CE 5365
Decision Making in Infrastructure System Design and Evaluation
MW 3:00 – 4:20 PM
CRBL C-201
Fall 2015

Instructor: Carlos M. Chang, P.E., Ph.D.
e-mail: cchangalbitres2@utep.edu
Office: A-205
Phone: (915) 747-8301

Office Hours: Students are always welcome

Course Text: There is not textbook for this course. Class material will be provided to the students during the development of the course.

Prerequisites: Satisfactory completion of CE 3373 or equivalent and department approval.

COURSE PURPOSE

CE 5365 provides students with methodologies and applications for complex decision making in infrastructure system design and evaluation in the presence of multiple criteria/objectives, multiple actions and uncertainty. In addition to the conceptual, mathematical and algorithmic aspects of the various approaches, limitations, implementation issues and case studies are addressed.

COURSE OBJECTIVES

By the end of the semester you should be able to do the following: (1) to explain the fundamental concepts of infrastructure decision making; (2) to apply decision making methodologies to analyze infrastructure systems; (3) to summarize asset management concepts and applications; (4) to formulate life cycle cost and cost-benefit analyses to infrastructure problems; (5) to select appropriate operation research methods to analyze multiple criteria infrastructure systems; (6) to design risk analysis models to better handle uncertainty in infrastructure decisions; (7) to use Excel applications and other software tools to evaluate infrastructure systems; (8) to make criterion/based judgments when solving multi-objective infrastructure problems; (9) to work effectively in problem-solving teams, and carry out meaningful performance assessment of individual team members.

COURSE MAIN TOPICS

1. Introduction to Decision Making in Infrastructure Systems
2. Asset Management Principles with Focus on Implementation
3. Life-Cycle Cost Analysis (LCCA)
4. Decision Making Models
5. Operations Research Applied to Decision Making in Infrastructure
6. Simulation and Optimization Tools
7. Problem-based Risk Analysis
8. Case Studies
GRADING

Your grade for this course will be determined on the basis of 100 points as follows:

- Midterm Exams (02) 35 points
- Homework and Quizzes 20 points
- Class Presentations 20 points
- Project Term Report 25 points

Final grades are based on the normal distribution of points as shown below:

- A 100 - 90
- B 89 - 80
- C 79 - 70
- D 69 - 60
- F < 60

In accordance with University regulations, students who miss examinations will receive grades of zero. Exceptions to this rule will be made only on a carefully considered individual basis and only if the student contacts the instructor before the exam. If you know in advance that you are going to miss an exam, it is your responsibility to inform the instructor before the exam.

ATTENDANCE

Students are expected to attend all class periods. Those who fail to attend class regularly are inviting scholastic difficulty and, with the approval of the Dean of the College of Engineering, may be dropped from the course with a grade of F for repeated (5 or more) unexcused absences.

COURSE ACTIVITIES

We will discuss theoretical and practical approaches to better assimilate how the topics taught in class are applied to real-world infrastructure decision making problems. Student participation and interaction in class will constitute a major portion of course activities. Active participation in class is expected. Class exercises following a problem-based approach will be conducted during the course. We will use software tools to model and analyze case studies presented to the students. Students will work in the case studies and make presentations. Students will also be required to prepare presentations on selected topics for class discussion.

EXAMS

Two midterm exams will be given in the course. Exams are comprehensive. The exam dates will be announced at least one week in advance.
HOMEWORK AND QUIZZES

Homework assignments will be given in class. Assignments must be turned in on time. Homework will be assigned regularly. The student should be able to present and discuss in class any homework assignment. Both a printed and an electronic copy must be submitted to the instructor (Format: A#-YYMMDD-CE5365-YourLastName-Topic.PDF and DOC). Any additional files used during the development of the assignment should be attached (Excel, DWG, etc). Failure to comply with the format and rules will result in deduct points. A quiz related to the assignment could be delivered the due date of the assignment. No special notification is required for quizzes.

CLASS PRESENTATIONS

Students will be required to make oral presentations on selected topics assigned by the instructor. The purpose of this activity is to develop oral communication skills which are considered vital for professional development in infrastructure. Power points files should be submitted to the instructor prior to the presentation (Format: P#-YYMMDD-CE5365-YourLastName-Topic.PPT). Proactive participation is encouraged in class.

PROJECT TERM REPORT

The project term report will be a scholarly work prepared in accordance with the American Society of Civil Engineers (ASCE) “Authors’ Guide to Journals and Practice Periodicals.”

The electronic file name formats will be: R-YYMMDD-CE5365-YourLastName(s)-Topic.PDF and DOC. Any additional files used during the development of the project term report should be attached (Excel, DWG, etc).

POLICY ON CHEATING

Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts (Regents Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22). Scholastic dishonesty harms the individual, all students, and the integrity of the university. Policies on scholastic dishonesty will be strictly enforced.

COURSE/INSTRUCTOR EVALUATION

A course/instructor evaluation will be conducted in class near the end of the semester.
FINAL COMMENT

This course is designed for the students to learn how to formulate multi-objective infrastructure decision making models and select appropriate methods to evaluate alternative solutions using operation research tools. The teaching methodology is learner-centered and based on active learning techniques. If you feel that you are not understanding a topic, please do not hesitate to ask questions in class, or if necessary, to see your instructor outside of class. Any specific comments that students have on how the course might be improved are particularly welcomed.