SC 5301: Fundamentals of Smart Cities
Department of Civil Engineering

General Information

Instructor:	Jeffrey Weidner, Ph.D. Office: A-222 Lab: E-214 Office Phone: (915)-747-6913 Cell Phone: (215) 292-4830 Email: jweidner@utep.edu Office Hours: Schedule at www.jeffreyweidner.com/schedule
Meeting Time and Location:	Tuesday/Thursday: 3:00 PM to 4:20PM Engineering E-217
Final Exam:	None
Course Description:	This course introduces the students to the interdisciplinary concept of smart cities, with focuses on smart homes, buildings, energy, mobility, logistics, etc. and its common system integration into smart streets, squares, districts, etc. knowledge-based city management will be presented in accordance with a concept of Industry 4.0. The students will gain the technological, business and sustainability knowledge that will allow them to act as specialists of smart cities with a local and global perspective.
Class Approach:	This course is, first and foremost, an introductory component of the Dual Master degree in Smart Cities offered by UTEP and the Czech Technical University, in Prague, Czech Republic. Students who want to participate in the Dual MS program usually take this course in their first year of graduate studies here at UTEP, or at CTU, where the course is taught by Dr. Miroslav Svitek – a world-renowned expert in Smart Cities. In the past, he has traveled here to teach the course as well, but we are building capacity in this area locally, which is why I am teaching it now. Teaching Smart Cities is not like teaching Statics or Fluid Dynamics. These things are governed by laws of physics and calculus. We are not debating the merits of free-body diagrams as a profession. There is little change or advancement to keep up with. They are fundamental courses. While this class is called Smart Cities Fundamentals, the concept of Smart Cities is dynamic. What is fundamental now may change with time. Smart Cities is a human-focused domain and with that comes all the messiness and incongruity that we humans engender. Let's get into it.

Textbook: None

Course   By the end of this course you should be able to:
Objectives:

1.   Describe what a city is and what makes a city "smart"
2.   Analyze the idea of "Smart Cities" as a paradigm
3.   Explain the technologies that underpin present-day Smart Cities
4.   Explain the components of Smart Cities and how they integrate
5.   Discuss the human side of Smart Cities
6.   Assess the efficacy of a Smart Cities initiative

Class Policies

Honor   Students are expected to adhere to the Honor Code of the Department of Civil
Code: Engineering, which can be found here (http://ce.utep.edu/honorcode.htm).
             Instances of suspected cheating or other violations of the Honor Code will be
             handled according to the procedures in the UTEP Handbook of Procedures.

Attendance   I do not take attendance during class. Your work is your responsibility, and you
Policy: make the decision to show up in person or not.

Neatness   Part of being an engineer is executing tasks in a neat, understandable and
Policy: repeatable manner. This is a critical aspect of engineering education that is often
             overlooked. In this class, I ask that you do the following:
             - Complete homework assignments digitally or on engineering paper.
             - **Loose-leaf paper is not permitted.**
             - Write precisely and neatly.
             - Include your name on every page of your homework.
             - Number, title and date the pages of your homework.
             - Clearly sketch out any diagrams with labels as required.
             - Box answers so they can be readily identified.
             - List any external references used in the homework (i.e., textbook tables)
             - Make a clean digital copy for submission

Group Work   Working in groups is encouraged for homework assignments, but everyone must
Policy: submit their own work. Blatant copying is not permitted and both the copier and
             the person who provided their work to be copied will lose credit for the
             assignment.

Device   It would ironic if I were to ban technology in this class, but I do ask that you
Policy: exercise discretion. Studies have shown that phones, tablets, and laptops have
             negative effects on not only your learning but the entire class. If you want to use
             devices for note-taking, I strongly consider airplane mode. You may be
             surprised.

Coursework and Grading Expectations

Grading: Grade Breakdown:

                Discussions: 25%
                Homework: 25%
                Final Project: 50%

Final Grade $A \geq 89.5$
Thresholds: $89.5 > B \geq 79.5$
              $79.5 > C \geq 69.5$
              $69.5 > D \geq 59.5$
              $59.5 > F$

Exams: I am not giving exams in this course

Homework: Homework will be assigned on an ad hoc basis. I am aiming for seven homework assignments – one per module.

Class Structure and Schedule

The subject matter of this course could be spread out to 30 in-depth PowerPoint lectures and delivered from to you but that is not how I want to teach. The course is broken into seven modules. Each module is about two weeks, or four class periods. There is a flow to the classes within the modules:

1. Class Discussions: We will spend 25% of our class discussing Smart Cities. I have tried to identify guiding questions for us to discuss, as listed below. Please be prepared to share your opinion, to ask questions, and to participate. I will, from time to time, use Blackboard for online discussions as well As noted above, discussion participation (in-person and online) is 25% of your grade.

Class
Structure: 2. Traditional Lecture: During each block I will deliver one traditional lecture on the subject matter. This will be informative and often historical. Smart cities is evolving so we will discuss how we got to today in lecture and then look at where we are with case studies.

3. Case Studies: We will take an in-depth look at seven cities, tentatively identified in the schedule below.

4. Project Work Sessions: I am dedicating 25% of in-class time to working on your term project. This project replaces your final exam, and it accounts for 50% of your grade. More detailed instructions for the project to follow in the first work session.

Course Schedule

Week	Lecture	Date	Driving Question	Notes
1	1	29-Aug	What is a City?	Class Discussion – Define "city"
	2	31-Aug		Jeff out of town
2	3	5-Sep	What are Smart Cities?	Lecture – Background of Smart Cities
	4	7-Sep		Class discussion – what is smart?
3	5	12-Sep	How do we make cities "smart?"	Guest Lecture – Czech Professors
	6	14-Sep		Lecture – Smart Cities Technology
4	7	19-Sep	How do we make cities smarter?	Case Study #1 – Barcelona!
	8	21-Sep		Project Work Session - Introduction
5	9	26-Sep	What are the building blocks of Smart Cities?	Class Discussion – Smart Living
	10	28-Sep		Lecture – Smart Cities Components
6	11	3-Oct	How are the building blocks of Smart Cities formed?	Case Study #2 – Bogota!
	12	5-Oct		Project Work Session – Campus walk
7	13	10-Oct	How are the building blocks of Smart Cities integrated?	Class Discussion – How smart is too smart?
	14	12-Oct		Lecture – Integration of smart cities comp.
8	15	17-Oct	How are the building blocks of Smart Cities digitized?	Case Study #3 – Songdo!
	16	19-Oct		Project Work Session – ConOps
9	17	24-Oct	What is the human role in Smart Cities?	Class Discussion – Do you like Smart Cities?
	18	26-Oct		Lecture – Humans in Smart Cities
10	19	31-Oct	How can humans shape future Smart Cities?	Case Study #4 – New York City!
	20	2-Nov		Project Work Session - Users
11	21	7-Nov	How do we evaluate Smart Cities?	Class Discussion – Are KPIs good?
	22	9-Nov		Lecture – Assessment of Smart Cities
12	23	14-Nov	Are we evaluating Smart Cities correctly?	Case Study #5 – Guadalajara!
	24	16-Nov		Project Work Session – Performance
13	25	21-Nov	Holiday Week	Lecturesgiving
	26	23-Nov		Thanksgiving Holiday – Campus Closed
14	27	28-Nov	How do we make El Paso "Smart?"	Class Discussion – Is El Paso Smart?
	28	30-Nov		Class Discussion – Let's make El Paso Smart
15	29	5-Dec	Project Presentations	Final Project Presentations
	30	7-Dec		Final Project Presentations