

ENGINEERING (3-2)

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Mission and Goals

Consonant with the mission of the College, this department is “dedicated to providing for its students the means for their full realization of a dual goal of vocation and enlightenment.” Society requires competent professionals who can solve contemporary problems by using connections among disciplines, especially the humanities, engineering and technology, and the sciences. The Programs within this Department are designed to blend the unique characteristics of Catholic liberal arts education with preparation for productive and rewarding professional careers. The four professional educational objectives of this department are to produce graduates who have:

- 1) The specialized knowledge and skills necessary for initiation into their chosen profession,
- 2) A broad range of skills necessary for effective communication,
- 3) An appreciation for the interrelationships among the branches of knowledge,
- 4) The ethical, social, and aesthetic perspectives necessary for values-based judgment and decision-making.

3-2 Engineering: Major in Mathematics

A student who completes the requirements for the 3-2 Engineering Major in Mathematics earns two degrees:

1. A Bachelor of Arts degree with a major in mathematics from Carroll College, and
2. A Bachelor of Science degree with a major in a selected field of engineering (e.g., mechanical engineering) from one of the following affiliated engineering schools:
 - Columbia University, New York, NY
 - The University of Notre Dame, South Bend, IN
 - The University of Southern California, Los Angeles, CA
 - The University of Minnesota, Minneapolis, MN
 - Gonzaga University, Spokane, WA
 - Montana Tech of the University of Montana, Butte, MT
 - Montana State University, Bozeman, MT

Engineering fields, which 3-2 students may select, include the following:

- Aerospace Engineering
- Engineering Mechanics
- Chemical Engineering
- Engineering Science
- Civil Engineering
- Geological Engineering
- Computer Engineering
- Geophysical Engineering
- Electrical Engineering
- Industrial Engineering
- Environmental Engineering
- Material Science Engineering
- Mechanical Engineering
- Metallurgical Engineering
- Applied Biology
- Mineral or Mining Engineering
- Applied Chemistry
- Nuclear Science and Engineering

- Applied Geophysics
- Operations Research
- Biological Engineering
- Petroleum Engineering

The purposes of the 3-2 program are to provide the student with a traditional engineering education augmented with a strong liberal arts background and to provide a broader and deeper exposure to mathematics and its applications than would ordinarily be possible in a four year engineering program.

Under the 3-2 program, a student attends Carroll College for three years and then selects and transfers to one of seven affiliated engineering schools for two years of study. Upon successful completion of the five-year program, the student receives a Bachelor of Arts degree with a major in mathematics from Carroll College and a Bachelor of Science degree with a selected engineering major from the engineering school.

Carroll College continually reviews its curriculum with the seven affiliated schools to ensure that 3-2 students can complete any of the engineering majors in the five-year program.

A program to prepare students for graduate studies in engineering is offered via the mathematics major with a cognate concentration in engineering.

A student in the 3-2 engineering program will be accepted at any one of the seven engineering schools on the written recommendation of the engineering program faculty. Before a student will be considered for a recommendation, at least a 2.60 cumulative grade average and a 2.60 average in the “Major Program Requirements” and in the “Other Program Requirements” must be achieved by the end of the fifth semester at Carroll College.

I. Major Program Requirements

ENGR 104	Engineering Graphics and CAD Applications
ENGR 201	Engineering Design Process
ENGR 302	Engineering Mechanics I: Statics
ENGR 308	Thermodynamics

Technical Electives: Four courses of three or four credits each, selected on the basis of the engineering field of interest and with approval of the engineering advisor. Technical electives must be selected as follows: one from Category I, two from Category II, and one from Category III. Technical electives include the following courses:

CH 301-302	Organic Chemistry I and II (Category I and III)
CS 110	Programming (Category I)
CS 330	Computer Networking I (Category III)
ENGR 303	Engineering Mechanics II: Solids (Category II)
ENGR 304	Engineering Mechanics III: Dynamics (Category III)
ENGR 305-306	Electronics and Circuit Analysis I and II (Category I and III)
ENGR 307	Fluid Mechanics (Category II)
ENGR 309	Geotechnical Engineering (Category II)
ENGR 310	Structures I (Category III)
ENGR 313	Hydrology (Category III)

II. Other Program Requirements

CH 101-102	General Chemistry I and II
EC 201 or 202	Principles of Economics (EC 202 preferred)
EC 203	Project Management Economics
ENWR 305	Technical Writing
MA 131	Calculus of Single Variable Functions
or MA 121-122	Differential and Integral Calculus
MA 232	Differential Equations and Linear Algebra I
MA 233	Multivariable Calculus
MA 334	Differential Equations and Linear Algebra II
MA 336	Probability and Statistics I

MA 341 Probability and Statistics II
or MA 342 Numerical Computing and Visualization
PHYS 205-206 Engineering Physics I and II

III. Carroll College Core Curriculum

To earn a Bachelor of Arts degree from Carroll College a student must complete the Carroll College Core Curriculum as listed in this catalog. However, since these requirements must be completed within 3 years, a total of only nine credits of philosophy and theology instead of twelve, six credits of one and three credits of the other. In addition, a student must earn a grade of "C" or better in all of the courses listed under "Major Program Requirements" and "Other Program Requirements." A lesser grade in any of these courses must be replaced before the Bachelor of Arts degree will be granted. In addition, lesser grades in any of these courses preclude taking subsequent courses for which the deficient courses are prerequisite.

IV. Additional Requirements

1. The requirements for the Bachelor of Arts degree with a major in mathematics under the 3-2 program differ from those for the four-year mathematics majors. Students in the 3-2 engineering major are not required to fulfill the requirements for the four-year mathematics major.
2. The requirements listed in sections I, II, and III above must be completed before transferring to an affiliated engineering school and cannot be satisfied by credits earned at the engineering school after the student has transferred.
3. Students transferring to Carroll College and entering the 3-2 program must complete at least two full-time semesters at Carroll College before they will be considered for a recommendation to transfer to an affiliated school. In addition, these students must complete a minimum of eighteen credits in the Department of Mathematics, Engineering and Computer Science at Carroll College. Credits transferred to Carroll do not satisfy this requirement.
4. A Student who transfers to a non-affiliated engineering school and completes an engineering degree in an ABET accredited program is eligible to receive the Bachelor of Arts degree with a major in mathematics from Carroll College. The Carroll degree is awarded provided that the student has completed all requirements for the degree listed in sections I, II, III, and IV.
5. Some engineering schools and/or departments require a grade point average higher than 2.60 for admission to junior and senior level courses. Some departments may also require the completion of a summer field or laboratory course for graduation in that department. In rare cases, additional course work may be required to satisfy a specialized engineering curriculum. These are requirements that apply to all students entering these programs and must also be satisfied by 3-2 students. Students in 3-2 engineering must consult with the director of engineering programs at Carroll College to select a school and field of study for which they qualify.