

## **Course Syllabus**

### **CE 5380 Management of Infrastructure Assets**

**Instructor:** Ghassan Khankarli, Ph.D., P.E, PMP

**Office Number:** ERB 122

**Office Telephone Number:** 817-272-9749

**Email Address:** khankarl@uta.edu

**Office Hours:** Friday 3:30 to 4:00 pm or by appointment

**Course Number, Section Number, and Course Title:** CE 5380, Sec 001, 101 –  
MANAGEMENT of INFRASTRUCTURE ASSETS

**Time and Place of Class Meetings:** Friday 4:00-6:50 pm, Room WH 311

**Description of Course Content:** This course is designed to provide an overview for engineers and managers in the application of an infrastructure management system. Topics include: infrastructure asset development and management, optimization of infrastructure asset procurement and preservation through good data input and the use of economic models, benefit cost studies, and good maintenance and rehabilitation practices to protect assets investments.

**Course Objective:** The course objective is to prepare students to demonstrate sound engineering and managerial judgment in the application of an infrastructure asset management process to optimize the use of available resources while protecting assets investments.

**Specific Course Learning Outcomes:** Upon completion of the course, the student will:

1. Understand infrastructure and its role
2. Understand general asset management principles
3. Understand the benefits of integrating the infrastructure evaluation, maintenance, and renewal process into a good asset management program
4. . Understand major sources of funding and total project cost principles
5. Understand the relevance of a good information management and decision support systems
6. Explore ways to quantitatively analyze and select optimal planning alternatives for assets through the use of life cycle cost and benefit analysis principles
7. Understand the importance of communicating research results through class discussions, presentations, and reports

All outcomes are observed implicitly through class participation, exams, homework, reports and formal/informal communications with instructor.

**Requirements: SOFTWARE:**

Student should have a working knowledge of and access to Microsoft Word®, Microsoft Excel®, Microsoft PowerPoint®.

**Required Textbooks and Other Course Materials:**

## Course Syllabus

### CE 5380 Management of Infrastructure Assets

- 1) Haas, Ralph, W., Ronald Hudson, and Waheed Uddin. 2013. *Public Infrastructure Asset Management, 2<sup>nd</sup> Edition*. McGraw-Hill Companies, Inc., New York, New York (ISBN 978-0-07-182011-0)
- 2) Handouts, notes, reading assignments, problem solutions and other information are located on the class Blackboard site which will be provided by the instructor

#### Referenced Textbooks

- 1) Amekudzi, A. and McNeil. S. 2008. *Infrastructure Reporting and Asset Management*. American Society of Civil Engineers, Virginia
- 2) Payant, Richard P. and Bernard T. Lewis. 2007. *Facility Manager's Maintenance Handbook, 2<sup>nd</sup> Edition*. McGraw-Hill Companies, Inc., New York, New York
- 3) Wood, Brian. 2009. *Building Maintenance*. Wiley- Blackwell, West Sussex, UK
- 4) Raina, V.K. 2004. *Concrete Bridges: Inspection, Repair, Strengthening, Testing and Load Capacity Evaluation, 1st Edition*. McGraw-Hill Companies, Inc., New York, New York
- 5) Handouts

**Descriptions of major assignments and examinations with due dates:** Homework assignments, review of **Three** peer-reviewed articles assignment, a research paper, presentation, one mid-term exam and a comprehensive final exam.


All assignments must be turned in at the start of the class in **Hard Copy** for in-class students and electronically (uploaded into Blackboard) for Distance Learning students or special arrangements for in-class students, prior to the class period in which they are due. Failure to do so will constitute a grade of zero for the assignment in question.

One week of advanced notice will be provided in scheduling each exam. The final exam will be given according to the university's published final exams schedule. Note that failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam

Homework, articles review, and paper in this class are the minimum assignments considered adequate to achieve basic proficiency of course material. Homework will be discussed in class.

#### Format for Homework:

- Name Convention: Last name, first name **exactly** as per university records
- Student ID: to be shown below name
- Course no, section and date to be shown below ID
- Location: Upper right corner of page in header section
- Other format: Homework is to be typewritten (font 12) unless noted otherwise by the instructor; Include at the beginning of the problem, the problem statement and any diagrams given as well as any additional diagram needed to solve the problem. then show the solution. If calculations are required, all calculations should show two (2) significant figures for intermediate values calculated. Final answer should be rounded to two (2) significant figures unless all data is greater than three (3) significant figures. When establishing elevations or distances for design drawing, answers must be in hundreds of a foot or thousands of a meter.



Doe, John
ID No.: 10000000
CE 5342-001
Feb, 2, 2017

The exams will generally relate to the material covered in the **lectures, handouts, assignments/HW and AR.** The philosophy of the exam is not to merely test your total recall or memorization, but to extend your thinking from theory and example problems to engineering situations. Each exam may include both open and closed book portions.

See the **"Make-up Exam and Assignment Policy"** section for accommodations of incomplete or missed assignments.

## Course Syllabus

### CE 5380 Management of Infrastructure Assets

**Attendance:** At the University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, [I have established following attendance policy:](#)

[I have elected to take attendance till Census Day but will not factor attendance into the grade."](#)

Students registered for **Sections 001** are expected to attend all classes. Students registered for **Sections 101-Distance Learning** are expected to communicate with the instructor through uploading a summary of lectures into Blackboard prior to the scheduled date of each exam or by email if specifically instructed and agreed to by the instructor. The uploaded message/email will cover the understanding or questions about the lectures covered during the week. Class participation and discussions are essential for full professional development and credit, as applicable.

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients

**Grading Policy:** Grades are based on two exams, [three](#) articles review (AR), assignments, group research paper, presentation and participation. Grades will be determined by averaging the exams and assignments as follows.

• Exams: 2 @ 37.5% each	75%
• Review and summary of peer-reviewed articles: 3 @ 3% Each	9%
• Class homework/assignment(s) and class participation (1.5% each)	3%
• Presentation 3%	3%
• Research paper 10%	<u>10%</u>
Total	100%

The presentation will cover the research topic. Proper spelling, use of clear and concise sentences on essay questions will also be considered in the grading process. Grade standards are as follows:  $100 \geq A \geq 90$ , Less than  $90 > B \geq 80$ , Less than  $80 > C \geq 70$ , Less than  $70 > D \geq 60$ , and Less than  $60 > F \geq 0$ . Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops

**Expectations for Out-of-Class Study:** Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an [additional 9 hours](#) per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

**Grade Grievances:** Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. [For](#)

## Course Syllabus

### CE 5380 Management of Infrastructure Assets

undergraduate courses, see

<http://catalog.uta.edu/academicregulations/grades/#undergraduatetext>; for graduate courses, see <http://catalog.uta.edu/academicregulations/grades/#graduatetext>.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>).

**Disability Accommodations:** UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

**The Office for Students with Disabilities, (OSD)** [www.uta.edu/disability](http://www.uta.edu/disability) or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability).

**Counseling and Psychological Services, (CAPS)** [www.uta.edu/caps/](http://www.uta.edu/caps/) or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

**Non-Discrimination Policy:** *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit [uta.edu/eos](http://uta.edu/eos).*

**Title IX Policy:** The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit [www.uta.edu/titleIX](http://www.uta.edu/titleIX) or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or [jmhood@uta.edu](mailto:jmhood@uta.edu).*

## **Course Syllabus**

### **CE 5380 Management of Infrastructure Assets**

**Academic Integrity:** Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Campus Carry:** Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

**Student Feedback Survey:** At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

**Final Review Week:** for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this

## Course Syllabus CE 5380 Management of Infrastructure Assets

week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, **which is located to the right center or left of the classroom**. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities

**Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](#), [major-based learning centers](#), developmental education, [advising and mentoring](#), personal counseling, and [federally funded programs](#). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to [resources@uta.edu](mailto:resources@uta.edu), or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

**The IDEAS Center (2<sup>nd</sup> Floor of Central Library)** offers **free** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email [IDEAS@uta.edu](mailto:IDEAS@uta.edu) or call (817) 272-6593.

**The English Writing Center (411LIBR):** The Writing Center Offers free tutoring in 20-, 40-, or 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Our hours are 9 am to 8 pm Mon.-Thurs., 9 am-3 pm Fri. and Noon-6 pm Sat. and Sun. Register and make appointments online at <http://uta.mywconline.com>. Classroom Visits, workshops, and specialized services for graduate students are also available. Please see [www.uta.edu/owl](http://www.uta.edu/owl) for detailed information on all our programs and services.

The Library's 2<sup>nd</sup> floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation.  
<http://library.uta.edu/academic-plaza>

**Librarian:** Martin Wallace, Engineering Librarian, Central Library, Office No. 518, (817) 272-3924, [martin.wallace@uta.edu](mailto:martin.wallace@uta.edu)

**Make-up Exam and Assignments Policy:** No make-up exams and assignments are given or accepted except for medical or other similar documented hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances describe above, failure to take the exam or turn in assignments at the scheduled time will constitute a grade of zero in the exam and assignment. It is the student's obligation to contact the instructor, generally before the examination so that appropriate arrangement (if any) may be made.

**Emergency Phone Numbers:** In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381



## Course Syllabus CE 5380 Management of Infrastructure Assets

### General Information:

**No credit will be given: (a) for any work that is non-compliant with UTA's current "Academic Dishonesty" policy and is subject to actions noted in the "Academic Integrity" section of this syllabus and (b) for any in-class due assignment submitted on the due date when not physically present or without prior arrangements with the instructor.**

**Blackboard Site:** Handouts, notes, articles, and other information are located on Blackboard

*"As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. - G. A. Khankarli."*

**Adjustments will be posted on Blackboard.**

**Articles Review:** Articles will be posted on Blackboard and are due by the dates shown on the class schedule. The articles shall be two to three pages long double spaced with font 12 (Arial or Times New Roman), one inch margins. It shall cover at a minimum:

- Introduction
- A summary discussion of the main points that the author(s) addressed in the paper.
- Author(s)' conclusion

Proper spelling, use of clear and concise sentences and structure will be considered in the grading process.

Provide a cover sheet that complies with UTA's Thesis and Dissertation (T&D) Guidelines that can be found at: <https://library.uta.edu/etd> using the **Turabian** or APA Styles. In addition, your last name must appear in the upper right corner and the page numbers must be centered in the bottom of each page. The paper shall follow the style guidelines as shown in UTA's Thesis Manual Style guides.

**Research Paper:** Students/assigned groups will submit a research topic in infrastructure asset management, preservation, or policy for approval by **February 9**. The research paper will cover a thorough review of a case study or the development of an infrastructure asset program as approved by the instructor. The research paper will be completed and turned in at the beginning of the class on **April 27** prior to the scheduled presentations

The research paper will be between 10 to 12 pages long double spaced with font 12 (Arial or Times New Roman), one inch margins.. Its format and style guidelines shall follow UTA's Thesis and Dissertation (T&D) Guidelines that can be found at: <https://library.uta.edu/etd> using the **Turabian** or APA Styles and shall cover at a minimum:

- Introduction
- Discussion of the case study or the development of an infrastructure program
- Findings and conclusion
- References (minimum 10 or as approved by instructor) and proper citations

Cover sheet, abstract/executive summary, table of content and appendices/attachments are not considered part of the total pages.

Proper spelling, use of clear and concise sentences, structure, and compliance with UTA's formatting requirements will be considered in the grading process.

## Course Syllabus

### CE 5380 Management of Infrastructure Assets

Your last name/Group Number must appear in the upper right corner and the page numbers must be centered in the bottom of each page.

**Presentation:** The presentation will provide a summary covering the findings of the research paper. All respective group members are expected to attend and take an active part in the presentation. Presentation time is limited to 15 to 20 min per group as noted by the instructor.

**Distance Learning students who are unable to attend/participate in the presentation must inform the instructor no later than the research topic approval due date to make alternate arrangements.** Failure to do so will result in no credit for the presentation.

A separate cover sheet must be included with the submission which shows each group member's name and the section of the research paper and presentation that the respective member developed. It is expected that each respective group member will provide equivalent level of contribution to the respective group's effort in the development and production of the presentation and associated research report. This is important to ensure an equitable grade distribution for this group effort.

**Use of Laptops, I-pads, other electronic devices, or E-MAIL correspondence during class:** In order to minimize disruption, the use of all electronic devices will not be allowed during class. Students wishing to take notes via a laptop may do so only with prior permission from the Instructor.

**Cell Phone use in classroom during class:** In order to minimize distractions, use of cell phones during class in the classroom is prohibited. Students must turn off/change to "vibrate" mode their cell phones during class. If you are anticipating an important call, please inform the Instructor at the beginning of class and change the cell phone to "vibrate" mode. If your call comes through during class, leave the classroom quietly before beginning your conversation and return quietly as soon as the call is completed. **No cell phone use is allowed during Tests.**

The Instructor reserves the right to adjust Students' grades as a result of class disruption due to cell phone or non-adherence to the above electronic device usage policy.

**Guest Speakers:** Guest speakers' presentations/class discussions will be part of the scheduled exams, as applicable unless specifically noted otherwise by the instructor.

**Case Studies:** Case studies/current events will be discussed throughout the semester and will be part of the scheduled exams, as applicable unless noted otherwise by the instructor.

**E-Files or email subject name convention:** Course No.-Section-Last name-assignment/test/topic (Ex: CE5380-101-Doe-AR1)

#### Useful Links:

Library Home Page.....	<a href="http://www.uta.edu/library">http://www.uta.edu/library</a>
Subject Guides .....	<a href="http://libguides.uta.edu">http://libguides.uta.edu</a>
Subject Librarians .....	<a href="http://www.uta.edu/library/help/subject-librarians.php">http://www.uta.edu/library/help/subject-librarians.php</a>
Database List.....	<a href="http://www.uta.edu/library/databases/index.php">http://www.uta.edu/library/databases/index.php</a>
Course Reserves .....	<a href="http://pulse.uta.edu/vwebv/enterCourseReserve.do">http://pulse.uta.edu/vwebv/enterCourseReserve.do</a>
Library Tutorials .....	<a href="http://www.uta.edu/library/help/tutorials.php">http://www.uta.edu/library/help/tutorials.php</a>
Connecting from Off- Campus.....	<a href="http://libguides.uta.edu/offcampus">http://libguides.uta.edu/offcampus</a>
Ask A Librarian .....	<a href="http://ask.uta.edu">http://ask.uta.edu</a>



## Course Syllabus

### CE 5380 Management of Infrastructure Assets

Class	Date		Topic/Chapter	Description	Homework/Articles Review (AR) Due
	<b>Jan 16</b>			<b>First Day of Classes</b>	
1	19	F-A	1	Introduction	
	19	F-B	2, 3	Framework and Planning for Infrastructure Management	
2	26	F-A	4	Data Management	
	26	F-B	5	Inventory Data	
			<b>Census Day Jan 31</b>		
3	<b>Feb 2</b>	F-A	6	In-Service Monitoring and Evaluation	
	2	F-B	7	Uses of Monitoring Data	
4	9	F-A	<b>Research Topic due</b>	Uses of Monitoring Data	<b>AR-1</b>
	9	F-B	8	Performance Modeling	
5	16	F-A	9	Service Life	
	16	F-B	10	Construction	
6	23	F-A	11	Maintenance, Rehabilitation and Reconstruction	
	23	F-B	12	Dealing with alternate Concepts	
7	<b>Mar 2</b>	F-A	13	Introduction to Economics Analysis	
	2	F-B		Economics, Life-Cycle Analysis, and Maintenance	
8	9	F-A	13	Life-Cycle/Benefits analysis	<b>AR-2</b>
	9	F-B	14	<b>EXAM I</b>	
				<b>Spring Break Mar 12-16</b>	
9	23	F-A	15	Prioritization and Optimization of work Programs	
	23	F-B	16	Integrated Infrastructure Management	
			<b>Last Day to Drop Mar 30</b>		
10	30	F-A	17	Application of an Integrated asset Management System	
	30	F-B	18	Application of an Integrated Asset Management System	
11	<b>Apr 6</b>	F-A	Handout	Risk Management	
	6	F-B	Handout	Risk Management	
12	13	F-A	Handout	In-Class Exercise	<b>AR-3</b>
	13	F-B		In-Class Exercise/ Case Study in accordance with Federal Requirements	
13	20			Case Study in accordance with Federal Requirements	
	20			Research Paper Work	
14	27	F-A	<b>Group Paper Due</b>	<b>Presentation/Misc</b>	
	27	F-B		Ethics in Infrastructure asset Management	
15	<b>May 4</b>	F-A		ISO 55000 Standards for Asset Management	
	4	F-B		Course Recap	
	<b>May 4</b>			<b>Last Day of Classes</b>	
				<b>Final Exams Week May 7-11</b>	
16	11	<b>F</b>	<b>Final Exam</b>	<b>Verify time and room assignment on UTA's website</b>	5:00-7:30 pm

*As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. – G. A. Khankarli.”*