CE 538 - CE Information Technology, Modeling, and Infrastructure Asset Management

Fall 2017 COURSE ANNOUNCEMENT

For Graduate Students and Seniors

The key objective of the course is to teach students to look at any engineering system, to fully understand its structure and characteristics, and know how to model and describe it in ways that are useful to engineers and for engineering applications. The course addresses the management, preservation, and maintenance of infrastructure assets. It deals with how to inventory assets, collect field and office inventory data, determine optimal condition assessment data, perform a field condition assessment, determine and assign a condition rating, assess and determine a criticality rating, evaluate risk and cost, and develop their repair, maintenance, and replacement strategies. The principles for doing so are applicable over the broad range of infrastructure activities from planning and preliminary engineering, through design and construction, and during maintenance and operations. It includes such topics as database design and management, advanced technologies, engineering constraints, and decision tables all applied to the creation maintenance and operation of our infrastructure.

CE 538 will include one of two case studies to demonstrate the application of the principles to various engineering scenarios. In both case studies links to GIS, GPS, and facility management will be explored. Relationships between geographic and database management systems will be studied. The application of the principles studied will especially be demonstrated for construction, environmental, transportation, and geotechnical applications. Also included will be an examination of the use of IT in support of disaster management related activities.

One case study will be especially of interest to construction and transportation students. It will focus on a highway network and will seek to illustrate the issues associated with representing transportation spatial (topology and geometry, point and segment data, locational data, and linear referencing), attribute, and temporal data. The link to the use of those same networks in construction scheduling and disaster response will be demonstrated.

The second case study focuses on the spatial, environmental, and geotechnical aspects of Oak Ridge National laboratory and considers all of the items associated with the transportation case study while adding emergency response operations (security for construction) and all of the issues that embodies. This case study includes the spatial layout of the facilities at the lab and their operations and is particularly related to transportation network emergency response in NC where need is dictated by floods, hurricanes, and tornados.

Students taking this course will learn to explore, evaluate, and assess new and emerging computing and information models and technologies and determine their role in engineering infrastructure preservation. These are most critical in engineering design, construction, manufacturing, and materials management.

Schedule: M/W 5:00pm to 6:15pm
Instructor: Dr. W. Rasdorf (200 Mann Hall, 515-7637, rasdorf@ncsu.edu)
Course No.: CE 538 - 001

Contact Dr. Rasdorf if you might be interested in taking this course. This course would fit in well as an elective course in any engineering curriculum as well as in the GIS certificate program.