



Capstone Project

Conditions and Evaluation Criteria



Condition



Conditions

- ▶ Complex Engineering Problems
- ▶ Engineering Design (not research)
- ▶ Major design experience in at least two civil engineering contexts
- ▶ Design Constrains (challenges)
- ▶ Generating multiple solutions



Complex Engineering Problems

Include one or more of the following characteristics:
involving wide-ranging or conflicting technical issues,
having no obvious solution,
addressing problems not encompassed by current standards and codes,
involving diverse groups of stakeholders,
including many component parts or sub-problems,
involving multiple disciplines, or
having significant consequences in a range of contexts.



Engineering Design

- A process of devising a system, component, or process that meets desired needs and specifications within constraints.
- It converts resources into solutions and involves identifying opportunities, developing requirements, performing analysis and synthesis.
- The design project must represent the culminating engineering design experience acquired during earlier course work.



Major design experience in at least two civil engineering contexts

- ▶ Major design work in at least two streams of Civil Engineering
- ▶ Civil engineering streams include:
 - ▶ Structure
 - ▶ Transportation
 - ▶ Environmental
 - ▶ Geotechnical
 - ▶ Management
- ▶ Working on two part from the same stream does not count



Design Constrains

- Added challenges to the project not included previously
- They may be: accessibility, aesthetics, constructability, cost, ergonomics, extensibility, functionality, interoperability, legal considerations, maintainability, manufacturability, marketability, policy, regulations, schedule, sustainability, or usability
- New standards or codes that are more strict than the prevailing ones currently



Generating multiple solutions

- ▶ Every project must propose multiple solutions
- ▶ Solutions may be evaluated against requirements, considering risks, and making trade-offs, for obtaining a high-quality solution under the given circumstances.



Evaluation



Evaluation

- ▶ Advisor
- ▶ Committee
- ▶ ABET Committee



Advisor

- Did the student(s) define the elements of the engineering problem?
- Were the problem's elements connected by governing relationships?
- Was the problem solved?
- Was the problem well formulated?
- Was there a systematic design process in place?
- Did the design/solution accommodate specified needs?
- Was the design procedure implemented?
- Did the student(s) submit professional design deliverables?
- Did the student understand his/her role in the team?
- Did the student function effectively in a team?
- Was the student capable of obtaining new knowledge independently?
- Did the student use appropriate learning strategies?



Committee

- ▶ Did the student(s) define the elements of the engineering problem?
- ▶ Were the problem's elements connected by governing relationships?
- ▶ Was the problem solved?
- ▶ Was the problem well formulated?
- ▶ Was there a systematic design process in place?
- ▶ Did the design/solution accommodate specified needs?
- ▶ Was the design procedure implemented?
- ▶ Did the student(s) submit professional design deliverables?
- ▶ Did the student understand the technical content?
- ▶ Did the Student demonstrate effective oral communication skills?
- ▶ Did the student demonstrate effective written communication skills?
- ▶ Were decisions made considering the economic, environmental, and social impacts of engineering solutions?



ABET Committee

- ▶ Complex Engineering Problems
- ▶ Engineering Design
- ▶ Major design experience in at least two civil engineering contexts
- ▶ Design Constrains
- ▶ Generating multiple solutions



Questions?