School of Engineering

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Degrees Offered and Accreditation
The School of Engineering offers four-year programs leading to
Bachelor of Science in Engineering (B.S.E.) degrees (134-credits) in
Biomedical Engineering
Chemical Engineering*
Civil Engineering*
Computer Science and Engineering*
Computer Engineering
Electrical Engineering*
Engineering Physics
Environmental Engineering
Mechanical Engineering*
Metallurgy & Materials Engineering
Bachelor of Science (B.S.) degree (120-credits) in Computer Science
Bachelor of Science (B.S.) degree (139-credits) in Management &
Engineering for Manufacturing (jointly offered with the School of Business)

The BSE programs shown above that are asterisked (*), are accredited by the
Engineering Accreditation Commission of the Accreditation Board for
Engineering and Technology (EAC/ABET). The BSE programs in Environmental
Engineering, Computer Engineering, and Metallurgy & Materials Engineering,
and the BS program in Management & Engineering for Manufacturing will be
submitted for EAC/ABET accreditation at the earliest opportunity. The BSE in
Computer Science & Engineering is also accredited by the Computer Science
Accreditation Board (CSAB).

The School of Engineering and the College of Liberal Arts and Sciences
offer a five-year, double-degree EUROTECH program leading to a B.S. degree
in Engineering and a B.A. degree in German. The program includes German
Language courses specially designed to include engineering content, engineering
courses taught partly in German, and a six-month internship in a company in
Germany.

Students who wish to concentrate their elective work in a second field within
the School of Engineering may elect a double major program. This program
requires the completion of all requirements in both majors. Students need the
approval of the Director of Advising to change majors.

The School of Engineering also offers Minors in Bioinformatics, in
Biomedical Engineering, in Environmental Engineering, in Information
Technology, and in Metallurgy & Materials Engineering. Please refer to the
“Minors” section of this publication for their descriptions.

Admission Requirements. See Admission to the University. All students
admitted to the School of Engineering are required to take a placement
examination in mathematics and a calculus readiness examination prior to
registration for their first semester. Students who make unsatisfactory grades in
these examinations may be required to take additional preparatory work that
may not be counted toward graduation.

Admission to Junior Year. Students should declare their major as soon as
possible, but no later than the second semester of their sophomore year. All
students, to be admitted to their junior year in their selected major in the School
of Engineering, must have a cumulative grade point average of at least 2.0 in all
courses in mathematics, physics, chemistry, and engineering applicable toward
the degree. For Management & Engineering for Manufacturing majors, the
cumulative grade point average requirement also includes Management &
Engineering for Manufacturing courses.

Scholarships. More than $450,000 in scholarships and awards is available
annually to students in the School of Engineering.

Faculty Advisors. Faculty advisors are assigned to students entering the School
of Engineering according to a student’s major. Advisors assist students in their
course selections, counsel them in meeting their educational and career goals,
and advise them in non-academic issues.

School Academic Requirements.

Schools in the School of Engineering must complete the following requirements:

Foreign Language
All students must (1) have passed the third year level in high school in a single
foreign language or (2) complete one year (two semesters) of a single foreign
language at the college level.

Expository Writing
ENGL 110 or ENGL 111

Culture and Modern Society
HIST 100 or HIST 101

Philosophical or Ethical Analysis
PHIL 104

Additionally, all majors are required to complete:

- University General Education requirements (see Academic
Requirements)
- A Plan of Study form submitted prior to entering the junior year
- MATH 115Q and 116Q (or MATH 112Q, 113Q, and 114Q), ENGR
100 and CSE 123C
- The University writing (W) course requirement must be met through
required major-specific W course work. Most programs have two W
courses specified in the curriculum although in some curricula, an
equivalent number of Partial Writing (P) courses are required.
- All majors, except BS in Computer Science majors, are required to
come to complete
  CHEM 127Q (or CHEM 129Q)
  PHYS 151Q and 152Q
- All majors, except BS in Computer Science and BS in Management &
Engineering for Manufacturing majors, are required to complete
CHEM 128Q (or 130Q).
- All majors, except BS in Computer Science and BS in Management &
Engineering for Manufacturing majors, are required to complete at least two
courses in one of the departments listed in the General Education Groups 4 through
7. See the “Academic Regulations” section of this Catalog. At least one of these
courses must be at the 200 level. Examples of course selections that meet this
requirement are:
  ANTH106 (Group 7) & ANTH 226 (Group 5)
  ENGL 210 (Group 4) & ENGL 218 (Group 5)
  PHIL 104 (Group 6) & PHIL 263 (Group 5)
  HIST 101 (Group 5) & HIST 281 (Group 5)

Credit Restrictions. The following courses may not be counted for credit toward
graduation in the School of Engineering: MATH courses numbered 112 and
below; MATH 118; PHYS 101 and 103; CSE 101; STAT 100; and courses labeled
“independent study” or “variable topics” (e.g. course numbered 298 or 299)
taken in departments outside the School of Engineering. No course taken on a
Pass/Fail basis may be counted for credit toward graduation or may be used to
meet any course requirements of the School of Engineering. Only eight credits of
chemistry and physics at the 100’s level may be applied toward graduation in the
School of Engineering: MATH courses numbered 112 and
below; MATH 118; PHYS 101 and 103; CSE 101; STAT 100; and courses labeled
“independent study” or “variable topics” (e.g. course numbered 298 or 299)
taken in departments outside the School of Engineering. No course taken on a
Pass/Fail basis may be counted for credit toward graduation or may be used to
meet any course requirements of the School of Engineering. Only eight credits of
chemistry and physics at the 100’s level may be applied toward graduation.

Major Requirements and Normal Sequences. In addition to the University
General Education requirements and the School requirements listed above, the
requirements for the specific majors are listed in the following pages. Full details,
normal course sequences, and accreditation requirements can be found in the
respective Guide to Course Selection for each major.

Bachelor of Science in Engineering in Biomedical Engineering

Biomedical Engineering majors are required to complete the following:

CE 211
BME 210, 221, 251, 252, 261W, 271W, 290, 291
CHEM 240, 243
ECE 201
ENGR 166
MATH 210Q, 211Q
MMAT 201
PNB 264
STAT 224Q
Professional Requirements (15 credits)
Elective Courses (4 credits)
The professional requirements and electives are specified in the Biomedical Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Chemical Engineering**

Chemical Engineering majors are required to complete the following:

- **Chemical Engineering majors are required to complete the following:**
  - **CHEM 264Q** (CHEM Electives) (6 credits minimum)
  - **ENGR 166**
  - **MATH 210Q and 211Q**
  - **Professional Requirements courses** (12 credits)
  - Elective courses (5 credits)

*Students may select CHEM 232Q, MCB 203, MCB 204 or MCB 229 as a replacement for CHEM 264Q.*

Selection of Professional Requirements courses must include engineering design work as detailed in the Chemical Engineering Guide to Course Selection. At least three credits of Professional Requirements must be outside of Chemical Engineering.

**Bachelor of Science in Engineering in Civil Engineering**

Civil Engineering majors are required to complete the following:

- **Civil Engineering majors are required to complete the following:**
  - **CE 211**
  - **CHEG 203, 211, 212, 222, 224, 237W, 239W, 243, 247, and 251**
  - **CHEG Electives** (6 credits minimum)
  - **CHEM 240, 243, 244, 256, 263Q, and 264Q**
  - **ENGR 166**
  - **MATH 210Q and 211Q**
  - **Professional Requirements courses** (12 credits)
  - Elective courses (5 credits)

CE 291 must be taken twice before CE 280W. Professional Requirements include at least three credits of Professional Requirements must be outside of Chemical Engineering.

**Elective Courses (9 credits)**

- One course from each of the following groups:
  - **Computer Applications** - CSE 255, 275, or 282
  - **Computer Architecture** - CSE 228, 240 or 245
  - **Computer Languages** - CSE 233 or 244

Two courses from CSE 261, 262, 263, 265, 268, and 269

- **CSE/ECE 290 and 291**

- **ECE 201, 202, and 209W**

- **Professional Requirements courses** (9 credits)

- **Elective courses** (9 credits)

Further details and course sequences are given in the Computer Science Guide to Course Selection.

**Bachelor of Science in Engineering in Electrical Engineering**

Electrical Engineering majors are required to complete the following:

- **Electrical Engineering majors are required to complete the following:**
  - **CE 211**
  - **CSE 124C, 207, 208W, 221, 228, 230, 237, 243, 244, 254, 258, and 259**

Two CSE design laboratory courses

- **MATH 210Q, 211Q, and 227Q**

One of MATH 231, STAT 220Q, 224Q, or 230Q

- **ECE 201, 202, and 209W**

Professional Requirements courses (9 credits)

- **Elective courses** (9 credits)

Further details and course sequences are given in the Computer Science & Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Electrical Engineering**

Electrical Engineering majors are required to complete the following:

- **Electrical Engineering majors are required to complete the following:**
  - **CE 211**
  - **CSE 124C, 207, 208W, 221, 228, 230, 237, 243, 244, 254, 258, and 259**

Two CSE design laboratory courses

- **MATH 210Q, 211Q, and 227Q**

One of MATH 231, STAT 220Q, 224Q, or 230Q

Further details and course sequences are given in the Computer Science & Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Electrical Engineering**

Electrical Engineering majors are required to complete the following:

- **Electrical Engineering majors are required to complete the following:**
  - **CE 211**
  - **CSE 124C, 207, 208W, 221, 228, 230, 237, 243, 244, 254, 258, and 259**

Two CSE design laboratory courses

- **MATH 210Q, 211Q, and 227Q**

One of MATH 231, STAT 220Q, 224Q, or 230Q

Further details and course sequences are given in the Computer Science & Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Electrical Engineering**

Electrical Engineering majors are required to complete the following:

- **Electrical Engineering majors are required to complete the following:**
  - **CE 211**
  - **CSE 124C, 207, 208W, 221, 228, 230, 237, 243, 244, 254, 258, and 259**

Two CSE design laboratory courses

- **MATH 210Q, 211Q, and 227Q**

One of MATH 231, STAT 220Q, 224Q, or 230Q

Further details and course sequences are given in the Computer Science & Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Electrical Engineering**

Electrical Engineering majors are required to complete the following:

- **Electrical Engineering majors are required to complete the following:**
  - **CE 211**
  - **CSE 124C, 207, 208W, 221, 228, 230, 237, 243, 244, 254, 258, and 259**

Two CSE design laboratory courses

- **MATH 210Q, 211Q, and 227Q**

One of MATH 231, STAT 220Q, 224Q, or 230Q

Further details and course sequences are given in the Computer Science & Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Mechanical Engineering**

Mechanical Engineering majors are required to complete the following:

- **Mechanical Engineering majors are required to complete the following:**
  - **ENGR 295 (4 credits)**
  - **MATH 210Q, 211Q, and 227Q**
  - **Electrical Engineering** - CSE/ECE 201, 202, 204, 209W, 228, 229, 232, 241, 245, 261, and 262W
  - **Electrical Engineering** - CSE/ECE 290 and 291
  - **Chemical Engineering** - CHEG 203, 211, 287; STAT 224; ME Elective Courses (6 credits); PHYS Elective Courses (6 credits)
  - **Elective courses** (7-8 credits)

Further details and course sequences are given in the Mechanical Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Metallurgy and Materials Engineering**

Metallurgy and Materials Engineering majors are required to complete the following:

- **Metallurgy and Materials Engineering majors are required to complete the following:**
  - **PHYS 230Q, 242Q, 255Q, 257Q, 258Z, 261Q, 285Z**
  - **ENGR 295 (4 credits)**
  - **MATH 210Q, 211Q, and 227Q**

One of MATH 231, STAT 220Q, 224Q, or 230Q

- **Electrical Engineering** - CSE/ECE 201, 202, 204, 209W, 228, 229, 232, 241, 245, 261, and 262W

Further details and course sequences are given in the Metallurgy and Materials Engineering Guide to Course Selection.

**Bachelor of Science in Engineering in Metallurgy and Materials Engineering**

Metallurgy and Materials Engineering majors are required to complete the following:

- **Metallurgy and Materials Engineering majors are required to complete the following:**
  - **CHE 127Q, or 128Q; GEOL 102; PHYS 131Q, 132Q, 141Q, 142Q, 151Q, or 152Q** but not in the same department as the two-semester sequence

One course from each of the following groups:

- **Computer Applications** - CSE 255, 275, or 282
- **Computer Architecture** - CSE 228, 240 or 245
- **Computer Languages** - CSE 233 or 244

Two courses from CSE 261, 262, 263, 265, 268, and 269

A minimum of three 3-credit courses at the 200-level in a single related area forming a cohesive body of knowledge outside of Computer Science

Further details and course sequences are given in the Computer Science Guide to Course Selection.
Bachelor of Science in Engineering in Environmental Engineering

Environmental Engineering majors are required to complete the following:
- CE 211, 251, and 263 (or ENVE 263)
- ANSC 226
- CHEG 211, 212, 223, 224, and 285
- EEB 244W
- ENGR 166
- ENVE 110, 260 (or CHEG 281), 262, 265 or 267, 270, 279, 290W, 291W, and 296
- MATH 210Q and 211Q
- MCB 229

Professional Requirements courses (9 credits)

Professional Requirements include at least one course each to strengthen three of the following eight focus areas: Atmospheric Systems & Air Pollution Control, Environmental & Occupational Health, Environmental Chemistry, Environmental Systems Modeling, Hazardous Waste Management, Solid Waste Management, Water Supply & Resources, and Wastewater Management. The following courses may be used to meet the Professional Requirements:

- ARE 234, and 235
- EEB 238, and 247
- MCB 203, 235, and 240
- CHEG 247, 251, 280, and 283
- CHEM 141, 232Q, 263Q - 264Q, 270W
- CE 265, 268
- GEOG 205, 206, 215, 237, and 286
- GEOL 206, 234C, and 245
- IMGT 210
- MARN 244, and 280W
- ME 239
- NRME 204, 210, 236Q, 237, 239, 240, 260P, and 263
- PHAR 150
- SOCI 259W
- PLSC 259C or ENVE 259C

The Professional Requirements are specified in the Environmental Engineering Guide to Course Selection.

Bachelor of Science in Management and Engineering for Manufacturing

Offered jointly by the School of Business and the School of Engineering

Management & Engineering for Manufacturing majors are required to complete the following:
- ACCT 131 and 200
- ANTH 100 or GEOG 160
- BLAW 271
- CE 211, 212, and 287
- ECON 113
- ECE 220
- FNCE 201
- HIST 101
- MATH 210Q and 211Q
- ME 221, 222, 227, 235, and 260W
- MEM 151, 210, 211, 215W, 221, 225, and 231
- MMAT 201, and 290
- MKTG 201
- MMAT 201
- OPIM 252
- STAT 110V
- Technical Electives courses (6 credits)

The Technical Electives course must be 200-level or higher listed in the department listed in the School of Business and the School of Engineering as specified in the Management & Engineering for Manufacturing Guide to Course Selection. Students are encouraged to seek faculty-supervised manufacturing summer internships prior to their junior and senior years. Such internships may be shown on the student records by registering for MEM 296 – Manufacturing Internship, with instructor and advisor approval.

Bachelor of Science in Engineering in Mechanical Engineering

Mechanical Engineering majors are required to complete the following:
- CE 211, 212, and 287
- ECE 220
- ENGR 166
- MATH 210Q and 211Q
- MMAT 201, and 202
- ME Requirement (6 credits)
- Professional Requirements (6 credits)
- Electives (6 credits)

Details on the ME and Professional Requirements are specified in the Mechanical Engineering Guide to Course Selection.

Bachelor of Science in Engineering in Metallurgy and Materials Engineering

Metallurgy & Material Engineering majors are required to complete the following:
- CE 211, 212, and 287
- MATH 210Q and 211Q
- MMAT 243, 244, 253, 255, 256, 265, 266, 267, 276, 277, 283, 284, 285W, 286W, 287, and 288
- ME 233 or CHEM 263Q
- ENGR 166
- ECE 220
- CHEG 256

Professional Elective courses (9 credits from EE 246, ME 217, and 228, and MMAT 206, 207, 217, 219, 229, 232, 234, 236, and 238)

Technical Elective courses (6 credits from BIOS 107; CHEM 243, 244, 263Q, and 264Q; MCB 203; ME 218, 253, and 255; MATH 214Q, 215Q, 227Q, and 231Q; PHYS 216Q, and 262Q; and STAT 220Q, 221Q, and 224Q)

Elective courses (2 credits)

Selection of courses is detailed in the Metallurgy & Materials Engineering Guide to Course Selection.