

McCormick School's Mission Statement – Excellence at All Levels

The Robert R. McCormick School of Engineering and Applied Science seeks excellence at all levels from its students, faculty, and staff. Our goal is to be a recognized world leader in science and technology-driven initiatives, such as materials and nanotechnology, bioengineering and biotechnology, infrastructure and critical infrastructure and systems. We aspire to be a world leader in societal-driven initiatives that positively impact our world. We actively collaborate with industry, governmental and peer institutions to assist us in accomplishing these goals.

Department of Civil and Environmental Engineering's Undergraduate Programs

The McCormick School's Mission Statement provides the foundation for articulating the Educational Objectives and Outcomes of the Department of Civil and Environmental Engineering's (CEE) two Undergraduate Programs—the Bachelor of Science in Civil Engineering and the Bachelor of Science in Environmental Engineering.

The Educational Objectives and Outcomes and how they meet ABET (Accrediting Board for Engineering and Technology) criteria “a-k” for the two separately accredited degree programs are presented in two separate tables: [Civil](#) & [Environmental Engineering](#), along with the American Society of Civil Engineers and the American Academy of Environmental Engineers overlays in bold.

Program Assessment Tables for the [Civil](#) and the [Environmental](#) programs are employed in the CEE Department's [Program Enhancement Cycle](#) that is implemented yearly to assess student learning and improve program outcomes.

**Bachelor of Science in Civil Engineering (BSCE)'s
Educational Objectives and Program Outcomes**

Described with Accrediting Board for Engineering and Technology (ABET)'s Criteria (a-k)

<i>BSCE Educational Objectives</i>	<i>BSCE Program Outcomes</i>
<p>A. Graduates employ their knowledge of science, mathematics, and engineering in civil and environmental engineering practice, research, and management as well as other professional fields such as law, medicine, finance and management.</p>	<p>(a) Ability to apply knowledge of mathematics, science, and engineering (including probability and statistics).</p> <p>(b) Ability to design and conduct experiments, as well as to analyze and interpret data in at least 4 recognized areas.*</p> <p>(e) Ability to identify, formulate and solve engineering problems in at least 4 recognized areas.*</p> <p>(k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.</p>
<p>B. Graduates become leaders in organizations that focus on advanced problem solving for complex systems in multidisciplinary settings.</p>	<p>(c) Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.</p> <p>(d) Ability to function on multidisciplinary teams.</p> <p>(e) ability to identify, formulate and solve engineering problems in at least 4 recognized areas.*</p> <p>(g) Ability to communicate effectively.</p> <p>(h) Ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.</p> <p>(k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.</p>
<p>C. Graduates play key roles in the process of constructing and managing local and global civil and environmental infrastructure systems</p>	<p>(d) Ability to function on multidisciplinary teams.</p> <p>(f) Understanding of professional and ethical responsibility.</p> <p>(g) Ability to communicate effectively.</p> <p>(h) Ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.</p> <p>(j) Knowledge of contemporary issues.</p>
<p>D. Graduates are engaged in broadly conceived organizations that require a diversity of thought, creativity, and curiosity.</p>	<p>(d) Ability to function on multidisciplinary teams.</p> <p>(f) Understanding of professional and ethical responsibility.</p> <p>(g) Ability to communicate effectively.</p> <p>(h) Ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.</p> <p>(i) Recognition of the need for, and an ability to engage in lifelong learning.</p> <p>(j) Knowledge of contemporary issues</p>

Emboldened Outcomes are part of the *American Society of Civil Engineers (ASCE)* definition of Professional Practice: Procurement of work, bidding versus quality-based selection processes, how design professionals and construction professionals interact to construct a project, the importance of professional licensure and continuing education, and other professional practice issues. *ASCE recognized areas include Environment, Fluids, Geotechnics, Structures, and Transportation.

2009

**BSCE
Program
Assessment
Table**

Courses	216 Mech of Materials	221 Theory of Structures	222 Structural Steel Design	250 Soil Mechanics	260 Environmental Engrg	340 Fluid Mech II	371 Trans. Plan & Analysis	Calculus-based Probability Crs	330 Construction Mgmt	382 CAPSTONE DESIGN	325 RF Concrete Design	352 Foundation Engineering	302 Engineering Law	304 CEE Engr Syst Analysis	321 Properties of Concrete	336 Project Scheduling	GEN_ENG 220 CAD	IDEA Engr. Design/Comm
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Please assess your satisfaction with the listed courses (identified by column headings) by using the "a-k" criteria (identified by row). Learning outcomes (the "a-k" criteria) are assessed only in the white boxes (marked with an X), so only the white boxes need to be completed with your "response number" ranging from: 1= not at all satisfied; 2 = hardly satisfied; 3 = somewhat satisfied; 4 = largely satisfied; 5 = mostly satisfied. Of course, you may fill other boxes if you wish, or add comments in the response space at the end of the Survey.

a. an ability to apply knowledge of mathematics, science, and engineering (including chemistry, physics, geology and biology)

X	X	X	X	X	X					X	X		X	X				
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b. an ability to design and conduct experiments as well as to analyze and interpret data in more than one focus area.

X				X	X										X			
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c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political. ethical. health and safetv. manufacturabilitv. and sustainabilitv

		X							X	X	X							X
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d. an ability to function on multidisciplinary teams

		X		X		X			X	X		X		X	X			X
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e. an ability to identify, formulate, and solve engineering problems

X	X	X	X	X	X	X		X	X	X	X	X	X					X
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f. an understanding of professional and ethical responsibility

				X				X				X						
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g. an ability to communicate effectively

	X	X				X				X	X	X	X	X	X			X
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h. an ability to understand the impact of engineering solutions in a global, economic, environmental and social context

				X		X							X					
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i. a recognition of the need for, and an ability to engage in lifelong learning (evaluated as part of leadership audit from exit survey and resume)

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j. a knowledge of contemporary issues (evaluated through arts and sciences themes)

			X	X				X		X				X	X			
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k. an ability to use the techniques, skills, modern engineering tools necessary for engineering practice and concepts of professional practice

X	X	X	X		X			X		X			X		X	X		
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Required							Required*			50%+TookCrs		33% + Took Course				GenEng	McC
216	221	222	250	260	340	371	Prob	330	382	325	352	302	304	321	336	220 **	IDEA

notes: * in 2007-09 catalog. ** strongly recommended. White X'd box = course instructor assesses that ABET "a-K" learning outcome.

**Bachelor of Science in Environmental Engineering (BSEE)
Program of Study's Educational Objectives**

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ABET's Criteria (a-k)

<i>BSEE Educational Objectives</i>	<i>ABET criteria (a-k)</i>
<p>1. Excel in the engineering practice, research and management associated with the protection and conservation of ecological and human health.</p>	<p>(a) Ability to apply knowledge of mathematics, science, and engineering (including chemistry, physics, earth science, biological science, and fluid mechanics). (e) Ability to identify, formulate and solve engineering problems. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice. (l) Understanding of concepts of professional practice and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.*</p>
<p>2. Play key roles in the analysis of the behavior of complex natural and engineered environmental systems and design infrastructure in a sustainable way to meet societal needs.</p>	<p>(c) Ability to design a system, component, or process to meet desired needs. (d) Ability to function on multidisciplinary teams. (e) Ability to identify, formulate and solve engineering problems. (f) Understanding of professional and ethical responsibility. (h) Broad education necessary to understand the impact of engineering solutions in a global and societal context. (j) Knowledge of contemporary issues. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.</p>
<p>3. Apply their broad environmental engineering training to excel and become leaders in a diverse range of professions including engineering consulting, industry, medicine, law, government, and education.</p>	<p>(c) Ability to design a system, component, or process to meet desired needs. (e) Ability to identify, formulate and solve engineering problems. (f) Understanding of professional and ethical responsibility. (g) Ability to communicate effectively. (h) Broad education necessary to understand the impact of engineering solutions in a global and societal context. (i) Recognition of the need for, and an ability to engage in life-long learning. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.</p>

<i>BSEE Educational Objectives</i>	<i>ABET criteria (a-k)</i>
<p>4. Think critically, behave ethically and consider the technical and social consequences of their work, especially as it affects the health, safety and environment of both ecological and human communities.</p>	<p>(f) Understanding of professional and ethical responsibility. (h) Broad education necessary to understand the impact of engineering solutions in a global and societal context. (i) Recognition of the need for, and an ability to engage in life-long learning. (j) Knowledge of contemporary issues. (k) Ability to use the techniques, skills, and modern engineering tools necessary for professional engineering practice.</p>
<p>5. Apply their knowledge creatively and innovatively throughout their careers to meet the challenges posed by a rapidly changing world.</p>	<p>(a) Ability to apply knowledge of mathematics, science, and engineering (including chemistry, physics, earth science, biological science, and fluid mechanics). (b) Ability to design and conduct experiments, as well as to critically analyze and interpret data <i>in more than one major environmental engineering focus area</i>. (d) Ability to function on multidisciplinary teams. (e) Ability to identify, formulate and solve engineering problems (g) Ability to communicate effectively. (i) Recognition of the need for, and ability to engage in life-long learning.</p>

* Criterion "l" is an additional criterion specified by the American Academy of Environmental Engineers (AEE).

2009

**BSEE
Program
Assessment
Table**

Courses

260 Fund of Environ Engrg

340 Fluid Mechanics II

361 Envir Micro/Public Hlth

363 Env Eng Apps: Air/Land

364 Env Eng Apps: Water

365 Environ Laboratory

367 Aquatic Chemistry

370 Environ Engrg Design

201 Earth: Habitable Planet

202 Health of the Biosphere

203 Energy/Environ: The Auto

GEN_ENG 220 CAD

IDEA Engr. Design/Comm

Please assess your satisfaction with the listed courses (identified by column headings) by using the "a-k" criteria (identified by row). Learning outcomes (the "a-k" criteria) are assessed only in the white boxes (marked with an X), so only the white boxes need to be completed with your "response number" ranging from: 1= not at all satisfied; 2 = hardly satisfied; 3 = somewhat satisfied; 4 = largely satisfied; 5 = mostly satisfied. Of course, you may fill other boxes if you wish, or add comments in the response space at the end of the Survey.

a. an ability to apply knowledge of mathematics, science, and engineering (including chemistry, physics, geology and biology)	X	X	X	X		X	X	X	X	X	X		
b. an ability to design and conduct experiments as well as to analyze and interpret data in more than one focus area.		X	X	X		X		X	X	X			
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability		X	X		X			X			X		X
d. an ability to function on multidisciplinary teams			X			X		X	X	X	X		X
e. an ability to identify, formulate, and solve engineering problems	X	X	X	X	X		X	X			X		X
f. an understanding of professional and ethical responsibility			X			X		X	X		X		
g. an ability to communicate effectively			X					X		X	X		X
h. an ability to understand the impact of engineering solutions in a global, economic, environmental and social context	X	X	X	X	X		X	X	X	X	X		
i. a recognition of the need for, and an ability to engage in lifelong learning			X						X		X		
j. a knowledge of contemporary issues	X		X	X	X		X	X	X	X	X		
k. an ability to use techniques, skills, modern engineering tools necessary for engineering practice and concepts of professional practice	X	X	X	X	X	X	X	X				X	
	CIV_ENV Required								ENV_SCI Required			GEng	McC Required
	260	340	361	363	364	365	367	370	201	202	203	220	IDEA

Program Enhancement Cycle

