

## **CEE Program Outcomes**

The Civil Engineering program Educational Objectives have been formulated to produce twelve core Program Outcomes, each comprised of multiple components. The desired Outcomes are as follows:

### **Outcome 1: Apply knowledge of math, science, engineering**

- 1.1. The graduates will have an understanding of the role of mathematics as a tool in engineering study and will be able to solve problems in mathematics up to the level of differential equations.
- 1.2. The graduates will have an understanding of the fundamental laws of chemistry and calculus-based physics.
- 1.3. The graduates will understand the basic concept of statistics and probability as applied to engineering systems.
- 1.4. The graduates will have an understanding of comparing various alternatives through skills of engineering economy.
- 1.5. The graduates will have an understanding of engineering geology and material properties.

### **Outcome 2: Comprehension of four Civil Engineering areas**

- 2.1. The graduates will be exposed to various civil engineering disciplines, including structural, environmental, transportation, and engineering mechanics.
- 2.2. The graduates will take one or more courses in each of structures, environmental, hydraulics, transportation, engineering mechanics, geotechnical, materials, and surveying.
- 2.3. The graduates will have a sequence of technical electives concentrating on a single area of civil engineering (structures, engineering mechanics, environmental, and transportation).

### **Outcome 3: Explain professional registration process**

- 3.1. The graduates will understand the process involved in obtaining a professional license and can explain the importance of professional licensure.
- 3.2. The graduates will take the FE exam prior to graduation.
- 3.3. The graduates will be aware of the need for additional training and professional short courses to remain current in their field.

### **Outcome 4: Identify, formulate, and solve engineering problems**

- 4.1. The graduates will construct problem statements and offer solution criteria.
- 4.2. The graduates will select appropriate solutions based on the given criteria.
- 4.3. The graduates will select and document a recommended solution.
- 4.4. The graduates will acquire problem-solving experiences through independent and group study.
- 4.5. The graduates will incorporate multi-disciplinary knowledge into analysis and design.
- 4.6. The graduates will recognize the broad and diverse fields of civil engineering knowledge that are involved in problem solving and design.

**Outcome 5: Effective communication skills**

- 5.1. The graduates will be able to organize and present ideas clearly and logically.
- 5.2. The graduates will use proper grammar.
- 5.3. The graduates will choose appropriate audiovisual tools to support their presentation.
- 5.4. The graduates will strive to speak clearly and understandably, and provide professional presentations appropriate to the situation and audience.

**Outcome 6: Function on multi-disciplinary teams**

- 6.1. The graduates will communicate and interact with their peers in a team environment.
- 6.2. The graduates will understand the importance of project deadlines and attending team meetings regularly.
- 6.3. The graduates will participate in the development of ideas and the needed methodologies to implement the ideas.
- 6.4. The graduates will understand the importance of obtaining meaningful group consensus and working with team members to resolve conflicts constructively.

**Outcome 7: Conduct experiments and analyze data**

- 7.1. The graduates will use the knowledge of mathematics, chemistry, statistics, and engineering science in laboratory courses.
- 7.2. The graduates will be able to conduct civil engineering experiments, and analyze and interpret the resulting data.

- 7.3. The graduates will use generic software, i.e., word processors, spreadsheets, engineering solvers, etc., to complete laboratory assignments.
- 7.4. The graduates will relate theoretical concepts to relevant laboratory experiments.
- 7.5. The graduates will recognize the importance of the laboratory courses in preparation for conducting experimental research.

**Outcome 8: Use techniques, skills, and modern tools for engineering practice**

- 8.1. The graduates will use e-mail and World Wide Web for communicating and obtaining needed information.
- 8.2. The graduates will utilize word-processors, spreadsheets, and other presentation software.
- 8.3. The graduates will write programs using a programming language.
- 8.4. The graduates will produce basic engineering drawings using computer aided drafting (CAD) software.
- 8.5. The graduates will use typical civil engineering software.

**Outcome 9: Understand professional and ethical responsibility**

- 9.1. The graduates will be required to complete courses in social sciences and humanities.
- 9.2. The graduates will be aware of the basic principle of ethical conduct in providing safety and health in performance of their professional activities.
- 9.3. The graduates will understand social and ethical impacts of design decisions made in civil engineering applications.

**Outcome 10: Need for life-long learning**

- 10.1. The graduates will have opportunities to gain practical experiences and exposure to real-life problems through the Cooperative Education Program.
- 10.2. The graduates will be aware of the need to obtain new intellectual experiences for professional growth.
- 10.3. The graduates will be aware of the need for additional training and professional short courses to remain current in their field.
- 10.4. The graduates will recognize the role of advanced degrees in the practice of the civil engineering profession.

**Outcome 11: Awareness of the significance of applied research**

- 11.1. The graduates will be aware of the significance of fundamental and applied research throughout their experiences in basic and engineering science, engineering design, and laboratory classes.
- 11.2. The graduates will have an opportunity to interact with graduate students, and participate in research and scholarly activities through independent courses or project work.

**Outcome 12: Explain basic concepts in management, business, public policy, and leadership**

- 12.1. The graduates will be able to explain basic concepts in project management, construction, and asset management.
- 12.2. The graduates will have an understanding of key concepts in business, public policy and public administration.
- 12.3. The graduates will be able to explain the role of leader, leadership principles, and attitudes conducive to effective professional practice of civil engineering.