

Course Syllabus

CE/CM 5345 Infrastructure Evaluation, Maintenance, and Renewal

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

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Office Number: ERB 122

Office Telephone Number: 817-272-9749

Office Hours: Fri 8:50 to 9:30 pm or by appointment

Section Information: CE/CM5345, Sec 001, 101 - INFRASTRUCTURE EVALUATION, MAINTENANCE, and RENEWAL

Time and Place of Class Meetings: Friday 6:00-8:50 pm, Room WH 221

TA: TBD; Email: @mavs.uta.edu ; Office: NH243; TBD

Description of Course Content: This course is designed for engineers and managers involved in infrastructure development, sustainability, and replacement. Topics include asset management, inspection, evaluation, maintenance, and renewal alternatives for waste collection and water distribution systems, surface and subsurface drainage, pavements, bridges, culverts, buildings, and other structures. Credit not granted for both CE 4302 and CE 5345. Prerequisite: CE 4347, CE 4348 or equivalent.

Student Learning Outcomes: The course objective is to prepare students to demonstrate sound engineering judgment for evaluating, maintaining, and rehabilitating infrastructure related components.

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

1. Demonstrate the ability to identify causes of failures for a variety of infrastructure assets.
2. Understand the difference between maintenance, rehabilitation, and repair of most civil engineering types of infrastructure.
3. Analyze complex problems to identify potential methods to repair, rehabilitate and restore damaged infrastructure.
4. Understand the importance of communicating research results through class discussions, presentations, and reports.
5. Understand the benefits of integrating the infrastructure evaluation, maintenance, and renewal process into a good asset management program.

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:

- 1) 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) Tsinker, G. (Editor). 2004. *Port Engineering: Planning, Construction, Maintenance, and Security*. Wiley & Sons, Hoboken, New Jersey
- 2) Papagiannakis, A.T. and E. A. Masad. 2008. *Pavement Design and Materials*. Wiley & Sons, Hoboken, New Jersey
- 3) Payant, Richard P. and Bernard T. Lewis. 2007. *Facility Manager's Maintenance Handbook*, 2nd Edition. McGraw-Hill Companies, Inc., New York, New York

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- 4) Wood, Brian. 2009. *Building Maintenance*. Wiley- Blackwell, West Sussex, UK
- 5) Raina, V.K. 2004. *Concrete Bridges: Inspection, Repair, Strengthening, Testing and Load Capacity Evaluation, 1st Edition*. McGraw-Hill Companies, Inc., New York, New York
- 6) Houghton, Peggy M. and Timothy J. Houghton. 2013. *Turabian: The Easy Way, 8th Edition*. Baker College, MI (ISBN 978-0-923568-96-7)
- 7) Houghton, Peggy M. and Timothy J. Houghton. 2009. *APA: The Easy Way, 2nd Edition*. Baker College, MI (ISBN 0-923568-96-2)

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 **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.

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.

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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, articles review (AR), assignments, group research paper, and presentation. 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) (1.5%) and class participation (1.5%)	3%
• Presentation at 3%	3%
• Research paper will be weighted at 10%	10%
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 ≥ A ≥ 90, Less than 90 > B ≥ 80, Less than 80 > C ≥ 70, Less than 70 > D ≥ 60, and Less than 60 > F ≥ 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 undergraduate courses, see** <http://catalog.uta.edu/academicregulations/grades/#undergraduatetext>; **for graduate courses, see** <http://catalog.uta.edu/academicregulations/grades/#graduatetext>. **For student complaints, see** <http://www.uta.edu/deanofstudents/complaints/index.php>.

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

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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)** <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.

Counseling and Psychological Services (CAPS) 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.

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 or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu*

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/>. Faculty are encouraged to discuss plagiarism and share the following library tutorials <http://libguides.uta.edu/copyright/plagiarism> and <http://library.uta.edu/plagiarism/>

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

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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 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, or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

The IDEAS Center (2nd 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.

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To schedule an appointment with a peer tutor or mentor email 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 for detailed information on all our programs and services.

The Library's 2nd 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

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 reduction as per schedule for assignments. It is the student's obligation to contact the instructor, generally before the examination so that appropriate arrangement (if any) may be made

Active Shooter/Threat Resources

The UTA Police Department strives to educate our community in a wide range of issues that have the potential to affect our campus, including active shooter/threat and workplace violence incidents. The following link includes critical safety information to our students on effective options and actions they could employ if faced with an active aggressor or other threat.

<https://police.uta.edu/crime-prevention/active-shooter-resources.php>

The information being provided will also equip you with information to make the best decisions regarding your safety and the safety of your colleagues.

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

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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 (AR): 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://www.uta.edu/gradstudies/> 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 construction project management for approval by **September 14**. The research paper will cover a thorough review of a case study or research covering one or more areas of the topics listed in the assigned class book as approved by the instructor. The research paper will be completed and turned in at the beginning of the class on **November 30** at the start of the scheduled class.

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://www.uta.edu/gradstudies/> using the **Turabian** or APA Styles and shall cover at a minimum:

- Introduction
- Discussion of the case study or the research topic
- 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.

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.

A separate cover sheet must be included with the submission which shows each group member's name and the section of the research paper 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

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development and production of the research paper. This is important to ensure an equitable grade distribution for this group effort.

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.

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.

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 that emit noise or sounds or causes disruption will not be allowed during class. Students wishing to take notes via electronic means 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.

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 specifically noted otherwise by the instructor.

E-Files and subject line name convention: Course No.-Section-Last name-assignment/test
(Ex: CE5300-101-Doe-AR1)

Useful Links:

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

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Class	Date		Topic	Description	Homework/Articles Review (AR) Due
	Aug 22			First Day of Classes	
1	24	F-A		Introduction	
	24	F-B		Program Management	
2	31	F-A		Asset Management Review	
	31	F-B		Asset Management Review; Causes of Failures in Concrete/Other Materials	
3	Sept 7	F-A		Causes of Failures in Concrete/Other Materials	
	7	F-B	Census Day Sept 7	Causes of Failures in Concrete/Other Materials; Repair Guide	
5	14	F-A		Repair Guide	AR-1
	14	F-B	Research Topic due	Repair Guide	* LCCA HW
6	21	F-A		Property Condition Assessment (ASTM E2018)	
	21	F-B		Property Condition Assessment (ASTM E2018)	
7	28	F-A		Pavements (ASTM D6433)	
	28	F-B		Pavements (ASTM D6433)	
8	Oct 5	F-A		Multi-level Parking Garages/ Water Leakage Assessment (ASTM E2128)	* Pavement HW
	5	F-B	EXAM I		
9	12	F-A		Bridges Inspection, Repair, Strengthening	AR-2
	12	F-B		Bridges Inspection, Repair, Strengthening	
10	19	F-A		Bridges Inspection, Repair, Strengthening	
	19	F-B		Bridges Inspection, Repair, Strengthening	
11	26	F-A		Bridges Inspection, Repair, Strengthening	
	26	F-B	Last Day to Drop Nov 1	Bridges Inspection, Repair, Strengthening	
12	Nov 2	F-A		Tunnels/Airports	* Bridge HW
	2	F-B		Ports and other Marine Structures	
13	9	F-A		Drainage/Water/Wastewater /Research Paper	AR-3
	9	F-B		Drainage/Research Paper Work	
14	16	F-A		Drainage/Water/Wastewater	
	16	F-B		Formwork Design for Repair Conditions	
				Thanksgiving Holiday Nov 21-25	
15	30	F-A	Group Paper Due	Presentation/Misc	
	30	F-B		Safety, Health, Equipment Maintenance & Other Issues	
	Dec 4			Last Day of Classes	
				Final Exams Week Dec 12-16	
16	7	F	Final / EXAM II	5:00 pm – 7:30 pm	
				*NOTE: DUE DATES OF HW WILL BE DISCUSSED IN CLASS OR BY EMAIL	

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."