

ENVIRONMENTAL ENGINEERING, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (<https://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext>) section of the Guide.

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|-------------------|--|
| General Education | <ul style="list-style-type: none"> • Breadth–Humanities/Literature/Arts: 6 credits • Breadth–Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits • Breadth–Social Studies: 3 credits • Communication Part A & Part B * • Ethnic Studies * • Quantitative Reasoning Part A & Part B * |
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* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

SUMMARY OF REQUIREMENTS

The following curriculum applies to students admitted to the environmental engineering degree program.

| Code | Title | Credits |
|------|-----------------------------------|------------|
| | Introduction to Engineering | 3 |
| | Mathematics and Statistics | 19 |
| | Basic Science | 16 |
| | Engineering Mechanics | 9 |
| | Engineering Tools | 6 |
| | Fundamental Principles | 18 |
| | Advanced Principles and Practices | 33 |
| | Communications | 8 |
| | Liberal Studies | 16 |
| | Total Credits | 128 |

INTRODUCTION TO ENGINEERING

| Code | Title | Credits |
|--------------|----------------------|----------|
| INTEREGR 170 | Design Practicum | 3 |
| | Total Credits | 3 |

MATHEMATICS AND STATISTICS

| Code | Title | Credits |
|---------------------------|--|--------------|
| MATH 221 or MATH 217 | Calculus and Analytic Geometry 1 Calculus with Algebra and Trigonometry II | 5 |
| MATH 222 | Calculus and Analytic Geometry 2 | 4 |
| MATH 234 | Calculus--Functions of Several Variables | 4 |
| MATH 319 or MATH 320 | Techniques in Ordinary Differential Equations ² Linear Algebra and Differential Equations | 3 |
| | One of the following: | 3-6 |
| STAT 324 or I SY E 210 | Introduction to Statistics for Science and Engineering Introduction to Industrial Statistics | |
| STAT 311 & STAT 312 | Introduction to Theory and Methods of Mathematical Statistics I and Introduction to Theory and Methods of Mathematical Statistics II | |
| | Total Credits | 19-22 |

BASIC SCIENCE

| Code | Title | Credits |
|-------------------------------------|--|--------------|
| | One of the following: | 5-9 |
| CHEM 109 | Advanced General Chemistry | |
| CHEM 103 & CHEM 104 | General Chemistry I and General Chemistry II | |
| | One of the following: | 5 |
| PHYSICS 202 | General Physics | |
| PHYSICS 208 | General Physics | |
| | One of the following: | 3 |
| GEOSCI 100 | Introductory Geology: How the Earth Works | |
| GEOSCI/ ENVIR ST 106 | Environmental Geology | |
| | One of the following: | 3 |
| ZOOLOGY/ BIOLOGY/ BOTANY 151 | Introductory Biology | |
| ZOOLOGY 153 | Introductory Biology | |
| ZOOLOGY/ BOTANY/ ENVIR ST 260 | Introductory Ecology | |
| MICROBIO 101 | General Microbiology | |
| | Total Credits | 16-20 |

ENGINEERING MECHANICS

| Code | Title | Credits |
|----------------------|---------------------------------------|----------|
| E M A 201 | Statics (with a grade of C or better) | 3 |
| E M A 202 | Dynamics | 3 |
| CIV ENGR 310 | Fluid Mechanics | 3 |
| Total Credits | | 9 |

ENGINEERING TOOLS

| Code | Title | Credits |
|----------------------------|---|------------|
| CIV ENGR/G L E 291 | Problem Solving Using Computer Tools | 4 |
| CIV ENGR 159 or M E 231 | Civil Engineering Graphics Geometric Modeling for Design and Manufacturing | 2-3 |
| Total Credits | | 6-7 |

FUNDAMENTAL ENVIRONMENTAL ENGINEERING PRINCIPLES

| Code | Title | Credits |
|----------------------|---|-----------|
| CIV ENGR 311 | Hydrosience | 3 |
| CIV ENGR 320 | Environmental Engineering | 3 |
| CIV ENGR 324 | Environmental Engineering Thermodynamics | 3 |
| CIV ENGR 325 | Environmental Engineering Materials | 3 |
| CIV ENGR 494 | Civil and Environmental Engineering Decision Making | 3 |
| CIV ENGR 498 | Construction Project Management | 3 |
| Total Credits | | 18 |

ADVANCED PRINCIPLES AND PRACTICES**Environmental Engineering Experiments**

Note: Courses taken to meet this requirement may not be used to meet the environmental engineering breadth requirement.

| Code | Title | Credits |
|-----------------------------------|---|----------|
| One of the following lab courses: | | 3 |
| CIV ENGR 322 | Environmental Engineering Processes | |
| CIV ENGR 410 | Hydraulic Engineering | |
| BSE 365 | Measurements and Instrumentation for Biological Systems | |
| GEOSCI/ G L E 627 | Hydrogeology | |
| Total Credits | | 3 |

Senior Capstone Design

| Code | Title | Credits |
|----------------------|-------------------------------------|----------|
| CIV ENGR 578 | Senior Capstone Design ¹ | 4 |
| Total Credits | | 4 |

¹ At least one engineering design course as designated with an asterisk(*) must be completed before taking CIV ENGR 578 Senior Capstone Design.

² MATH 319 Techniques in Ordinary Differential Equations preferred

Environmental Engineering Breadth Electives

| Code | Title | Credits |
|---|--|---------|
| Electives | | |
| At least one class in at least four of the following sub-disciplines. At least two of the courses must be designated as an engineering design course (*) and must be from different sub-disciplines. At least one engineering design course (*) must be taken prior to CIV ENGR 578. If more than one course is taken from a subdiscipline, then the additional course(s) will be counted towards the Technical and Professional Electives Requirement. | | 12 |
| <i>Environmental Chemistry</i> | | |
| CIV ENGR 500 | Water Chemistry | |
| SOIL SCI 621 | Soil and Environmental Chemistry | |
| <i>Health Hazards and Risk Assessment</i> | | |
| CIV ENGR 422 | Elements of Public Health Engineering | |
| POP HLTH/ ENVIR ST 471 | Introduction to Environmental Health | |
| POP HLTH/ ENVIR ST 502 | Air Pollution and Human Health | |
| <i>Hydraulics</i> | | |
| CIV ENGR 410 | Hydraulic Engineering | |
| CIV ENGR 411 | Open Channel Hydraulics | |
| <i>Surface Water Resources and Hydrology</i> | | |
| BSE 473 | Water Management Systems | |
| BSE 571 | Small Watershed Engineering | |
| CIV ENGR 414 | Hydrologic Design * | |
| CIV ENGR 415 | Hydrology | |
| <i>Groundwater, Soils, and Sediments</i> | | |
| CIV ENGR 412 | Groundwater Hydraulics | |
| GEOSCI/ G L E 627 | Hydrogeology | |
| <i>Water and Wastewater</i> | | |
| CIV ENGR 426 | Design of Wastewater Treatment Plants * | |
| CIV ENGR 428 | Water Treatment Plant Design * | |
| CIV ENGR 521 | Membrane Science and Technology | |
| <i>Air Quality and Control</i> | | |
| CIV ENGR 423 | Air Pollution Effects, Measurement and Control | |
| <i>Solid and Hazardous Waste</i> | | |
| CIV ENGR 427 | Solid and Hazardous Wastes Engineering * | |
| CIV ENGR 522 | Hazardous Waste Management * | |
| <i>Energy and Environment</i> | | |
| BSE/ ENVIR ST 367 | Renewable Energy Systems | |
| CBE 512 | Energy Technologies and Sustainability | |
| CIV ENGR/ G L E 421 | Environmental Sustainability Engineering | |
| CIV ENGR/ G L E 535 | Wind Energy Balance-of-Plant Design * | |

GEOSCI/ Energy Resources
ENVIR ST 411

Total Credits 12

Professional Electives

Note: Courses taken to meet this requirement may not be used to meet the environmental engineering breadth requirement.

Select 14 credits of coursework that meets at least one of the following criteria:

- Any engineering course numbered 300 or higher, excluding E P D and INTEREGR. Up to six credits of independent study (e.g. CIV ENGR 699 Independent Study and others) may be counted
- Any intermediate or advanced-level course¹ from atmospheric and oceanic sciences, botany, chemistry, geography, geoscience, mathematics², microbiology, molecular and environmental toxicology, physics, population health sciences, soil science, statistics², or zoology
- Up to three credits of any intermediate or advanced-level course from agricultural and applied economics, economics, general business, management and human resources, or INTEREGR 303 Applied Leadership Competencies in Engineering
- Up to three credits of CIV ENGR 1 Cooperative Education Program

¹ Courses with social science, humanities, or literature breadth (H, L, S, W, X, Y, Z) cannot be used

² Transfer/test math elective credits for calculus or STAT 301 Introduction to Statistical Methods may not be used to fulfill Professional Electives

COMMUNICATIONS

| Code | Title | Credits |
|---|--|----------|
| Communications A (choose one) | | 3 |
| ENGL 100 | Introduction to College Composition | |
| LSC 100 | Science and Storytelling | |
| COM ARTS 100 | Introduction to Speech Composition | |
| ESL 118 | Academic Writing II | |
| Speech-Related Course (choose one) | | 2 |
| INTEREGR 275 | Technical Presentations (was EPD 275) ¹ | |
| COM ARTS 181 | Elements of Speech-Honors Course | |
| COM ARTS 262 | Argumentation and Debate | |
| COM ARTS 266 | Theory and Practice of Group Discussion | |
| Writing-Related Course | | 3 |
| INTEREGR 397 | Engineering Communication | |
| Total Credits | | 8 |

¹ INTEREGR 275 Technical Presentations is strongly recommended to satisfy this requirements.

LIBERAL STUDIES

| Code | Title | Credits |
|--|-------|-----------|
| College of Engineering Liberal Studies Requirements | | 16 |
| Complete Requirements (https://guide.wisc.edu/undergraduate/engineering/#requirementstext) ¹ | | |

Requirements specific to Environmental Engineering:

An economics course must be selected from the following list:

| | |
|----------|---|
| ECON 101 | Principles of Microeconomics |
| ECON 102 | Principles of Macroeconomics |
| ECON 111 | Principles of Economics-Accelerated Treatment |

A minimum of three credits of environmental studies course that meets the breadth designations of Humanities, Literature, and/or Social Studies. Courses that also carry breadth designations of Biological Sciences, Natural Sciences, or Physical Sciences will not count towards this requirement.

Total Credits 16

¹ All liberal studies credits must be identified with the letter H, S, L, or Z. Language courses are acceptable without the letter and are considered humanities. An economics elective and an environmental studies elective are required.

Note: See an environmental engineering advisor for additional information.

HONORS IN RESEARCH

Students in environmental engineering that have completed at least two semesters on the Madison campus with a cumulative GPA of at least 3.5 may apply to participate in the Honors in Research program. Students may register for 1 to 3 credits per semester. A grade of P (Progress) will be assigned each semester until the student completes the honors in research program or drops out of the program, at which time a final grade is assigned (based on research progress and the written thesis, if completed). This becomes the grade for all credits taken in CIV ENGR 489 Honors in Research.

A senior thesis worth 3 credits of CIV ENGR 489 is required. The senior thesis is a written document reporting on a substantial piece of work that is prepared in the style of a graduate thesis. The thesis advisor determines the grade which the student receives for the thesis. A bound copy of the thesis must be submitted to the Department of Civil and Environmental Engineering office to complete the program.

The designation "Honors in Research" will be recorded on the student's transcript if the following criteria are met:

1. Satisfaction of requirements for an undergraduate degree in Environmental Engineering.
2. A cumulative grade-point average of at least 3.3.
3. Completion of a total of at least 8 credits in CIV ENGR 489.
4. Completion of a senior honors thesis with a final grade of B or better.

Students interested in the Honors in Research program should contact their advisor or the BSEnvE chair for more information. Applications to the program are to be submitted to the BSEnvE chair with a supporting letter from the student's academic and thesis advisors. Decisions regarding acceptance are made by the BSEnvE chair.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

Residency Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

Quality of Work Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.