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Welcome to Capstone

With your help the BYU Civil & Environmental Engineering Department’s Capstone Program (CE 471A & 472) is building a reputation as one of the best graduate and undergraduate experiences our students can have. Your role as a technical advisor can be integral to each student’s educational success and positive outcomes in capstone. With your help, we know that this will be a successful year. We are grateful for your willingness to share and help these remarkable students become tomorrow’s civil engineering leaders by providing opportunities for them to work on real-world problems where innovation and an understanding of today’s technical and operational challenges in civil engineering can be learned and practiced.

Dr. Jim Nelson – Director
Dr. Brett Borup – Co-Director
Kim Glade – Administrative Assistant

Capstone Overview

The Civil & Environmental Engineering Capstone Program is a two semester educational program for undergraduate and graduate students. This program enables cross-functional student teams from a variety of Civil Engineering areas (Environmental/Water, Geotechnical, Structures, and Transportation) to work on real sponsored projects.

Each team is assigned a graduate student mentor who will guide the undergraduate student team through the development of a design solution for the project. Research indicates that students work harder and more creatively when their projects are authentic and of real consequence to a sponsoring “client”. Over the two semesters, students are taught design methods and professional practice elements in civil and environmental engineering which gives them a chance to use this in a structured design process that mimics what is done in professional practice, in fact we refer to the 472 class where students are doing the actual work as an “on campus internship.”

The graduate mentor and team develop a relationship with you as the project faculty technical advisor and will look to you for ideas and to review their work. Capstone is a course of study that includes more than 200 hours of internship work including class time, lab time, and independent work towards developing a solution to sponsored project. Of course each team is comprised of 3-4 students so the combined man-hours actually devoted to solving the problem is generally more than 600. As a faculty technical advisor you should not solve their problems but rather encourage them to stretch, to research, and to put into practice what they have been taught so that they can have a successful experience by providing the sponsor with the best solution possible given time and resources available.
As a project sponsor, your support is vital to helping the student project teams succeed. We do not want you to jump in and do the project or give detailed guidelines, rather we hope that you will help them get past dead ends (their perceived dead ends) and point them in the right direction. You might take a little time to visit with the sponsor so that you have a better understanding of what the team needs to do in order to meet/exceed their desired outcomes even though that is primarily a responsibility of the graduate mentor assigned to work with your team/project. The responsibilities of the faculty advisor fall into four general areas:

1. Work with the sponsor and graduate mentor to define an appropriate scope that can be used in an RFP
2. Hold a kickoff meeting with the undergraduate team and set the stage for working together successfully.
3. Provide guidance and point teams towards potential solutions when they are stuck and having a difficult time moving forward.
4. Evaluate project results and provide assessment of team performance

We do not anticipate that your time involvement will be onerous and hope that you will become excited about seeing engineering come alive for the team as they experience the “rubber meeting the road” in civil engineering professional practice. Each of these responsibilities is discussed in a separate section below.
"By working closely with the graduate mentor during the fall semester to develop an appropriate scope, which will become the basis of the RFP the undergraduate teams respond to, not only will the objectives be well understood by the teams, but more importantly you will be able to transfer some “ownership” of the understanding and management of the project to the graduate mentor so that he/she can effectively resolve most of the technical and other questions that come up along the way.”

1. Work with the Sponsor and Graduate Mentor to Develop an RFP

One of the most important aspects of the Civil & Environmental Engineering Capstone program is the graduate student mentor. The mentor is involved in a graduate experience to further his/her understanding of civil engineering business practice, project management, and leadership. His/her experience in successfully leading the undergraduate team and developing them as engineers is the fundamental learning experience in their graduate class. Further, the graduate mentor is provided to create a buffer or liaison between the project sponsor, faculty advisor, and the team. We know that your time is valuable and that you have many other priorities ahead of the capstone project, but in order for the undergraduate teams to perform at a high level and produce results that are valuable they need to be able to ask questions and get timely responses. By working with the sponsor and graduate mentor during the fall semester to provide suggestions and guidance to develop an appropriate scope, which will become the basis of the RFP the undergraduate teams respond to, not only will the objectives be well understood by the teams, but more importantly you will be able to transfer some “ownership” of the understanding and management of the project to the graduate mentor so that he/she can effectively resolve most of the technical and other questions that come up along the way.

We expect that the graduate mentors will contact you early in September as they are assigned to a project. You will want to meet with him/her and visit enough to get an idea of the objectives of the project. You can provide suggestion about an appropriate scope and the graduate student will turn that information into a formal RFP by early October. Helping establish a good plan up front will go a long ways towards everyone involved having a successful experience.

2. Hold a Kickoff Meeting with the Undergraduate Team

In order to get to know your undergraduate team and establish boundaries and expectations you should consider holding a kickoff meeting with them. You could hold this meeting after they learn of their project assignment in November but may wish to do this right at the beginning of winter semester in January. The teams will be holding a similar meeting with the sponsor and it would be ideal for you to participate in that, but coordinating everyone’s schedules can be a challenge so this may not be possible. During the meeting you can help them gain an appreciation and excitement about the importance of the project, the value it has for them in their education, and then review the scope and make sure they get off to a good start. You should also indicate to them your schedule and expectations for interactions.

After the initial meeting it is our intent that the graduate mentor can handle most of the communications and help keep the team on task. They may reach out to you for specific technical guidance and we hope you will monitor somewhat their progress and help encourage them along the way. Be positive about the benefits the capstone experience will have for them.
3. Provide Guidance Along the Way

Teams prepare a progress report for the graduate mentor weekly. Periodically they may send these reports to you or you may request them. Respecting your time availability, the graduate mentors are expected to oversee the team’s progress, but you can interject as frequently as you would like and have time for. As you see potential problems in the direction of the team you should reach out and help put them back on track. Undoubtedly the team will face challenges and what appear to them to be dead ends. Make yourself available periodically to help them brainstorm solutions to their problems and point them to relevant research, technologies, tools that they can look into without solving the problem for them. Be sure to remind them of proper boundaries and your own time constraints.

4. Evaluate Project Results and Provide Assessment of Team Performance

Working towards tangible results for a real-world-sponsored project is important in meeting the educational outcomes of the Capstone course for our students. The project is a key in helping facilitate student learning throughout the design process. To increase the likelihood for a successful project outcome, it is important that you provide useful assessments that are prompt and help keep them moving forward. Your review along with the team’s graduate mentor is important to help facilitate a positive outcome for the students and the project.

Students value your opinion and are generally eager to address concerns that you may have. Throughout the capstone program you will be asked specifically to provide three feedback surveys for the following:

1. The project management plan

2. The mid-term report

3. The final product (report, presentation, poster)

These three assessments are critical to our evaluation of the students and help us assign grades, but we consider it a minimum. Of course your feedback to the team or to our Capstone program is welcome at any time and we encourage you to be as involved as you can.

“We encourage you to provide honest feedback that will help Capstone know what it is doing well and to identify potential areas for improvement“