BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN CIVIL AND ENVIRONMENTAL ENGINEERING AND A MAJOR CONCENTRATION IN ENVIRONMENTAL ENGINEERING

Program Learning Outcomes for the BA Degree with a Major in Civil and Environmental Engineering

Upon completing the BA with a major in Civil and Environmental Engineering and a major concentration in Environmental Engineering, students will be able to demonstrate:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to communicate effectively with a range of audiences.
3. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
4. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
5. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
6. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Requirements for the Bachelor of Arts (BA) Degree with a Major in Civil and Environmental Engineering

For general university requirements, see Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BA degree with a major in Civil and Environmental Engineering must complete:

- A minimum of 58 credit hours to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 9-10 courses (25-28 credit hours), depending on declared major concentration, taken at the 300-level or above.
- 9 courses (21 credit hours) of General Math and Science courses.
- 6 courses (16 credit hours) as Major Concentration Core courses.
- 7 courses (21 credit hours) in a focused specialty area of study.
- The requirements of a major concentration. When students declare the major (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/#text) in Civil and Environmental Engineering, students must additionally identify and declare one of two major concentrations, either in:
  1. Civil Engineering (https://ga.rice.edu/programs-study/departments-programs/engineering/civil-environmental-engineering/civil-environmental-engineering-ba-civil-concentration/#Civil_Engineering), or
  2. Environmental Engineering (p. 2).

Because of the common core requirements, it is possible for students to change their major concentration at any time, even after initially declaring the major. To do so, please contact the Office of the Registrar (registrar@rice.edu).

Each major concentration is to be tailored to the specific needs of the student by discussions with, and approval by, the Civil and Environmental Engineering departmental major concentration advisor. Although not required, students are encouraged to double major when pursuing the BA degree.

The coherent and complete core curriculum is designed to give Rice undergraduate students a consistent technological literacy through the lens of Civil and Environmental Engineering and to prepare students for graduate school in engineering, various sciences (depending upon focus), economics, business MBA, political science, law, or medicine. Select students will be invited to finish an accelerated MS/PhD degree in the CEVE Department (see your advisor or department chair for details). Those students who want to obtain an engineering degree from a program accredited by the Engineering Accreditation Commission (EAC) of ABET must follow one of the Bachelor of Science programs the EAC has accredited at Rice, like the Bachelor of Science in Civil Engineering (BSCE). Students pursuing professional engineering licensure should also consider our BS in Civil and Environmental Engineering (BSCE).

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major’s academic advisor, or where applicable, the department’s Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major’s Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the Major in Civil and Environmental Engineering</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Total Credit Hours Required for the BA Degree with a Major in Civil and Environmental Engineering</td>
<td>120</td>
</tr>
</tbody>
</table>

Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Core Requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Math and Science Courses</td>
<td></td>
</tr>
<tr>
<td>CHEM 121</td>
<td>GENERAL CHEMISTRY I</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 111</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY I</td>
<td></td>
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</tbody>
</table>
Environmental Engineering.

Students must complete the following 6 courses (16 credit hours) to satisfy the requirements for the major concentration in Environmental Engineering.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 123</td>
<td>GENERAL CHEMISTRY LABORATORY I</td>
<td>1</td>
</tr>
<tr>
<td>or CHEM 113</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY LAB I</td>
<td>3</td>
</tr>
<tr>
<td>CMOR 220</td>
<td>INTRODUCTION TO ENGINEERING COMPUTATION</td>
<td>3</td>
</tr>
<tr>
<td>or CMOR 302</td>
<td>MATRIX ANALYSIS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>AP/OTH CREDIT IN CALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 101 &amp; PHYS 103</td>
<td>MECHANICS (WITH LAB) and MECHANICS DISCUSSION ¹</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 102 &amp; PHYS 104</td>
<td>ELECTRICITY &amp; MAGNETISM (WITH LAB) and ELECTRICITY AND MAGNETISM DISCUSSION ²</td>
<td>4</td>
</tr>
</tbody>
</table>

Major Concentration

Select 1 of the following Major Concentrations (see below for Major Concentration requirements):

- Civil Engineering
- Environmental Engineering

Specialty Focus Area

Select 7 courses from approved electives selected with the Civil and Environmental Engineering advisor (see below for more information, including course requirements).

Total Credit Hours Required for the Major in Civil and Environmental Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEVE 307 / EEPS 307 / ENST 307</td>
<td>ENERGY AND THE ENVIRONMENT</td>
<td>3</td>
</tr>
<tr>
<td>CEVE 310</td>
<td>PRINCIPLES OF ENVIRONMENTAL ENGINEERING</td>
<td>3</td>
</tr>
<tr>
<td>CEVE 315</td>
<td>URBAN WATER SYSTEMS: SOURCES, TREATMENT, DISTRIBUTION, RESOURCE RECOVERY AND REUSE</td>
<td>3</td>
</tr>
<tr>
<td>CEVE 316</td>
<td>URBAN WATER SYSTEMS LAB: WATER QUALITY PARAMETERS AND TREATMENT TECHNIQUES</td>
<td>1</td>
</tr>
<tr>
<td>CEVE 401</td>
<td>CHEMISTRY FOR ENVIRONMENTAL ENGINEERING AND SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td>CEVE 412</td>
<td>HYDROLOGY AND WATER RESOURCES ENGINEERING</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours

16

Footnotes and Additional Information

*Note: University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student’s declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

¹ The Civil and Environmental Engineering department has determined that credit awarded for PHYS 141 CONCEPTS IN PHYSICS I is not eligible for meeting the requirements of the Civil and Environmental Engineering major.

² The Civil and Environmental Engineering department has determined that credit awarded for PHYS 142 CONCEPTS IN PHYSICS II is not eligible for meeting the requirements of the Civil and Environmental Engineering major.

Major Concentration: Environmental Engineering

Students must complete the following 6 courses (16 credit hours) to satisfy the requirements for the major concentration in Environmental Engineering.

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>AP/OTH CREDIT IN CALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 101 &amp; PHYS 103</td>
<td>MECHANICS (WITH LAB) and MECHANICS DISCUSSION</td>
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<td>4</td>
</tr>
</tbody>
</table>

Policies for the BA Degree with a Major in Civil and Environmental Engineering and a Major Concentration in Environmental Engineering

Program Restrictions and Exclusions

Students pursuing the BA Degree with a Major in Civil and Environmental Engineering and a Major Concentration in Environmental Engineering should be aware of the following program restrictions:

- As noted in Majors, Minors, and Certificates (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors).
Departmental Honor, Award, and Scholarship
or designations.

university/

Work

cum laude

students/honors-distinctions/university/

honors, please see

undergraduate's academic history at Rice. For information on university

The university recognizes academic excellence achieved over an

Environmental Engineering

Opportunities for the BA Degree with a Major in Civil and Environmental Engineering and a Major Concentration in Environmental Engineering may pursue only one major concentration within the major.

Transfer Credit
For Rice University's policy regarding transfer credit, see Transfer

Credit (https://qa.rice.edu/undergraduate-students/academic-policies-

procedures/transfer-credit/). Some departments and programs have

additional restrictions on transfer credit. The Office of Academic Advising

maintains the university's official list of transfer credit advisors (https://

qaa.rice.edu/advising-network/transfer-credit-advisors/) on their

website: https://oaa.rice.edu. Students are encouraged to meet with their

academic program's transfer credit advisor when considering transfer

credit possibilities.

Departmental Transfer Credit Guidelines
Students pursuing the major in Civil and Environmental

Engineering should be aware of the following departmental transfer credit

guidelines:

• Requests for transfer credit will be considered by the program
director (and/or the program's official transfer credit advisor) on an

individual case-by-case basis.

Additional Information
For additional information, please see the Civil and Environmental

Engineering website: https://cee.rice.edu/

Opportunities for the BA Degree with

a Major in Civil and Environmental

Engineering and a Major Concentration in

Environmental Engineering

Academic Honors
The university recognizes academic excellence achieved over an

undergraduate's academic history at Rice. For information on university

honors, please see Latin Honors (https://qa.rice.edu/undergraduate-

students/honors-distinctions/university/) (summa cum laude, magna

cum laude, and cum laude) and Distinction in Research and Creative

Work (https://qa.rice.edu/undergraduate-students/honors-distinctions/

university/). Some departments have department-specific Honors awards

or designations.

Departmental Honor, Award, and Scholarship
Opportunities
• Distinction in Research and Creative Work: The Department of

Civil and Environmental Engineering will recognize graduating

seniors for outstanding creative contributions with the award of

Distinction in Research and Creative Work (https://qa.rice.edu/

undergraduate-students/honors-distinctions/university/). The

Department recognizes this award as being a significant honor.

As such, it will be awarded to no more than 20% of a graduating

class (rounded up to next whole number). This award shall be

given for significant contributions in research, design, and creative

projects beyond class assignments (except CEVE 499). Generally, it

is expected that the student recipients will have performed research/

design for a minimum of two academic segments (one segment

= one academic year or one summer) during their undergraduate

career (either for credit or pay). It may be given for one outstanding

piece of work for consistent meaningful contributions made over the

course of an undergraduate career. All majors (BA and BS) are eligible

and will be considered for this distinction in the spring prior to their

graduation.

• Rice Global Forum: Rice Global Forum (RGF) is an engineering

and construction industry funded center which is in its second

decade of operation. It was founded by Ahmad Durrani, past chair

of Civil and Environmental Engineering at Rice. RGF funds and

facilitates interaction with the engineering and construction industry,

particularly oil and gas related work. RGF funds $25,000 worth of

scholarships every year. In addition, RGF also consistently sponsors

and supports Engineers Without Borders (EWB) and has donated

to other student clubs as well in addition to holding an engineering
design competition every year in February during National Engineers

Week.

Fifth-Year Master's Degree Option for Rice
Undergraduate Students
In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an

additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or

senior year. Upon acceptance, depending on course load, financial aid

status, and other variables, they may then start taking some required

courses of the master's degree program. A plan of study will need to be

approved by the student’s undergraduate major advisor and the master's

degree program director.

As part of this option and opportunity, Rice undergraduate students:

• must complete the requirements for a bachelor's degree and the

master’s degree independently of each other (i.e. no course may be

counted toward the fulfillment of both degrees).

• should be aware there could be financial aid implications if the

conversion of undergraduate coursework to that of graduate level

reduces their earned undergraduate credit for any semester below that

of full-time status (12 credit hours).

• more information on this Undergraduate - Graduate Concurrent

Enrollment opportunity, including specific information on the

registration process can be found here (https://qa.rice.edu/

undergraduate-students/academic-opportunities/undergraduate-

graduate-concurrent-enrollment/).

Rice undergraduate students completing studies in science and

engineering may have the option to pursue the Master of Civil and

Environmental Engineering (MCEE) degree. For additional information,

students should contact their undergraduate major advisor and the

(MCEE) chair of the department graduate studies committee.

Student Organizations and Clubs
• American Society of Civil Engineers Student (ASCE): https://


www.asce.org/communities/student-members/)

ASCE seeks to promote civil and environmental engineering, expose

students to real world engineering, and connect students to alumni
and professionals. Throughout the year we invite speakers from the industry, visit plants and sites, and organize social events. The objectives of this Chapter are to encourage the development of a professional consciousness, to afford an opportunity for civil engineering students to become acquainted and to practice working together effectively, to promote a spirit of congeniality among them, and to provide friendly contact with the engineering profession. We also support the Concrete Canoe competition (see below) and the Seismic Design Competition of the Earthquake Engineering Research Institute (EERI).

• **Chi Epsilon:** [https://www.chi-epsilon.org/](https://www.chi-epsilon.org/)
  Chi Epsilon is dedicated to maintaining and promoting the status of civil engineering as an ideal profession. Chi Epsilon was organized to recognize the characteristics of the individual civil engineering deemed to be fundamental to the successful pursuit of an engineering career, and to aid in the development of those characteristics in the civil engineering student.

• **Engineers Without Borders (EWB):** [https://ewb.rice.edu/](https://ewb.rice.edu/)
  EWB partners with developing communities worldwide to design engineering solutions that will improve their standards of living. It is an important component of the Civil and Environmental Engineering program. BA students with their flexible curriculum are encouraged to participate. This exciting endeavor allows undergraduates to have an experience in a developing country, where they are able to design and build a project to help society. Students have been attracted to the EWB program in large numbers and our local chapter is one of the most successful in the United States. Some CEVE courses are EWB-related, providing the opportunity to also obtain credit hours.

• **Concrete Canoe:** [https://concretecanoe.rice.edu/](https://concretecanoe.rice.edu/)
  Rice Concrete Canoe is a student-run club that creates a functional concrete canoe to race and present at the yearly ASCE sponsored competition. Through the year, members gain engineering experience through the research, planning and constructing of a concrete canoe. By offerings members exposure to the engineering design process, small-group work, software such as Matlab and Adobe Illustrator (and possibly more starting this year), and laser cutters, Concrete Canoe offers a unique experience to students regardless of whether or not they want to become engineers.

• **Society of Women Engineers:** [https://swe.rice.edu/](https://swe.rice.edu/)
  The Society of Women Engineers aims to empower women to pursue and achieve their full potential in science and engineering related fields. We provide opportunities in professional development, academic and post-graduate planning, community outreach, and social events.

**Additional Information**

For additional information, please see the Civil and Environmental Engineering website: [https://cee.rice.edu/](https://cee.rice.edu/)