

Updated: 01/11/2018 (See D2L for Update)

**CE 465/565 Transportation Data Management and Analysis  
(3 Units)**

**Spring 2018 Course Syllabus**

**Lecture: Tuesday and Thursday, 3:30pm~4:45pm**

**Classroom: CE201 (lecture) and Computer room (or Bring your laptop)**

**Course Description:** In recent years, traffic detectors have been intensively deployed in major highway systems across the country. These sensors generate tremendous traffic data that are extremely valuable for traffic management, travel demand forecasting, pavement design, and traffic control. How to manage the data efficiently and produce the most useful information out of them have been crucial challenges faced by transportation professionals. This course introduces important concepts of database design and application. Popular database and analytical tools are introduced and demonstrated using traffic sensor data, roadway geometric data, and traffic accident data. The objective is to introduce modern concepts, algorithms, and tools for transportation data management and analysis. With the instructions, assignments, and projects in this course, students are expected to learn database design theories; analytical methods for capacity, safety, and time series analyses; and skills on popular software tools for transportation data management and analysis.

Major topics of this course include: (1) database design and management; (2) data management and analysis tools (Microsoft SQ, ACCESS, Excel, R, etc.); (3) analytical methods for transportation data analysis; (4) data exchange format (XML); and (5) online data sharing technologies.

**Instructor Information:**

- Dr. Yao-Jan Wu
  - Civil Engineering Building 324F
  - Office Phone: (520) 621-6570
  - Email: [yaojan@email.arizona.edu](mailto:yaojan@email.arizona.edu)
  - Open Office Hours: (by appointment or stopping by is welcome)
    - After each class (one hour)

**Teaching Assistant Information**

- Abolfazl Karimpour
  - Civil Engineering Ph.D. Student
  - Email: [karimpour@email.arizona.edu](mailto:karimpour@email.arizona.edu)
  - Open Office Hours:
    - Wednesday 10am~noon
  - Office: CE324G1 (Smart Transportation Lab)

**Prerequisite:** N/A

**Text/Notes/Materials/Supplies:**

**Required Text:** No; Additional materials supplied via D2L.

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### Grading and Assessment:

	Undergraduate	Graduate
Homework Assignments, In-Class Exercise, Conference Report, and Quizzes	20%	20%
Projects	30%	30%
Midterm Exams	50% (All Three Exams)	30% (Exam 3 is optional)
Term Project Report	0%	20%

A = above 90%; B = 80 to 89%; C = 70 to 79%; D = 60 to 69%; E = below 60%.  
Please note that it is a very clear cut between grades. For example, 89.99% is B.

### Tentative Schedule: (*Schedules and topics may change, watch D2L for updates*)

Week	Day	Lecture	Date	Topics	Readings	Note
1	Th		Jan. 11	TRB Annual Conference Course [ <b>No Class</b> ]		
2	Tu	1	Jan. 16	Course Introduction		
	Th	2	Jan. 18	Advanced Excel Applications	Ref. 1&2	HW1 Out
3	Tu	3	Jan. 23	Advanced Excel Applications	R1	ICE1
	Th	4	Jan. 25	Advanced Excel Applications	R2&R3	HW1 Due P1 Out
4	Tu	5	Jan. 30	Statistical Applications in Traffic Engineering	R4	ICE2
	Th	6	Feb. 1	Statistical Applications in Traffic Engineering		
5	Tu	7	Feb. 6	Statistical Applications in Traffic Engineering		HW2 Out
	Th	8	Feb. 8	Statistical Applications in Traffic Engineering	R5	P1 Due
6	Tu	9	Feb. 13	Statistical Applications in Traffic Engineering : ANOVA		ICE3 HW2 Due
	Th	10	Feb. 15	Midterm 1 Review Database Design Fundamentals	R6	
7	Tu		Feb. 20	<b>Midterm 1</b>		

Updated: 01/11/2018 (See D2L for Update)

	Th	11	Feb. 22	E/R Diagram and Relational Data Model	R7	HW3 Out
8	Tu	12	Feb. 27	E/R Diagram and Relational Data Model (Midterm 1 discussion)	R8	
	Th	13	Mar. 1	Reduce Redundancy in Schema Design / Structured Query Language (SQL) I	R9	ICE4 P2 Out HW3 Due
9	Tu		Mar. 6	<b>Spring Recess</b>		ICE5, 6
	Th		Mar. 8			
10	Tu	14	Mar. 13	Structured Query Language II		
	Th	15	Mar. 15	Structured Query Language III		
11	Tu	16	Mar. 20	Structured Query Language IV <b>Midterm 2 Review</b>		ICE7
	Th	17	Mar. 22	Structured Query Language V	ICE8	P2 Due
12	Tu	18	Mar. 27	Introduction to Advanced SQL		
	Th		Mar. 29	(No Class) Roads and Streets Conference		
13	Tu		Apr. 3	<b>Midterm 2</b>		
	Th	19	Apr. 5	Sharing Data Online	ICE9	P3 Out
14	Tu	20	Apr. 10	Sharing Data Online		Working on P3
	Th		Apr. 12	Invited Talk (Dr. Jeff Jenq, OZ Engineering) – Transportation Big Data		
15	Tu	21	Apr. 17	Accident Analysis		
	Th	22	Apr. 19	Accident Analysis using R <b>Midterm 3 Review</b>	ICE11	
16	Tu	23	Apr. 24	Access Fundamentals		
	Th		Apr. 26	Using Access for Data Management	ICE13	HW4 Out
17	Tu	24	May 1	<b>Midterm Exam 3</b>		
18	Wed		May 9			HW4 Due

Updated: 01/11/2018 (See D2L for Update)

				Final Project Presentations (3:30 pm - 5:30 pm) as same as the <u>Final Exam time.</u>		
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Ref. – Reference

R#x – Reading Number x

ICE#y- In-Class Exercise y

A#n - Assignment Number n;

P#m - Project Number m.

There will be a final project presentation at the end of the semester. No final exam.

**Term Project Report (Graduate Student Only):** At the end of the semester, graduate students need to finish a research paper related to this course. The research topic has to be decided BEFORE Midterm Exam One. The deadline of the term project report is the final exam day. *It is graduate student's responsibility to schedule a time to discuss with the instructor.* The paper format should follow the TRB paper author guide (latest version).

Link: <http://onlinepubs.trb.org/onlinepubs/AM/InfoForAuthors.pdf>

**Conference Report(s):** It is very important to talk to transportation practitioners and researchers to gain knowledge outside your textbooks and classes. Several conferences will be held this semester. Please attend at least one conference and at least two sessions that are most related to our class. You are required to submit a one-page report summarizing your thoughts with a photo (photos) attached within seven days after the conference.

### Projects.

- There are **three** projects in this course.
- All three projects are designed to be completed by teams of students. Each team will consist of **two** members.
- A project report should be typed and submitted by each team just like a consulting firm submitting it to a client. It should be written in clear English, contain the relevant answers and descriptions of the work done for the project, be relatively short and be backed up by additional pages of relevant equations, assumptions, etc.
- Rubrics
  - Technical content 80%

Updated: 01/11/2018 (See D2L for Update)

- Professionalism 20%

## Homework

There will be homework assignments, including In-Class Exercises (ICEs)

- Working on homework in groups is permitted. However, each person must turn in a separate write-up and solution prepared by his/her own hand. This means that the problem description, steps taken to solve the problem, and any computer input and output must be written by each person individually.
- **Late assignments.** You are required to turn in your homework, including ICEs, on time (homework assignments are usually due one week after they are posted). The assignment must be turned in by the beginning of the class. Late assignment submission is **NOT** allowed. The lowest score will be dropped.
- Copying another person's work without attribution, including copying of any part or the whole of computer files or material from the Internet, is considered plagiarism. It will be prosecuted as a violation of the University of Arizona Student Code of Conduct in accordance with the Code of Academic Integrity. Both codes are published on-line at <http://deanofstudents.arizona.edu/policiesandcodes/>. It is the student's responsibility to be familiar with these Codes.

## D2L:

The primary source for homework, solutions, design project activities, and other course materials will be D2L. Students may access D2L through <http://d2l.arizona.edu/>. It is the students' responsibility to check this site regularly. Note that the syllabus is updated frequently.

## Teaching Philosophy/Tips for Success in Course:

1. Check out **D2L** for updates.
2. **Study time:** The normal after-class study time is 2 hours for a one-credit hour class. You're expected to study 6 hours (weekly average) outside this 3-credit-hour class.
3. **Class Attendance:** Information lectured in the class cannot always be found in the course slides. Some random quizzes and bonus questions will be given in the class.
4. Please feel free to give your instructor feedback (in person, mail, or email). Anonymous online feedback is available at <https://sites.google.com/site/yaojan/courses/feedback>. I will try my best to help you. Note that I cannot reply if the feedback is anonymous.

## Course Policy:

1. Respect your classmates (on time and be quiet).

**Updated: 01/11/2018 (See D2L for Update)**

2. Class Attendance. You are expected to attend all lectures and computer labs scheduled for this course. If you cannot attend a specific lecture, please get instructor's permission ahead of the class time or provide relevant document (e.g. doctor's note) afterwards.
  - a. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion,
  - b. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.
3. If you have any questions regarding your grade, please let me know **within 7 days** after your grade is returned. Any corrections will not be made after 7 days.
4. In addition to University of Arizona Student Code of Conduct and Code of Academic Integrity mentioned above, please also review Policy on Threatening Behavior by Students (<http://policy.web.arizona.edu/threatening-behavior-students>)
5. The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. The University encourages anyone who believes he or she has been the subject of discrimination to report the matter immediately as described in the section below, "Reporting Discrimination, Harassment, or Retaliation." All members of the University community are responsible for participating in creating a campus environment free from all forms of prohibited discrimination and for cooperating with University officials who investigate allegations of policy violations. Please review Nondiscrimination and Anti-harassment policy (<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>)
6. **Accessibility and Accommodations:** It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

**Program Outcome**

1. PO(d): Be a contributing team member (G-7) : Projects
2. PO (g): Write clear, concise professional reports, and prepare and deliver effective oral presentations to groups (G-6): Projects
3. PO(k): Apply probability and statistics concepts (G-4): Exams
4. PO (k) : Ability to apply Excel/SQL/ACCESS software (G-1) : Exams/Homework

End.