

# 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

Code	Title	Credits
<b>First semester</b>		
CE 1010	Introduction to Civil and Environmental Engineering	
CHEM 1111	General Chemistry I *	
MATH 1231	Single-Variable Calculus I *	

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

**Sixth semester**

CE 3240	Structural Theory II
CE 3310	Reinforced Concrete Structures
CE 3520	Environmental Engineering I: Water Resources and Water Quality
CE 3521	Environmental Engineering Laboratory
CE 3610	Hydraulics
CE 3611	Hydraulics Laboratory

One humanities and social science elective \*\*

**Seventh semester**

CE 4320	Metal Structures
CE 4341	Senior Design Project I
CE 4410	Introduction to Geotechnical Engineering
CE 4411	Geotechnical Engineering Laboratory
CE 4530	Environmental Engineering II: Water Supply and Pollution Control
CE 4620	Hydrology and Hydraulic Design

One humanities and social science elective \*\*

One engineering elective selected from the list below

**Eighth semester**

CE 4330	Contracts and Specifications
CE 4342	Senior Design Project II
CE 6730	Sustainable Urban Planning

Two engineering electives selected from the list below

Code	Title	Credits
<b>Engineering electives</b>		
CE 4810	Research	
CE 4820	Special Topics	
CE 6102	Application of Probability Methods in Civil Engineering	
CE 6201	Advanced Strength of Materials	
CE 6202	Methods of Structural Analysis	

CE 6203	Reliability Analysis of Engineering Structures
CE 6204	Analysis of Plates and Shells
CE 6205	Theory of Structural Stability
CE 6206	Continuum Mechanics
CE 6207	Theory of Elasticity I
CE 6208	Plasticity
CE 6209	Mechanics of Composite Materials
CE 6301	Design of Reinforced Concrete Structures
CE 6302	Prestressed Concrete Structures
CE 6320	Design of Metal Structures
CE 6321	Advanced Metal Structures
CE 6401	Fundamentals of Soil Behavior
CE 6402	Theoretical Geomechanics
CE 6403	Foundation Engineering
CE 6404	Geotechnical Earthquake Engineering
CE 6405	Rock Engineering
CE 6501	Environmental Chemistry
CE 6502	Advanced Sanitary Engineering Design
CE 6503	Principles of Environmental Engineering
CE 6504	Water and Wastewater Treatment Processes
CE 6505	Environmental Impact Assessment
CE 6506	Microbiology for Environmental Engineers
CE 6507	Advanced Treatment Processes
CE 6508	Industrial Waste Treatment
CE 6509	Introduction to Hazardous Wastes
CE 6601	Open Channel Flow
CE 6602	Hydraulic Engineering
CE 6603	Design of Dams
CE 6604	Advanced Hydrology
CE 6605	Ground Water and Seepage

regulations/general-education); the remaining courses 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](http://www.seas.gwu.edu/sites/www.seas.gwu.edu/files/downloads/HSS%20Form%20Fall%202015%20Admits%201_0.pdf))

CE 6606	Mechanics of Water Waves
CE 6607	Water Resources Planning and Control
CE 6608	Hydraulic Modeling
CE 6609	Numerical Methods in Environmental and Water Resources
CE 6610	Pollution Transport Systems
CE 6701	Analytical Mechanics
CE 6702	Vehicle Dynamics
CE 6705	Nonlinear Finite Element Modeling and Simulation
CE 6706	Pavement and Runway Design
CE 6707	Systems Dynamics Modeling and Control
CE 6721	Traffic Engineering and Highway Safety
CE 6722	Intelligent Transportation Systems
CE 6800	Special Topics
EMSE 6410	Survey of Finance and Engineering Economics

Code	Title	Credits
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**Additional elective options for this program**

ECON 8375	Econometrics I
EMSE 3855	Critical Infrastructure Systems
STAT 6201	Mathematical Statistics I
STAT 6207	Methods of Statistical Computing I
STAT 6210	Data Analysis
STAT 6215	Applied Multivariate Analysis I

\*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](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->