtgrieve. Students must complete a petition and have their plans approved prior to starting any program of study at another institution.

Tech Tutoring Program:

Coordinator of Student Involvement	Room L269	491-5195
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McCormick offers free tutoring which is available in the afternoon and in the evening to undergraduate engineering students. The program is conducted in an informal manner with a flexible approach to insure individual needs are met. Students work one-on-one with a tutor, or, when appropriate, will work together in groups led by a tutor. Tutors are available to help with math, chemistry, physics, computer, and basic engineering courses. A schedule of tutoring times and subjects covered is posted outside Room LG52, where tutoring takes place.

Counseling and Psychological Services (CAPS)

633 Emerson Street	2nd floor	491-2151
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The Counseling and Psychological Services staff are the University's primary counseling staff. The team of counselors, social workers, psychologists, and psychiatrists provide counseling and psychotherapy services to students with emotional and personal concerns. Services include individual counseling, groups, workshops, and firesides for a wide range of concerns including homesickness, academic motivation, test anxiety, personal relationships, family problems, eating behavior, sexuality, loss of a loved one, and depression.

CAREER PLANNING AND INFORMATION RESOURCES

Mechanical Engineering graduates from Northwestern University are well prepared for employment in a wide spectrum of industries, ranging over transportation, heavy and light machinery, machine and precision tools, construction equipment, heating and refrigeration, power and energy, and robotics. Engineering and consulting firms and government laboratories and agencies also offer many career opportunities. Typical assignments involve work in product development, design, production, or sales, all utilizing the scientific and engineering background obtained on campus. New problem areas relating to energy, materials, pollution control, electronic packaging, medicine, and aerospace offer challenges for the future as well.

Many graduates continue their education as graduate students on a part-time or full-time basis. Medical, dental, law and business schools readily accept a mechanical engineering degree as a firm basis for further professional study. In addition, graduate programs leading to the Master's or Doctoral degree in mechanical engineering provide opportunities for preparation in research and teaching in mechanical engineering, in universities and industrial or government laboratories.

NORTHWESTERN CAREER ADVANCEMENT:

Mark Presnell, Executive Director - URL: <http://www.northwestern.edu/careers/index.html>
620 Lincoln Street, (847) 491-3700, fax: (847) 467-7778, nca@northwestern.edu

The mission of Northwestern Career Advancement (NCA) is to foster excellence in career development, preparation, and professional opportunities for undergraduate and graduate students and alumni by providing comprehensive services and programming and by promoting strong partnerships with employers, academic departments, and the university community.

You are encouraged to register early since many employers seeking engineers visit campus during the Fall Quarter. As you engage in the transition from student to employed engineer, it is recommended that you take full advantage of the following resources to strengthen your career plans and to enhance your employment options:

Services include:

- Campus Interviews, resume referral service, and job listings via CareerCat <http://www.northwestern.edu/careers/job-intern-prep/resources/careercat/index.html>
- Individual career and employment counseling/Express advising hours
- Resume & cover letter development
- Employer research tools including: Career Search database, employer videos, brochures and annual reports
- Job Search workshops and special events such as Class Conferences and the Career Expo job fair
- GETAJOB and PhD listservs/Engineering & Science web site:
- Campus interviews and job listings
- Internships, part-time and temporary jobs <http://www.northwestern.edu/careers/job-intern-prep/resources/index.html>

MECHANICAL ENGINEERING DEPARTMENT FACILITIES

The facilities of the newly reconstructed mechanical engineering laboratories provide many opportunities for undergraduates to explore quantitatively the implication of fundamental laws through application to practical problems in heat transfer, fluid flow, vibration, dynamics and control, manufacturing processes and engineering design. The undergraduate instrumentation laboratory uses state-of-the-art computers and associated electronics for investigations requiring sophisticated mechanical measurements and data acquisition. The prototyping shop provides space and equipment, including machine tools, for prototyping designs and building experimental apparatus. The laboratories shared with the Manufacturing Engineering Program contain powerful workstations for computer-aided design and a variety of modern computer-controlled machine tools and a workstation lab.

STUDENT ORGANIZATIONS

The American Society of Mechanical Engineers (ASME), the Society of Automotive Engineers (SAE), and Pi Tau Sigma (mechanical engineering honor society) have student sections at Northwestern University. For further information see the Mechanical Engineering website.

MECHANICAL ENGINEERING FACULTY AND THEIR RESEARCH

A complete list of faculty and their research interests is available on the department website.
<http://www.mccormick.northwestern.edu/mechanical/>