

COURSE SYLLABUS (2 Page)

Course Number: CEGR 2154
Course Name: Design Project Lab

Credits and Contact Hours: 2

Instructor: Jim Bowen

Textbook: Textbook not required, but the following text is recommended:
Title: Energy and the Environment (2nd ed.)
Authors: Ristinen and Kraushaar
Year: 2006

Other Supplemental Materials: Moodle Page

Catalog Description: Problem definition, evaluation of design alternatives, design concepts, conceptual design. Students work together in teams to find, present, and defend their solutions to real world civil engineering problems. One hour of lecture and 3 hours of laboratory per week.
Most Recently Offered (Day): Spring 2016, Fall 2015, Spring 2015
Most Recently Offered (Evening): Course has not been offered in 3 years

Pre-Requisites/Co-Requisites: CEGR 2102

Course is: Required (R)

Goals: The goals of this course are to help students:

1. Develop their oral and written communication skills (this courses satisfies the “O” goal);
2. Learn about the challenges and opportunities for Civil and Environmental Engineers in the coming years;
3. Develop their ability to work effectively in teams;
4. Gain experience working through the engineering design process; and
5. Lear to work independently, in a relatively unstructured environment.

Student Outcomes Addressed:

In this course, students will develop the following Student Outcomes:

- C. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- D. an ability to function on multidisciplinary teams
- G. an ability to communicate effectively
- L. an ability to explain key concepts and problem-solving concepts used in management

Course Topics:

- Course introduction, syllabus, engineering professional information, procedures for licensure, general information on profession, future outlook. In lab: Archimedes principle, hands-on design experience (buoyancy boat competition);
- Civil Engineering: where the profession is headed - National Academy of Engineering, Grand Challenges of Engineering in the 21st Century, ASCE National and State Report Cards. In lab: How to give oral presentations, review of presentations from previous semesters;
- Greenhouse Gas Emissions and Climate change, What is a greenhouse gas (GHG), how do GHGs affect radiative flux and planet temperature, what are the principal GHGs, properties of principal GHGs, CO₂ emission sources, CO₂ concentration trends;
- Energy Use in the US, how much energy do we use, trends in energy use, energy use by sector, comparison of energy use in US to other countries, factors affecting energy use;
- Fossil Fuels and CO₂ emissions, benefits and costs of coal, petroleum, natural gas, relative costs, trends in production, magnitude of reserves relative to production, comparison of CO₂ emissions per unit energy produced;
- Greenhouse gas emissions at UNC Charlotte, what is the magnitude of emissions, what is the trend, what are the plans for GHG emission reduction, what are the GHG emissions by scope;
- Conceptual design and the engineering design process, what is the engineering design process, what is conceptual design, why do we do conceptual design, how do we do conceptual design. In lab: A conceptual design group project, a proposed measure to reduce greenhouse gas emissions at UNC Charlotte; and
- Current Conditions, future needs – US infrastructure, what is the condition and future needs for transportation infrastructure in the US, how does US transportation infrastructure compare to other countries, how is US transportation infrastructure funded, what are the expected trends in infrastructure needs and funding. In lab: Design, construction, oral presentation of a table-top device to demonstrate an Engineering Science principle.