Text: There is no required text for the course. Handouts, technical papers, and reports will be provided to the students during the development of the course. Make sure that you have access to Blackboard and check the site on a regular basis. Additional helpful references are: *Public Infrastructure Asset Management, Second Edition* by W. Uddin, W. R. Hudson, and R. C. G. Haas, McGraw-Hill, 2013, *International Infrastructure Management Manual* by NAMS Group, 2006.

**OBJECTIVES**

The objectives of CE 6301 are: (1) to introduce students to infrastructure problems by discussing engineering and management approaches to address infrastructure challenges; (2) to explain the decision-making process to manage infrastructure assets; (3) to select the data needed to manage infrastructure assets in an agency; (4) to describe and discuss data collection and condition assessment methods for infrastructure management; (5) to discuss strengths and weaknesses of infrastructure management systems to assess infrastructure needs, to prioritize funding allocation, and to perform what-if impact analysis; (6) to apply infrastructure management decision-support tools to solve problems; (7) to discuss strategies to implement Infrastructure Management Systems (IMS) in an agency.

In this course, we will present and discuss infrastructure management concepts including approaches for the maintenance and rehabilitation of infrastructure assets, development and implementation of IMS. We will discuss and apply practical approaches to better understand how the concepts taught in class can be applied to real world infrastructure management problems. Topics will be presented by the instructor or guest speakers as a lecture or a case study format.

This course follows a student centered-learning approach. Student’s active participation and interaction constitutes a major portion of the learning activities in the classroom. There will topics assigned to the students individually or as a team to conduct research under the direction of the instructor in order to prepare lectures follow up with an open class discussion.

**TOPICS**

**MODULE 1: Fundamental Concepts of Infrastructure Management**

1.1 What is the Infrastructure Management Purpose?
1.2 An Overview of the Infrastructure Management Process
1.3 Infrastructure Management and Asset Management Systems
1.4 The Decision Making Process: Elements, and Tools
MODULE 2: Infrastructure Management Elements and Analytical Methods for Decision Making
2.1 Inventory
2.2 Storing and Managing Data
2.3 Condition Assessment of Infrastructure Assets
2.4 Needs Analysis
2.5 Forecasting Infrastructure Performance
2.6 Prioritization of Funds
2.7 “What if” Impact Analysis
2.8 Quantifying the Benefits of Infrastructure Management Strategies

MODULE 3: Implementing Infrastructure Management Systems
3.1 Tools for Infrastructure Management Systems
3.2 Barriers for the Implementation of Infrastructure Management Systems
3.3 Communicating Infrastructure Needs to Funding Authorities

Note: Handouts and course material will be provided during the development of the course. Students should review their e-mails periodically for communications related to the course. A virtual folder will be also implemented to facilitate distribution of the course material.

EXAMINATIONS

Two exams will be given. The first exam will be about half way through the course. 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 in writing before the exam. If you know in advance that you are going to miss an exam, it is your responsibility to inform the instructor in writing before the exam.

ASSIGNMENTS

Individual and team assignments will be given along the course. Some assignments will require to use of software packages installed in your own laptops or on-line tools. Students should be able to discuss in class the solutions to the assignments. Knowledge acquired in the assignments will be graded directly or through a quiz.

Students will be required to make individual or team class presentations on selected topics related to the topics address in the course. The purpose of class presentations is to enhance oral communication skills that are vital for a successful professional career in infrastructure management.

PROJECT TERM

Students are required to conduct research and prepare a project term paper on a selected infrastructure management topic assigned by the instructor. The final project term paper will be a scholarly work prepared in accordance with the American Society of Civil Engineers (ASCE) Author’s Guide. The specific instructions for authors can be found at http://engineering.missouri.edu/civil/files/asce-author-guide-journals.pdf.
ATTENDANCE

Students are expected to attend all class periods required by the instructor. Those who fail to attend class regularly will miss lectures and class learning activities. Students with four or more unexcused absences will be inviting scholastic difficulty may be dropped from the course with a grade of F.

GRADING

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>30</td>
</tr>
<tr>
<td>Project Term (Paper)</td>
<td>30</td>
</tr>
<tr>
<td>Regular Assignments</td>
<td>20</td>
</tr>
<tr>
<td>Final Assignment (Team)</td>
<td>20</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 - 90</td>
</tr>
<tr>
<td>B</td>
<td>89 - 80</td>
</tr>
<tr>
<td>C</td>
<td>79 - 70</td>
</tr>
<tr>
<td>D</td>
<td>69 - 60</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60</td>
</tr>
</tbody>
</table>

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.

HONOR CODE

The Civil Engineering Department embraces the Honor Code: “Civil Engineering and Construction Management are licensed professions that are regulated by each state through a licensing or engineering practice law. Each state requires engineers to protect the public safety and act in an honest and trustworthy manner. These standards of ethical behavior are also codified in ethics guidelines established by the National Society of Professional Engineers (NSPE), the American Society of Civil Engineers (ASCE), and the Texas Society of Professional Engineers (TSPE).” Please learn more about the honor code Department Policy and disciplinary actions here:

http://catalog.utep.edu/undergrad/college-of-engineering/civil-engineering/
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 understand infrastructure management concepts and tools learning how to apply them to address present and future infrastructure challenges. The instructor expects all the students to succeed in learning the course subjects. It is critical for your success to establish a good studying habit in order to do very well in this course. Please do not hesitate to ask questions in class, or see your instructor outside of class. Any specific comments that students have on how the course might be improved are particularly welcomed.