Department of Civil and Environmental Engineering

CivE 900 – Design Capstone for Master of Engineering Students in Structural Engineering & Construction Engineering

Course Syllabus

Winter Term 2024

Course Description

An open-ended capstone design project. Students work in teams on a design project encompassing construction engineering and structural engineering disciplines. Develop a design for a project; prepare regular team reports, design memos, engineering drawings and presentations; and present findings.

Learning Outcomes

For All Students

- Learn how to approach, breakdown, and solve an undefined (or poorly defined) problem.
- Develop and execute a project workplan.
- Use acquired technical knowledge to solve a real-world problem.
- Effectively communicate design ideas and solutions to both technical and non-technical audiences.
- Function effectively on a diverse team towards shared objectives.

Additionally for Structural Engineering Students

- Develop skills in structural analysis and design.
- Select structural systems and materials based on project requirements, cost-effectiveness, constructability, and sustainability.
- Create construction documentation including structural drawings, specifications, and calculations.

Additionally for Construction Engineering Students

- Develop comprehensive construction plans and schedules that consider sequencing, resource allocation, and project constraints.
- Accurately estimate construction costs, consider cost drivers, and implement effective cost control measures.
- Ensure that design solutions are practical to construct and maintain, considering available resources, construction techniques, and site logistics.

Instructors

Cameron Franchuk, M.Sc., P.Eng.
franchuk@ualberta.ca
DICE 6-372
Office Hours: Thursdays 09:00 – 12:00 by appointment arranged via email.

Salam Khalife, Ph.D.
khalife@ualberta.ca
NREF 3-050.36
Office Hours: TBD

Course Structure

Class Time: Thursday 14:00 – 16:50 in NREF 2-127

While three hours of class time is scheduled per week, it is expected that formal content will be less than one hour per week with the remaining time devoted to addressing problems as they arise and for students to meet with their team, the "client," and consulting advisors.

Project Teams

Students will work in teams of three to five consisting of both structural engineering and construction engineering students. Team selection will be discussed in class.

Course Deliverables

There are no exams or assignments beyond the design project itself. Throughout the term, the following deliverables will be required:

Project Status Reports

- Updates on your team's progress to date.
- A sample template will be provided via eClass.

Proposal

- A final report outlining the teams proposed solution to the design problem (i.*e.,* the team's Proposal).
- Proposal requirements will be provided via the Request for Proposal (RFP).

In Class Presentation

- Teams will present their final design at the end of the term.
- Details will be provided in class.

Deliverables are due to be uploaded via eClass **by 5:00:00 pm** on the due date listed in the schedule below.

Grading

The course is **Pass/Fail** based on the instructors' evaluation of the team's deliverables. Because of the type of course and open-ended nature of the project, a marking rubric is not provided. Teams will be evaluated on the following broad concepts:

- Is the submission complete?
- Has the full scope of the problem been addressed?
- Have all parts of the RFP been answered?
- Are decisions justified and documented?
- Has appropriate engineering analysis been completed?
- Has the rationale for recommendations been given?
- Does the work represent a professional work product?

Suggested Textbooks and Other Resources

Text: **Universal Principles of Design** by William Lidwell, Kritina Holden, and Jill Bulter

Did you know that the University of Alberta has various low-to-no-cost services to help students succeed? Visit www.deanofstudents.ualberta.ca for information about the academic, wellness, and various other support services available to U of A students. It's never too early or too late to seek help!