
Department: Civil Engineering

Number of students enrolled in the program in Fall, 2011: none

Faculty member completing template: Ramzi J. Mahmood                Date: 2/6/2012

Period of reference in the template: 2006-07 to present

1. Please describe your program’s learning-outcomes trajectory since 2006-07: Has there been a transformation of organizational culture regarding the establishment of learning outcomes and the capacity to assess progress toward their achievement? If so, during which academic year would you say the transformation became noticeable? What lies ahead; what is the next likely step in developing a learning-outcomes organizational culture within the program? [Please limit your response to 200 words or less]

The graduate certificate program in Civil Engineering was designed for practicing Civil Engineers that would like to specialize in an in one of the five major areas of Civil Engineering practice (Environmental, Geotechnical, Structural, Transportation, and Water Resources). Within each of these areas, the following certificates are identified:

a. Environmental Engineering
   i. Geo-Environmental Certificate
   ii. **Treatment Systems Certificate**
   iii. Water Quality Certificate

b. Geotechnical Engineering
   i. Foundation Engineering Certificate
   ii. Ground Modification Certificate

c. Structural Engineering
   i. Structural Engineering Certificate

d. Transportation Engineering
   i. Transportation Planning Certificate
   ii. Transportation/Traffic Engineering Certificate

e. Water Resources Engineering
   i. Engineering Hydraulics Certificate
   ii. Water Resources Planning Certificate

Each of the Certificate Programs identified above is designed for professional to improve their skills in a specific area of practice.

The assessment of the certificate programs is completed with the graduate degree (refer to the master’s program assessment in Civil Engineering.)
The Treatment System Certificate requires the students to complete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
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</thead>
<tbody>
<tr>
<td>CE 252A</td>
<td>Environmental Quality Processes I</td>
<td>(CE 170 or equivalent)</td>
</tr>
<tr>
<td>CE 252B</td>
<td>Environmental Quality Processes II</td>
<td>(CE 170 or equivalent; CE 252A recommended, or instructor permission)</td>
</tr>
<tr>
<td>CE 252C</td>
<td>Environmental Quality Processes III</td>
<td>(CE 170 or equivalent; CE 252A recommended, or instructor permission)</td>
</tr>
<tr>
<td>ENGR 203</td>
<td>Engineering Statistics</td>
<td>(ENGR 115 or equivalent)</td>
</tr>
</tbody>
</table>

2. Please list in prioritized order (or indicate no prioritization regarding) up to four desired learning outcomes ("takeaways" concerning such elements of curriculum as perspectives, specific content knowledge, skill sets, confidence levels) for students completing the program. For each stated outcome, please provide the reason that it was designated as desired by the faculty associated with the program.

   The main learning outcome of each certificate is to improve the technical skills of the student in the specific area of practice. This is similar to Outcome 2 in the graduate master’s certificate, which is stated as follows:

   Identify, analyze, and solve complex practical civil engineering problems in their chosen field of specialty.

   [Please limit your response per outcome to 300 words or less]

   The certificate program is designed for students who are interested in specializing in one area by taking 12 units from the courses in the master’s program. Outcomes 1 and 2 were developed to assess the success of the graduate program.

3. For undergraduate programs only, in what ways are the set of desired learning outcomes described above aligned with the University’s Baccalaureate Learning Goals? Please be as specific as possible.

   [Please limit your response to 400 words or less]

   NA

4. For each desired outcome indicated in item 2 above, please:
   a) Describe the method(s) by which its ongoing pursuit is monitored and measured.
   b) Include a description of the sample of students (e.g., random sample of transfer students declaring the major; graduating seniors) from whom data were/will be collected and the frequency and schedule with which the data in question were/will be collected.
c) Describe and append a sample (or samples) of the “instrument” (e.g., survey or test), “artifact” (e.g., writing sample and evaluative protocol, performance review sheet), or other device used to assess the status of the learning outcomes desired by the program.

d) Explain how the program faculty analyzed and evaluated (will analyze and evaluate) the data to reach conclusions about each desired student learning outcome.

[Please limit your response to 200 words or less per learning outcome]

(If the requested data and/or analysis are not yet available for any of the learning outcomes, please explain why and describe the plan by which these will occur. Please limit your response to 500 words or less.)

The assessment program for the graduate program in Civil Engineering started last year. The assessment of the certificate program is conducted within the assessment of the graduate program (master’s program in Civil Engineering).

5. Regarding each outcome and method discussed in items 2 and 4 above, please provide examples of how findings from the learning outcomes process have been utilized to address decisions to revise or maintain elements of the curriculum (including decisions to alter the program’s desired outcomes). If such decision-making has not yet occurred, please describe the plan by which it will occur.

[Please limit your response to 200 words or less per item]

b) Outcome 2 – Identify, analyze, and solve complex practical civil engineering problems in their chosen field of specialty – This outcome is assessed by direct measure. The department has developed a five-point scale rubric for grading specific assignments or projects. The data are collected from graduate courses. Example of the data collected in Fall 2010 is shown below.

The data were collected from the following courses: ENGR203 – Engineering Statistics; CE231A – Computer Methods of Structural Analysis I; CE252A – Environmental Quality Processes I – Water Chemistry; CE272 – Advanced Hydraulics; and CE280B – Advanced Soil Mechanics and Foundation Engineering II. The Department developed a criterion of achieving the learning outcomes of 80% of the students to be in the score category of 4 and 5. The Department used JMP software for analyzing the data.

<table>
<thead>
<tr>
<th>Frequencies</th>
<th>Confidence Intervals</th>
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</thead>
<tbody>
<tr>
<td>Level</td>
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<tr>
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<td>4</td>
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<tr>
<td>5</td>
<td>19</td>
</tr>
</tbody>
</table>
| Total | 87 | 1.00000 | Total | 87 | Note: Computed using score confidence intervals.

6. Has the program systematically sought data from alumni to measure the longer-term effects of accomplishment of the program’s learning outcomes? If so, please describe the approach to this
information-gathering and the ways in which the information will be applied to the program’s curriculum. If such activity has not yet occurred, please describe the plan by which it will occur.

[Please limit your response to 300 words or less]
The assessment program for the graduate program started in Fall 2010. The feedback that the Department received is through its advisory committees. The Department has the Civil Engineering Program Advisory Committee (CEPIAC), the Environmental/Water Resources Graduate Advisory Committee (EWRGAC), and the Structural Engineering Advisory Committee. The first two committees are very active committees (meet at twice a semester). The latter is not very active (meet occasionally). The EWRGAC advisory committee has a standing subcommittee on curriculum. This advisory committee gives feedback on the curriculum on the graduate courses in environmental and water resources area. Meeting minutes are available if requested.

7. Does the program pursue learning outcomes identified by an accrediting or other professional discipline-related organization as important? Does the set of outcomes pursued by your program exceed those identified as important by your accrediting or other professional discipline-related organization?

[Please limit your response to 300 words or less]
The certificate program is not accredited by an outside agency.

8. Finally, what additional information would you like to share with the Senate Committee on Instructional Program Priorities regarding the program’s desired learning outcomes and assessment of their accomplishment?

[Please limit your response to 200 words or less]
The graduate certificate program within Civil Engineering is designed to meet the practicing engineers’ needs as part of their professional development.