

Spring 2022—Smart City:
Evaluate, Design and Build A Smart City and Community
<https://utexas.zoom.us/j/95960377277>

BDP 319/CRP386 Smart City
Instructors: Prof. Junfeng Jiao



(Creator: metamorworks | Credit: Getty Images)

General Information

Title	BDP319/CRP386: Smart City	
Unique Number	60220/01352	
Faculty	Junfeng Jiao	Sam Lee (TA)
Credit	3	
Class Time	Thursday, 2:00-5:00 PM	
Location	CAL221	
Office Hour	Thursday 1:00-2:00 or By Appointment	Wednesday 1:00-2:00 or By Appointment
Email	jjiao@austin.utexas.edu	samantha.lee@utexas.edu

Zoom Link:

Per University guidelines the class will be online for the first two weeks. Pending guidance from the University the class we hope to move to in person learning. Until that is possible please use the recurring zoom link for class.

<https://utexas.zoom.us/j/95960377277>

Book

(Available at the UT Book store)

Jiao, J. 2022. Smart Cities, Dubuque, IA: Kendall Hunt

https://he.kendallhunt.com/smart_cities

Introduction

Today cities are gradually transforming into smarter, more technically advanced ones through the development of integrated services and infrastructures. "Smart City" refers to a city that incorporates innovative technologies as well as citizen-driven data to inform the efficient use of natural resources, public transport, energy, and urban infrastructure. In a smart city, people are at the center of development, and information and communication technologies (ICT) are used as tools to promote their participation in development of a sustainable community. Through this course, students will learn about different components of a smart city and the best practices of smart cities worldwide, through discussions with professionals and academics. The overall goals of this class are:

- To understand the basic knowledge of smart cities and current challenges.
- To understand the characteristics of smart cities and the main elements that define innovation processes in urban policy.
- To learn the concept of citizen design science.
- To get familiar with smart city applications and services.

This course is organized into two parts: 1) Introduction to smart cities; 2) real world smart city/community team projects. During the first half of the semester, the course will provide a detailed introduction to smart cities and smart communities, including their current status and development. The professors will invite leading speakers from different fields to talk about their experiences in smart city research. In the second phase, students will learn how to analyze smart city and smart community data in team projects for Austin and beyond.

COURSE CONTENT

General

Students must read the assignments in advance of class, and they must come to class prepared to discuss them. Also, we will have guest speakers in several of our classes, and students must come to class prepared to engage with them. Class participation, oral presentations, writing, and team work will be important in this class. Readings from books, articles and websites available on Canvas.

One individual paper will be due during the semester. Students will be able to choose their own smart city/community related topics with the approval of the professor. Additionally one team paper will be due based on the final project. Students will spend most of their time working on this final team project. At the end of the semester, students will make final presentations about their team projects, and they will submit a professional style written report.

Introduction to Smart City/Community

During the first half of the semester, the course will include the following important smart city and smart community topics:

- Concept of Smart City
- Smart Transportation

- Smart City and Business
- Smart City and AI
- Smart City and Robotics
- Smart City and Digital Twins
- Internet of Things, Blockchain, Artificial Intelligence, and many others

Students will submit their one individual paper during the first half of the semester. Detailed paper requirements will be shared with students later. Some sample Smart Modules are listed below.

- **Module 1: Concept of Smart Community and Challenges**



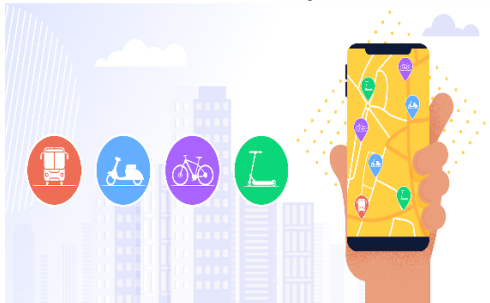
- ✓ *What is a smart city?*
- ✓ *What are the potential challenges faced in a smart city?*

- **Module 2: Big Data and Internet of Things (IOTs)**



- ✓ *What are the role of IOT and big data in a smart city?*
- ✓ *How does big data and IOT relate to each other?*

- **Module 3: Smart Mobility**



- ✓ *What are autonomous and connected vehicle technologies?*
- ✓ *What are the challenges to deploy emerging mobility technologies?*

- **Module 4: Smart Infrastructures**



- ✓ *Concepts associated with smart infrastructures.*
- ✓ *Approaches for situation awareness and assessment via information-rich as-built models and reality capture technologies.*

- **Module 5: Resilient Cities**



- ✓ *How do smart cities react to disasters?*
- ✓ *What factors and elements are needed to pave the way for effective responsive cities?*

Smart City: Final Project

After students develop some basic knowledge of smart cities and smart communities, the course will become more of a workshop environment. The professors will work with students to apply their smart city/community knowledge in real projects with different entities, such as Texas Advanced Computing Center, and the City of Austin. Students will form research teams, and the professors and partners will provide any necessary data. This could include open data, financial data, GIS etc., in the following areas:

- Transportation
- Business
- Data
- Public Safety
- Finance
- Digital Twin
- Artificial Intelligence
- Others

Topics may range from equity implications of new technologies, how smart city infrastructure can increase efficiency in any of the above topics, and any other implications of smart city technologies that you or local stakeholders would like to explore. At the end of the semester, each team will turn in a final report and make a final presentation to related stakeholders such as: planners, city officials, business leaders, engineers.

GRADING

Paper: 30% (including class presentation)

Class Participation: 10%

Group Research Project: 60% (including written report & class presentation)

Note:

Class participation is neither about the person who flaps his or her gums the most, nor about being an introvert or an extrovert. In this class, participation is about quality engagement. Students will be expected to lead some class discussions. To participate you must read and contemplate prior to class. Good class participation involves the following: active listening, consideration of your peers, making comments, asking questions, taking risks and giving opinions. Our class will be a safe environment, and I will be assessing whether you can back up your comments by applying the readings and course concepts.

All cell phones, PDA's, and other hand held devices must be turned off during class. Laptops/tablets will be allowed in class only for the purpose of taking notes or consulting course readings, unless I advise you otherwise. Surfing the web, texting or sending emails during class is prohibited; it is a breach of professionalism and will result in a loss of laptop/tablet privileges.

Class Schedule

(Subject to Change Due to Guest Speaker Schedules)

Week	Day	Date	Title	Deadlines
1	Thursday	20-Jan	What is Smart City -Speaker: Dr. Junfeng Jiao, Professor, director of Urban Information Lab, Co-Director, Texas Smart Cities	
2	Thursday	27 Jan	Big Data and Internet of Things - Guest: Dr. Weijia Xu, the group leader for Data Mining & Statistics group at Texas Advanced Computing Center, Co-Director, Texas Smart Cities	
3	Thursday	3-Feb	Smart City, AI and Decision Support System - Guest: Dr. Arya Farahi, Department of Statistics, UT Austin, Co-Director, Urban Information Lab	Smart City Paper Topics Due (2 pm)
4	Thursday	10-Feb	Smart Mobility -Guest: Jason JonMichael, Assistant Director at Austin Transportation Department, City of Austin	
5	Thursday	17-Feb	Smart Infrastructures--PINN Guest: Jeff DeCoux, Autonomy Insitute, Austin, TX	

6	Thursday	24-Feb	Smart City and Data Science Guest: James Guszczka Chief Data Scientist, Deloitte LLP (TBD)	Smart City Paper Due (2pm)
7	Thursday	3-March	Robotics and Smart City Guest: Justin Hart, Assistant Research Professor, Texas Robotics	Final Project Topic and Team Members Due
8	Thursday	10-March	Smart and Resilient Cities Guest: Dr. Kijin Seong, Post Doc Fellow Urban Information Lab	Review Final Project Team Options
9	Thursday	17-March	Spring Break	
10	Thursday	24-March	Smart City and Digital Twins Guest: Dan Issacs (TBD)	
11	Thursday	7-April	Smart City and Smart Business Guest: Prof. Feng Zhao, Staffordshire University, UK (TBD)	
12	Thursday	14-April	Smart City and Explainable AI Guest: Dr. Anand Rao, Principal and Global AI Lead, Pricewaterhouse Coppers	
13	Thursday	21-April	In class draft/midterm project progress presentation	Ten-Minute presentation for each group
14	Thursday	28-April	Work on the final project (No Class)	
15	Thursday	5-May	Final Presentation	Project Reports Due and Presentations (2pm)

ADDITIONAL INFORMATION

Students with Disabilities:

Qualified students with disabilities may request appropriate accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities at <http://www.utexas.edu/diversity/ddce/ssd/> or 471-6259.

Academic Dishonesty/Plagiarism:

Students are expected to respect the LBJ School's standards regarding academic dishonesty. You owe it to yourself, your fellow students, and the institution to maintain the highest standards of integrity and ethical behavior. A discussion of academic integrity, including definitions of plagiarism and unauthorized collaboration, as well as helpful information on citations, note taking, and paraphrasing, can be found at the Office of the Dean of Students web page. (<http://deanofstudents.utexas.edu/conduct/>) and the Office of Graduate Studies (<http://www.utexas.edu/ogs/ethics/transcripts/academic.html>). The University has also established disciplinary procedures and penalty guidelines for academic dishonesty, especially Sec. 11.504 in Appendix C of the Institutional Rules on Student Services and Activities section in UT's General Information Catalog.

Emergency Evacuation Routes:

The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, <http://operations.utexas.edu/units/csas/terms.php>:

- a. Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- b. Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- c. Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class. In the event of an evacuation, follow the instruction of faculty or class instructors.
- d. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- e. Behavior Concerns Advice Line (BCAL): 512-232-5050
- f. Link to information regarding emergency evacuation routes and emergency procedures can be found at: <https://preparedness.utexas.edu/emergency-plans>

Religious Holidays:

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Campus Safety and Wellness Resources:

More information on how to sign up for emergency text alerts, contact information for various UT offices, wellness resources, and campus initiatives relating to safety and/or wellness can be found at <https://www.utexas.edu/campus-life/safety-and-security>