BACHELOR OF SCIENCE WITH A MAJOR IN CIVIL ENGINEERING, TRANSPORTATION AND SUSTAINABILITY ENGINEERING OPTION

Graduates with the degree of bachelor of science in civil engineering, transportation and sustainability engineering option, have an in-depth understanding of traffic engineering concepts, analysis and design methods related to traffic flow, highway capacity, and measurement and control. Students gain basic understanding of human processes and interactions dictating urban demand for space and modes of movements of passengers and goods and how to plan urban transportation infrastructure to answer such demand in a sustainable manner.

Visit the program website (http://www.cee.seas.gwu.edu/programs-degrees) for additional information.

Bachelor of Science With a Second Major in Civil Engineering

Any undergraduate student who is enrolled at GW, may declare a second major in civil engineering only if their primary degree is a bachelor of science and the student must follow all the same degree requirements as those receiving a bachelor of science in civil engineering which include SEAS general, major, engineering electives, humanities/social science, and SEAS/technical GPA requirements. See the University Bulletin for more information on BS in Civil Engineering curriculum requirements for all the courses needed to complete the second major.

All other scenarios (BA, BBA, BFA, etc.) require the student to complete a double degree (http://bulletin.gwu.edu/university-regulations/#DDegrees).

Graduation grade-point average criteria:

To satisfactorily complete a second major in civil engineering, a student must have a minimum grade-point average of 2.2 in all technical engineering courses outlined in the fifth, sixth, seventh, and eighth semesters of the curriculum.

REQUIREMENTS

Recommended program of study

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>First semester</strong></td>
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<tr>
<td>CE 1010</td>
<td>Introduction to Civil and Environmental Engineering</td>
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<tr>
<td>CHEM 1111</td>
<td>General Chemistry I *</td>
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<td>MATH 1231</td>
<td>Single-Variable Calculus I *</td>
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<td>SEAS 1001</td>
<td>Engineering Orientation</td>
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<td>UW 1020</td>
<td>University Writing *</td>
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<td>One humanities and social science elective **</td>
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<tr>
<td><strong>Second semester</strong></td>
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<tr>
<td>CSCI 1121</td>
<td>Introduction to C Programming</td>
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<tr>
<td>MAE 1004</td>
<td>Engineering Drawing and Computer Graphics</td>
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<tr>
<td>MATH 1232</td>
<td>Single-Variable Calculus II *</td>
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<td>PHYS 1021</td>
<td>University Physics I *</td>
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<td>SUST 1001</td>
<td>Introduction to Sustainability</td>
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<td><strong>Third semester</strong></td>
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<tr>
<td>APSC 2057</td>
<td>Analytical Mechanics I</td>
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<td>APSC 2113</td>
<td>Engineering Analysis I</td>
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<tr>
<td>MATH 2233</td>
<td>Multivariable Calculus *</td>
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<td>PHYS 1022</td>
<td>University Physics II *</td>
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<td><strong>Fourth semester</strong></td>
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<tr>
<td>APSC 2058</td>
<td>Analytical Mechanics II</td>
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<td>CE 2210</td>
<td>Engineering Computations</td>
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<tr>
<td>CE 2220</td>
<td>Introduction to the Mechanics of Solids</td>
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<tr>
<td>CE 2710</td>
<td>Introduction to Transportation Engineering</td>
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<td>GEOL 1001</td>
<td>Physical Geology *</td>
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<td><strong>Fifth semester</strong></td>
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<tr>
<td>APSC 3115</td>
<td>Engineering Analysis III</td>
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<tr>
<td>CE 3110W</td>
<td>Civil Engineering Materials</td>
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<td>CE 3111W</td>
<td>Civil Engineering Materials Lab</td>
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<tr>
<td>CE 3230</td>
<td>Structural Theory I</td>
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<tr>
<td>CE 3720</td>
<td>Highway Engineering and Design</td>
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<tr>
<td>MAE 3126</td>
<td>Fluid Mechanics I</td>
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Sixth semester

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<tr>
<td>CE 3240</td>
<td>Structural Theory II</td>
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<td>CE 3310</td>
<td>Reinforced Concrete Structures</td>
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<tr>
<td>CE 3520</td>
<td>Environmental Engineering I: Water Resources and Water Quality</td>
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<td>CE 3521</td>
<td>Environmental Engineering Laboratory</td>
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<tr>
<td>CE 3610</td>
<td>Hydraulics</td>
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<tr>
<td>CE 3611</td>
<td>Hydraulics Laboratory</td>
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One humanities and social science elective **

Seventh semester

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<td>CE 4320</td>
<td>Metal Structures</td>
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<td>CE 4341</td>
<td>Senior Design Project I</td>
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<tr>
<td>CE 4410</td>
<td>Introduction to Geotechnical Engineering</td>
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<td>CE 4411</td>
<td>Geotechnical Engineering Laboratory</td>
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<td>CE 4530</td>
<td>Environmental Engineering II: Water Supply and Pollution Control</td>
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<tr>
<td>CE 4620</td>
<td>Hydrology and Hydraulic Design</td>
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One humanities and social science elective **

One engineering elective selected from the list below

Eighth semester

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<tr>
<td>CE 4330</td>
<td>Contracts and Specifications</td>
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<td>CE 4342</td>
<td>Senior Design Project II</td>
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<tr>
<td>CE 6730</td>
<td>Sustainable Urban Planning</td>
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Two engineering electives selected from the list below

Code | Title                                                   | Credits |
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<tr>
<td>CE 4810</td>
<td>Research</td>
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<td>CE 4820</td>
<td>Special Topics</td>
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<tr>
<td>CE 6102</td>
<td>Application of Probability Methods in Civil Engineering</td>
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<tr>
<td>CE 6201</td>
<td>Advanced Strength of Materials</td>
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<td>CE 6202</td>
<td>Methods of Structural Analysis</td>
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<td>CE 6203</td>
<td>Reliability Analysis of Engineering Structures</td>
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<td>CE 6204</td>
<td>Analysis of Plates and Shells</td>
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<td>CE 6205</td>
<td>Theory of Structural Stability</td>
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<td>CE 6206</td>
<td>Continuum Mechanics</td>
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<td>CE 6207</td>
<td>Theory of Elasticity I</td>
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<td>CE 6208</td>
<td>Plasticity</td>
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<td>CE 6209</td>
<td>Mechanics of Composite Materials</td>
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<td>CE 6301</td>
<td>Design of Reinforced Concrete Structures</td>
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<td>CE 6302</td>
<td>Prestressed Concrete Structures</td>
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<td>CE 6320</td>
<td>Design of Metal Structures</td>
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<td>CE 6321</td>
<td>Advanced Metal Structures</td>
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<td>CE 6401</td>
<td>Fundamentals of Soil Behavior</td>
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<td>CE 6402</td>
<td>Theoretical Geomechanics</td>
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<td>CE 6403</td>
<td>Foundation Engineering</td>
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<td>CE 6404</td>
<td>Geotechnical Earthquake Engineering</td>
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<td>CE 6405</td>
<td>Rock Engineering</td>
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<td>CE 6501</td>
<td>Environmental Chemistry</td>
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<tr>
<td>CE 6502</td>
<td>Advanced Sanitary Engineering Design</td>
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<tr>
<td>CE 6503</td>
<td>Principles of Environmental Engineering</td>
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<td>CE 6504</td>
<td>Water and Wastewater Treatment Processes</td>
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<td>CE 6505</td>
<td>Environmental Impact Assessment</td>
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<td>CE 6506</td>
<td>Microbiology for Environmental Engineers</td>
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<tr>
<td>CE 6507</td>
<td>Advanced Treatment Processes</td>
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<td>CE 6508</td>
<td>Industrial Waste Treatment</td>
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<td>CE 6509</td>
<td>Introduction to Hazardous Wastes</td>
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<td>CE 6601</td>
<td>Open Channel Flow</td>
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<tr>
<td>CE 6602</td>
<td>Hydraulic Engineering</td>
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<td>CE 6603</td>
<td>Design of Dams</td>
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<td>CE 6604</td>
<td>Advanced Hydrology</td>
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<tr>
<td>CE 6605</td>
<td>Ground Water and Seepage</td>
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Bachelor of Science with a Major in Civil Engineering, Transportation and Sustainability Engineering Option 2
Bachelor of Science with a Major in Civil Engineering, Transportation and Sustainability Engineering Option

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<tr>
<th>Code</th>
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<tr>
<td>CE 6606</td>
<td>Mechanics of Water Waves</td>
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<td>CE 6607</td>
<td>Water Resources Planning and Control</td>
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<td>CE 6608</td>
<td>Hydraulic Modeling</td>
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<tr>
<td>CE 6609</td>
<td>Numerical Methods in Environmental and Water Resources</td>
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<td>CE 6610</td>
<td>Pollution Transport Systems</td>
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<tr>
<td>CE 6601</td>
<td>Analytical Mechanics</td>
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<tr>
<td>CE 6602</td>
<td>Vehicle Dynamics</td>
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<tr>
<td>CE 6605</td>
<td>Nonlinear Finite Element Modeling and Simulation</td>
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<tr>
<td>CE 6606</td>
<td>Pavement and Runway Design</td>
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<tr>
<td>CE 6607</td>
<td>Systems Dynamics Modeling and Control</td>
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<tr>
<td>CE 6621</td>
<td>Traffic Engineering and Highway Safety</td>
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<tr>
<td>CE 6622</td>
<td>Intelligent Transportation Systems</td>
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<td>CE 6800</td>
<td>Special Topics</td>
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<tr>
<td>EMSE 6410</td>
<td>Survey of Finance and Engineering Economics</td>
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**Additional elective options for this program**

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<tbody>
<tr>
<td>ECON 8375</td>
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<td>EMSE 3855</td>
<td>Critical Infrastructure Systems</td>
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<td>STAT 6201</td>
<td>Mathematical Statistics I</td>
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<td>STAT 6207</td>
<td>Methods of Statistical Computing I</td>
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<td>STAT 6210</td>
<td>Data Analysis</td>
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<tr>
<td>STAT 6215</td>
<td>Applied Multivariate Analysis I</td>
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*Course satisfies the university general education requirement in math, science, and writing.

**At least two social and behavioral sciences courses must be selected from the University General Education Requirement list (http://bulletin.gwu.edu/university-regulations/general-education); the remaining course must be selected from either the University General Education Requirement list or the SEAS General Education Requirement list (http://www.seas.gwu.edu/sites/www.seas.gwu.edu/files/downloads/HSS%20Form%20Fall%202015%20Admits%201_0.pdf). At least one humanities course must be selected from the University General Education Requirement list (http://bulletin.gwu.edu/university-regulations/general-education).