Advanced Sustainable Design – CEVE 323-523

Advanced sustainable design is being offered in Spring, 2016 on Tuesday and Thursday at 1:00 p.m. This course is designed to follow CEVE 302-502 and takes selected concepts set out in that course and applies them to practical problems. CEVE 302/502 is a pre-requisite for this course (but it may be waived after discussion with prospective student). There are a limited number of places in the class. Those interested in registering who cannot pre-register should contact Jim Blackburn directly to be added to the course.

The course will be taught in three units with the overall goal to give students experience in developing and applying sustainable design concepts to address issues associated with three different types of sustainability problems. These three problem areas are selected to require the analysis of distinctly different economic, ecologic and social issues as well as to provide the student the opportunity to work on real world problems. These three units should provide excellent case studies in sustainable design which requires the incorporation of the triple bottom line in problem-solving.

Unit 1 involves the use of the Institute for Sustainable Infrastructure (ISI) Envision rating system on a regional case study. The Envision rating system is intended to guide decision-making in planning and designing civil infrastructure projects so they are more sustainable. This case study will involve the application of the rating system to the SSPEED Center’s proposed mid-bay structural alternative proposed to protect residential and industrial development on the west side of Galveston Bay and along the Houston Ship Channel. Envision awards points across social, economic, and ecologic categories and based upon the points awarded, projects then receive public recognition of their sustainability achievement from ISI. Due to the preliminary nature of the mid-bay alternative, the ISI process will be used to develop and propose design modifications and additions to the mid-bay gate and levee proposal by class members working in teams. This portion of the
course will be assisted by Michael Bloom of R.G. Miller Engineers, Inc. who is a credentialed Envision Sustainability Professional by ISI.

Unit 2 involves evaluating climate change response challenges facing Rice University. This unit will involve understanding the carbon footprint of Rice as well as evaluating sequestration and renewable energy alternatives available to Rice. This segment will utilize a modified life cycle assessment process and will apply the framework for ecological service transactions set out in the SSPEED Center’s Texas Coastal Exchange. This unit will utilize carbon foot-printing work done to date by Richard Johnson, the Director of Rice’s Administrative Center for Sustainability and Energy Management, who will also assist in this unit.

Unit 3 involves understanding, evaluating and proposing responses for the Valero Refinery near Manchester along the Houston Ship Channel. Air pollution will provide the basic context for this case study. The East Side advocacy groups, the Manchester Community and Valero have been engaged in an ongoing dialogue/dispute about air pollution and environmental justice issues surrounding the operation of this refinery. The Valero Corporation has agreed to allow access to the refinery and will provide personnel to assist the class in understanding the refinery’s view of the environmental justice and air pollution issues. Students will also meet with and hear from citizen activists concerned about neighborhood air pollution issues. The goal of this unit is to directly raise a social sustainability issue in the context of air pollution and require the class to develop responses to present to both Valero and the community members. This unit will involve a field trip to the refinery and each student must wear a pair of leather, rubber-soled boots with a steel toe. These boots are available at Academy for about $25. You cannot get in the refinery without these boots.

Successful completion of this course will require participation in three team projects for each of these units as well as completion of an individual final project associated with water supply at the Formosa
Plastics plant in Port Comfort, Texas. In this final assignment, each student will write an evaluation of water supply options from a sustainable design perspective. Formosa Plastics is undertaking a major expansion of its chemical plant in Point Comfort and is concerned about the water supply for this expansion as well as its ongoing operations. Formosa Plastics has agreed to make certain planning documents available to the class as well as certain key personnel. Depending upon scheduling, a trip to the Point Comfort plant may occur.

The professor for this course is Jim Blackburn, an environmental lawyer and planner and Professor of the Practice in Civil and Environmental Engineering. Jim Blackburn can be contacted at blackbur@rice.edu or jbb@blackburncarter.com. Blackburn’s office is Mech Lab 108.