

Course Tag Reflection Exemplar Critical and Creative Thinking

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CEE 478: Rehabilitation of Civil Infrastructure

Identify the course learning objectives in the syllabus that are clearly aligned to Critical & Creative Thinking and respective assignment(s).

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (ABET Student Outcome #1)

Critical and Creative Thinking (Evaluation of existing structures, e.g., evaluation of the reserved strength of an existing structural member) Assignments, Quizzes and Exams 65%.

2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (ABET Student Outcome #2)

Critical and Creative Thinking (Rehabilitation of existing structures, e.g., design of a retrofit or strengthening system for an existing structural member) Assignments, Quizzes and Exams 65%.

Explain the connection between specific assignment(s) and Critical & Creative Thinking. At least 30% of the course grade must engage students in the selected competency for the course to be tagged.

Assignments, quizzes, and exams are related to rehabilitation of existing structures, e.g., design of a retrofit or strengthening system for an existing structural member. Typically, students are asked to summarize what they have learned from the assignment or state the conclusion of their analysis and design.

As for each specific problem there are many possible solutions, which involves economic, political, operational, engineering and construction aspects. The students must come up with the most suitable solution for a specific problem under certain constraints.

Assignments 10% Critical and Creative Thinking

Unannounced Quizzes (closed book) 05% Critical and Creative Thinking

Term Exam (I) (closed book) 15% Critical and Creative Thinking

Term Exam (II) (closed book) 15% Critical and Creative Thinking

Final Exam (closed book) 20% Critical and Creative Thinking

Describe in detail the instructional strategies faculty use to intentionally teach Critical & Creative Thinking in the course.

Critical and Creative Thinking (Assignments, Quizzes and Exams 65%)
Assignments 1-8 require students to state as part of the assignment what they have learned from the assignment, which is a form of critical thinking. The fact that every problem that students encounter in this course has its unique best solution that students must find is creative by itself. The same applies to quizzes and exams, where the students are required to state why their solution is best for a specific problem.

Describe the feedback tool(s) faculty use to support students' competency development on Critical & Creative Thinking.

Detailed written feedback on all assignments, quizzes, and exams.
The following examples of approved tags may be helpful for you to review:

1. The selection of repair material "A" is a very good choice! Did you consider repair material "B" which slightly more expensive, but it cures faster? Material "B" could be a better choice if you need to open the bridge to traffic in few hours.
2. Your analysis is correct, but you assumed the steel would yield! That is an assumption! Could you verify your assumptions using strain compatibility?
3. It is correct, in reinforced concrete beams, there are two primary modes of shear failure. What makes one mode more likely to occur rather than the other? Consider concrete strength, development length, etc.