CEE STUDENT OUTCOMES

The civil engineering Program Educational Objectives have been formulated to produce twelve core outcomes, each comprised of multiple components. The desired Student Outcomes are as follows:

<u>Outcome 1:</u> 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.

<u>Outcome 2:</u> 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 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).

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<u>Outcome 3:</u> 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.

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<u>Outcome 4:</u> 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**.

<u>Outcome 5:</u> 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 be able to collaborate with their peers in preparing proposals and reports.

5.4. The graduates will choose appropriate audiovisual tools to support their presentation.

5.5. The graduates will be strived to speak clearly and understandably, and provide professional presentations appropriate to the situation and audience.

<u>Outcome 6:</u> Function on multi-disciplinaryteams

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 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 the 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.