

Course Proposal Details

Course Number and Title:	CIE 402 Introduction to Civil Engineering
Course Type:	New Discovery Course (not a 444 course)
Credit Hours:	4
Faculty Member:	Raymond Cook
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College:	College of Engineering and Physical Sciences
Department:	Civil Engineering
Department Chair:	Jean Benoit
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Existing Course Number:	
Existing Course Name:	
Existing Credit Hours:	
Existing Gen Ed Category:	
Existing Writing Intensive:	No
Existing Lab:	No
Typical Fall Enrollment:	
Typical Spring Enrollment:	
Discovery Category(s):	Environment, Technology and Society,
Perspective on Identity:	No
Interdisciplinary Understanding:	No
Inquiry 444:	No
Inquiry Attribute:	Yes
Not Inquiry:	No
Writing Intensive:	No
Lab:	No
Honors Program:	No
Future Honors Program:	Yes
Expected Fall Enrollment:	-
Expected Spring Enrollment:	-
	I am proposing to convert an existing course to both have an inquiry attribute and to fulfill the Discovery Category of Environment, Technology, and Society. The course is a natural fit. Civil engineering is all about engineers finding solutions, usually technical, for societal problems. In the early to mid 20th century, these solutions often ignored the environmental consequences. Hoover Dam was built, rivers were realigned, the Everglades

were drained. Beginning in the 70's, however, the results of these efforts became obvious and the public became aware. The practice of civil engineering began a significant change. Now, no civil engineering solutions can be determined without due consideration of the environmental impact and many civil engineering efforts are specifically focused on repairing the damage done in the past. I have developed and taught this course for years. Students do actual engineering calculations in each major category of civil engineering taught at UNH: structural engineering, geotechnical engineering, civil engineering materials, water resources, and environmental engineering. To this, are added topics of successful strategies for university study, basic grammar, mathematical probability, ethics and society, sustainability, and current events. There are regular homework assignments, quizzes, a mid-term, and a final exam. I have plenty of example course materials on hand should someone wish to review them as we keep these on file for our accreditation review. Over the years, we have addressed how topics in the news relate to civil engineering. I cover the 9/11 incident, Katrina, the Indian Ocean tsunami, the earthquake in Pakistan, the water shortages in China, the pros and cons of the Three Gorges dam, and other topics as they come up. We also discuss global warming, carbon offsets, the use of coal fly ash in concrete, the LEED program, ethanol, wind turbines, solar collection, and more. Next year, of course, I intend to also focus on Haiti and will use the Haiti incident as the basis for the inquiry attribute efforts. I would be glad to show you some of the slide presentations on these topics to give you a feel for how I tie civil engineering together with society and how I review the environmental impacts and considerations of these efforts.

Category Justification:

There's no avoiding it. Because civil engineering projects are often massive, involving large expenditures, and taking place over a long period of time and because these projects have a direct impact on the quality of life of the people living around them, they are constantly in the news and directly involve ethics, financing, and politics. Each Discovery Program Category is related to the topics in this class. The architecture of a grand bridge is a form of societal and technical art. The history of society is directly related to the development of highways, buildings, and the infrastructure. (Don't believe the mechanical engineers. It wasn't the wheel—it was the bridge. The Incans had road networks thousands of miles long and yet only used the wheel for play things.) One cannot reach an engineering solution without weighing the impact on society. One cannot understand how to cure concrete or treat drinking water without understanding chemistry and physics. One cannot predict if a bridge will fail or if a wind turbine will work without applying mathematical models. And one cannot judge whether an engineering solution will work without considering the culture, history, and wherewithal of the people who will live with it. These topics are woven into the lectures throughout the course.

Disciplinary Connections:

In addition to the 3 hours of lecture each week, we will add inquiry sections capped at 35 students run by teaching assistants under my direct guidance. All inquiry sections will address the same topics during the semester. I typically have about one hundred students in the class. If successful in attaining the Discovery Category and Inquiry Attribute, I expect more students will join. Thus, I plan to start with four inquiry sections this fall. This course will be required of all BSCE majors. I will, of course, be figuring out how best to add the inquiry component to this course, but at present, I plan on starting with the experience in Haiti. In the first session, I will direct the TAs to come in and simply write on the board: Civil engineering and Haiti. Discuss. It will be interesting to see how such an open ended statement gets the ball rolling. With TA guidance, I hope to have the students formulate the basic questions: what happened? why did it happen? where might a similar event happen again? how can civil engineers mitigate such disasters in the future. As the semester goes along, I hope the students work out answers to these questions as each civil engineering topic is brought up and discussed. They should be able to formulate their own questions about why the disaster was so bad early and late. Certain structures are more vulnerable, certain regions on the planet ignore

Inquiry:

earthquake threats, political decisions are made which have big impacts, codes are non-existent or not enforced. Corruption abounds. After the disaster, transportation and access become critical. Providing clean water and disposing of waste have a startling impact on the depth of the tragedy and whether or not there are revolts in the street. With this exercise, the four main inquiry attributes should be addressed. As students form their own questions, they should become curious to find their own answers. (What is the U.S. code system? Would it work in Haiti? What would?) They will need to consider solutions from multiple perspectives: What do people in the U.S. want to see in Haiti? What does a business woman in Haiti need to be successful. What does an engineer in Haiti need? What would a school child see as an ideal city? Figuring out the key questions and evaluating potential solutions will force the students to clarify their thinking. You cannot apply a Deer Island wastewater treatment plant to Port-au-Prince. Or can you? How do you know? With respect to communication, I plan on coming up with a series of deliverables from student groups in each section and a timetable for those deliverables. Students will be expected to write-up, discuss, and defend their questions, potential solutions, and conclusions. I plan on using these deliverables during the large lecture sections having a type of public debate. Results will also be presented in Blackboard along with on line quizzes and polls to encourage and assure active student participation in the exercise. Naturally, I expect to learn a great deal from my initial efforts to incorporate the inquiry components into the class. But I am convinced this class provides an excellent opportunity to provide students with the broader perspectives and to develop their excitement about independent and peer learning that the Discovery Program hopes to inspire.

Writing Intensive:**Lab:**