USC Marshall
School of Business

DSO-599: SMART CITY TACTICS, TECHNOLOGIES, AND OPERATIONS
Fall 2022

3 Units - Meets every Wednesday from 6:30PM to 9:30PM

Instructor: *Ted Ross*
Office: *BRI 401 T*
Office Hours: *One hour per week or by appointment. Wednesdays, 5:00-6:00PM*
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COURSE DESCRIPTION

This is a class about the tactical planning, implementation, and digital transformation of the communities where we live, work, and play (aka the Smart City). This class will dissect the various components of Smart City technologies (infrastructure, data, digital services, etc.), review a series of Smart City technology use cases in areas such as public safety, transportation, and sustainability, discuss strategies for digital transformation in large ecosystems, and detail the organizational change methods necessary to navigate complex political and organizational challenges. As smart city technology spending is more than $124 Billion per year globally, this class will also cover practical opportunities for students on how to consult, market, or sell to smart cities (International Data Corporation - 2020 Worldwide Smart Cities Spending Guide). This interdisciplinary class is a real-world intersection of technology, data, digital strategy, and the world in which we live, making it applicable to many student industries and areas of interest.

COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

1) Define what a Smart City is, including its various technology components and the interactions of those technologies with urban stakeholders (residents, businesses, tourists, government).

2) Apply modern digital transformation techniques to large, complex ecosystems and organizations.

3) Describe various national and international use cases of smart city technologies for modern urban challenges, including public safety, transportation, sustainability, public works, and digital inclusion/equity

4) Work as a team to identify, analyze, and solve an existing urban problem using current and emerging Smart City technologies

5) Develop and demonstrate personal skills in consulting, marketing, selling to, implementing, or building technologies in the large, global smart city industry

COURSE MATERIALS

Required Text/Readings:

1. "Smart Cities: Foundations, Principles, and Applications," First Edition, by Houbing Song, Ravi Srinivasan, Tamim Sookoor, Sabina Jeschke, Wiley Publishing, ISBN 9781119226390

2. "Smart Cities: The Internet of Things, People and Systems," First Edition, by Schahram Dustdar, Stefan Nastić. Ognjen Šćekić, Springer Publishing, ISBN 9783319600307

Blackboard Files:

- This course utilizes additional articles, videos, and publications to enhance your learning. These resources are listed in the Course Outline below and will also be posted on Blackboard.

GRADING

Grading is based on adding up the number of points obtained in each of the following assignments, weighted according to the percentage proportion given in the third column below (% of Overall Grade). A final letter grade will be assigned to you based on both your total number of points and how it compares to other students in the course. The target average GPA for this course is 3.5.

Grading Summary

Assignments	***Points***	***% of Overall Grade***
Class Contribution & Professionalism	*100*	*10%*
Homework	*150*	*15%*
Team Project	*210*	*21%*
Mid-Term Exam	*240*	*24%*
Final Exam	*300*	*30%*
TOTAL	*1000*	*100%*

CLASS CONTRIBUTION & PROFESSIONALISM

Class contributions are extremely important as it greatly improves the learning experience for you and your classmates. Professionally voicing your individual perspective and understanding in class will help you both practice the terminology used in the course and reinforce learning of its topics. In addition, your input can greatly help other students (and the professor) view the content in new and meaningful ways. For this reason, class participation counts 10% of your course grade. It requires that you do the assigned readings before class, participate actively in class with questions and comments, communicate in a respectful and professional manner, and participate in any interactive class activities, such as surveys or polls.

In-class participation grading is based on your demonstrated willingness to participate, the quality of the comments expressed (rather than quantity), and professional behavior demonstrated during the course. While some students are more comfortable than others with class participation, *all* students should make an effort to contribute meaningfully. Students will be "cold called" on from time to time to ensure inclusive student contributions.

For each in-class session ten (10) points will be awarded to a student for relevant, meaningful, and professional participation, five (5) points for modest contributions and professionalism in the class, and zero (0) points for no participation, absence, or highly unprofessional course behavior (up to 100 points maximum for the semester).

Class Participation—Behavioral Anchor Rating Scale:

Meaningful Contributions and Professionalism in Class

- Initiates information relative to topics discussed
- Accurately exhibits knowledge of assignment content
- Clarifies points that others may not understand
- Shares personal experiences or opinions related to topic
- Offers relevant / succinct input to class
- Actively participates in class exercises
- Demonstrates ability to apply, analyze, evaluate & synthesize course material.
- Demonstrates willingness to attempt to answer unpopular questions
- Builds on other students' contributions
- Exemplifies professional behavior typical for a business or graduate course environment, such as arriving on time, not using smartphone or laptop for non-course related content in class, dressing appropriately, respectful communication with the professor and other students, a positive attitude, etc.

Modest Contributions and Professionalism in Class

- Participates in group discussions when asked
- Demonstrates knowledge of course material
- Offers clear, concise, "good" information on class assignments
- Offers input, but tends to reiterate the intuitive
- Attends class regularly
- Mostly professional behavior typical for a business or graduate course environment

Unacceptable Contributions and Professionalism in Class

- Fails to participate even when directly asked
- Gives no input to discussions
- Does not demonstrate knowledge of the readings
- Shows up to class: does nothing
- Distracts group / class
- Irrelevant discussion
- Unprofessional behavior not conducive for a business or graduate course environment

HOMEWORK

Homework assignments count for 15% of your course grade. A typical assignment will consist of 2-3 short essay questions related to the readings for the week. Student responses that are thoughtful, thorough, and reference the week's reading or lectures will be given full points (15 points per homework assignment). Incomplete answers will receive partial credit. Unanswered questions will receive zero (0) points.

You will submit homework assignments through Blackboard by 6:30PM on Wednesday of each assigned week. In other words, your homework assignment is due in Blackboard by the start of each new class session so we can discuss those homework questions and answers as a group at the beginning of each class.

SMART CITY SOLUTION TEAM PROJECT

In Week 8 (after mid-term), I will form teams of five to eight students each (dependent on class size). These teams will draft, submit, and present a group PowerPoint presentation project to the class in weeks 14 and 15 (aka Smart City Solution Team Project).

Your team will serve as consultants for the City of Los Angeles (the nation's second largest city), analyzing a significant urban issue and providing recommendations for a Smart City technology solution. A list of urban issues will be provided to your team. Your team's job is to:

1. Select an urban issue from the provided list,
2. Research the issue using available online resources,
3. Detail a Smart City technology solution that would substantially benefit stakeholders impacted by the issue
4. Submit the completed presentation online in Blackboard in week 13. PowerPoint presentation template will be provided and includes:
    a. Executive Overview
    b. Definition of Problem/Issue
    c. List of Impacted Stakeholders
    d. Proposed Smart City Technology Solution
        i. Detail how the solution would work
        ii. Describe the technologies used to make up the solution (should reference technologies discussed in this class)
        iii. Summarize how the chosen technologies relate to each other to make a unified solution
    e. Brief Benefit Analysis to Impacted Stakeholders
    f. Expected Agents of Action
    g. Brief Stakeholder Engagement Plan
    h. Methods to Fund or Sustain the Proposed Smart City Solution, etc.
5. Present findings to class via concise 20-minute presentation and answer other student's questions in weeks 14 or 15

Include what you believe are the most important factors of the issue and how the Smart City technology solution will improve the lives of your stakeholders. Specify wherever possible. General solutions will get little credit. Provide both quantitative (when applicable) and qualitative analysis where possible. Practicality of solution, creativity in approach, ability to "sell" the proposal during the class presentation, and clear application of what is taught in this course will be given high credit.

Minimal time will be provided in class to form teams, discuss approved topics, and take a progress checkpoint (week 12). Researching and drafting the assignment is expected to be completed outside of class hours.

With the submission of your group assignment, you will be asked to rank your teammates using the Peer Evaluation Form as far as their relative contribution to the assignment with the intention that this will encourage all team members to do their best to contribute to the team assignment. Your presentation and peer reviews must be submitted on Blackboard on the same day the assignment is due.

EXAMS

There will be one midterm exam worth 24% of your course grade and one final exam worth 30% of your course grade. Both exams will be closed book/notes, taken in-class on Blackboard using your own computer, and include questions based on the assigned readings or lecture. The midterm exam will be on October 5th (Wednesday) during normal class hours and the final exam will be on December 7th (Wednesday) from 7-9PM. Both midterm and final review will be provided the class before to highlight areas of study and preparation.

EXAM RESCHEDULING

If you have a medical or family emergency, I can work with you to create a makeup exam to be completed at another date. For all other reasons, including travel for non-emergencies, oversleeping, or forgetfulness about the exam date, you will not be allowed to reschedule and will receive a zero for the exam.

ASSIGNMENT SUBMISSION

All homework and group presentation assignments must be submitted via Blackboard before the time it is due. If your computer, Internet access, or Blackboard have issues, then you can email the assignment to me as soon as you regain web access, along with a screenshot verifying the latest date of modification of the attached file. Unless you can document that you completed the assignment before the deadline or have a documented medical or family emergency, no late submissions will be considered for grading. This policy is strict, and the Blackboard system will not accept submissions after the given timestamp.

THE IMPORTANCE OF COURSE EVALUATIONS

Like a Smart City, this course is continuously being improved! Feedback from students through the midpoint and final course evaluations is invaluable.

EMERGENCY PREPAREDNESS

In case of a declared emergency if travel to campus is not feasible, the USC Emergency Information web site (https://emergency.usc.edu/) will provide safety and other information, including electronic means by which instructors will conduct class using a combination of USC's Blackboard learning management system (blackboard.usc.edu), teleconferencing, and other technologies.

USE OF RECORDINGS

Pursuant to the USC Student Handbook (www.usc.edu/scampus, Part B, 11.12), students may not record a university class without the express permission of the instructor and announcement to the class. In addition, students may not distribute or use notes or recordings based on University classes or lectures without the express permission of the instructor for purposes other than personal or class-related group study by students registered for the class. This restriction on unauthorized use applies to all information that is distributed or displayed for use in relationship to the class.

COURSE OUTLINE AND ASSIGNMENTS

	Topics/Daily Activities	Readings and Videos (*must complete before class*)	Deliverables with Due Dates
Week 1 August 24	**What is a Smart City?** **&** **Course Expectations** ● Course Expectations ● The Smart City Vision & Opportunity ● How Technology Makes Us "Smarter" ● The Smart City Defined ● Components of Smart City ● Smart City Stakeholders ● Cyber-Physical Systems & Cyber-Human Planning	*Smart Cities: Foundations, Principles, and Applications* (Chapter 1) ~18 pages *Smart Cities: The Internet of Things, People and Systems* (Chapter 1) ~11 pages Read City of Los Angeles' "SmartLA 2028 Smart City Strategy" (https://ita.lacity.org/sites/g/files/wph1626/files/2021-05/SmartLA2028%20-%20Smart%20City%20Strategy.pdf) ~48 pages Watch City of Los Angeles' "SmartLA 2028 Introduction" Video (5 minutes, 18 seconds) (https://www.youtube.com/watch?v=23NaWMzkkSU)	Homework #1 (8/31, 6:30PM)

Week 2 August 31	**Smart Infrastructure** ● Smart City Infrastructure Defined ● Strategic Infrastructure Opportunities ● Strategic Infrastructure Challenges ● Infrastructure Use Cases (Mobility, Smart Grid)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 7 and 15) ~46 pages *Smart Cities: The Internet of Things, People and Systems* (Chapter 2, 3, and 5) ~53 pages Watch Volvo's "Smart Cities - Infrastructure & Transportation of the Future" Video (2 minutes, 34 seconds) (https://www.youtube.com/watch?v=d1DndVz9dAs) Watch U.S. Dept of Energy "Smart Grid Video" (5 minutes, 18 seconds) (https://www.youtube.com/watch?v=JwRTpWZReJk)	Homework #2 (9/07, 6:30PM)
Week 3 September 07	**Smart Data Tools & Practices** ● Smart Data Tools & Practices Defined ● Strategic Data Opportunities ● Strategic Data Challenges ● Data Use Cases (Public Safety, Open Data)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 2 and 9) ~56 pages Watch City of Los Angeles' "ShakeAlertLA Earthquake Early Warning App" Video (2 minutes, 9 seconds) (https://www.youtube.com/watch?v=3G4H3t3QQDo&t=87s) Watch City of New York "Open Data" Video (50 seconds) (https://www.youtube.com/watch?v=l4undH4y0Ws)	Homework #3 (9/14, 6:30PM)

Week 4 September 14	**Smart Digital Services & Apps** ● Smart Digital Services Defined ● Strategic Digital Services Opportunities ● Strategic Digital Services Challenges ● COVID-19 Pandemic as a Catalyst ● Digital Services Use Cases (Citizen Service Requests, Parking Availability)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 11) ~22 pages *Smart Cities: The Internet of Things, People and Systems* (Chapter 7) ~35 pages Watch City of Los Angeles' "MyLA 311 Mobile App" Video (4 minutes) (https://www.youtube.com/watch?v=95eLlfRCarU) Watch MobiDev's "Smart Parking" Video (2 minutes, 12 seconds) (https://www.youtube.com/watch?v=-9s9QkpRzWs)	Homework #4 (9/21, 6:30PM)
Week 5 September 21	**Smart City Governance** ● Smart City Governance Defined ● Strategic Governance Opportunities ● Strategic Governance Challenges ● Smart City Governance Use Cases (City of Amsterdam, City of Los Angeles, Republic of Korea)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 12 and 21) ~52 pages *Smart Cities: The Internet of Things, People and Systems* (Chapter 9) ~18 pages Watch CIGI's "How to Build a Democratic Smart City" Video (7 minutes, 36 seconds) (https://www.youtube.com/watch?v=4z0fVAsHFro)	Homework #5 (9/28, 6:30PM)

Week 6 September 28	**Digital Inclusion & Connectivity and Midterm Review** ● Digital Inclusion Defined ● Strategic Digital Inclusion Opportunities ● Strategic Digital Inclusion Challenges ● Digital Inclusion Use Cases (United Kingdom, City of Louisville) ● Midterm Review	Read UK's "Government Digital Inclusion Strategy" (https://www.gov.uk/government/publications/government-digital-inclusion-strategy/government-digital-inclusion-strategy) ~35 pages Read City of Louisville's "Digital Inclusion Plan" (https://digitalinclusion.louisvilleky.gov/sites/default/files/Louisville_Metro_Digital%20Inclusion_Plan_May%202017.pdf) ~9 pages Study for Midterm	Homework #6 (10/05, 6:30PM)
Week 7 **October 5**	**MIDTERM**		
Week 8 October 12	**Securing the Smart City & Smart City Solution Team Project (Team Formation)** ● Cyber Threats ● Cyber Security Challenges ● Cyber Security Lifecycle of Smart Cities ● Group Presentation (Team Formation & Assignment Review)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 14 and 19) ~45 pages Watch Thales Group's "Importance of Smart City Security" Video (3 minutes, 25 seconds) (https://www.youtube.com/watch?v=Lzx-BsFPGno&t=191s) Watch Forrester's "Keeping Smart Cities Safe from Hackers" Video (9 minutes, 25 seconds) (https://www.youtube.com/watch?v=ktZ8HUkFj1M&t=51s) Work on Group Presentation Topic Proposal (due 10/19) ~2-3 hours of work	Group Presentation Topic Proposal Due (10/19, 6:30PM)

Week 9 October 19	**Innovating the Smart City - Part 1 (Emerging Technologies) & Smart City Solution Team Project (Topic Approval)** ● Evolution of Smart City Through Emerging Tech ● Emerging Technologies Review ● Importance of Integration (Smart City 2.0) ● Emerging Technology Use Cases (Smart Lighting, Smart Health Monitoring) ● Group Presentation (Topic Approval & Discussion)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 24 and 27) ~38 pages Read Tomorrow City's "Technology for Smart Cities: The Pillars of Urban Planning of the Future" ~11 pages (https://tomorrow.city/a/technology-for-smart-cities-the-pillars-of-urban-planning-of-the-future) Work on Group Presentation PowerPoint (due 11/20) ~2 hours	Homework #7 (10/26, 6:30PM)
Week 10 October 26	**Innovating the Smart City - Part 2 (Digital Transformation)** ● Evolution of Smart City Through Digital Initiatives ● Key Digital Transformation Practices ● Engaging & Navigating Stakeholders ● Smart City Measurements and Key Performance Indicators (KPIs)	*Smart Cities: Foundations, Principles, and Applications* (Chapter 5) ~24 pages Read Deloitte's "Seven Pivots for Government's Digital Transformation" ~13 pages (https://www2.deloitte.com/us/en/insights/industry/public-sector/government-digital-transformation-strategy.html) Work on Group Presentation PowerPoint (due 11/20) ~2 hours	Homework #8 (11/02, 6:30PM)

Week 11 November 02	**Sustaining & Funding Smart Cities** ● Sustainability as an Opportunity ● Sustainability as a Climate Imperative ● Sustainability Use Cases ● Funding Models for Smart City Investments	*Smart Cities: Foundations, Principles, and Applications* (Chapter 17 and 18) ~39 pages Read Deloitte's "The Challenges of Paying for Smart Cities Projects" ~22 pages (https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Public-Sector/gx-ps-the-challenge-of-paying-for-smart-cities-projects1.pdf) Watch City of Amsterdam's "How Amsterdam Revolutionizes Energy" Video (11 minutes, 39 seconds) (https://www.youtube.com/watch?v=pkTBjMGKPK8) Work on Group Presentation PowerPoint (due 11/20) ~2 hours	Homework #9 (11/09, 6:30PM)

Week 12 November 09	**Global Smart City Perspectives** **&** **Smart City Solution Team Project (Progress Checkpoint)** ● Smart Cities & Cultural Context ● Culture as a Technology Driver ● Culture as a Technology Detractor ● Variations in Smart City Focus & Strategies (Dubai, Paris, New York, Amsterdam, Korea)	Read City of Paris' "Smart & Sustainable Strategy" ~60 pages (https://cdn.paris.fr/paris/2020/02/26/f7dc822a66de6000cd910a145c7fca39.ai) Read City of New York's "Building a Smart & Equitable City" ~24 pages (https://www1.nyc.gov/assets/forward/documents/NYC-Smart-Equitable-City-Final.pdf) Read Dubai's 2021 Smart City Plan ~24 pages (https://www.dubaiplan2021.ae/c/document_library/get_file?uuid=14167c30-550d-546c-5b72-587a3d1e5c7a&groupId=1028358) Read City of Amsterdam's "Amsterdam Better Than Smart" Strategy Summary ~9 pages (https://smartcityhub.com/governance-economy/amsterdam-better-than-smart/) Read Korea's "Korean Smart Cities" Strategy Summary ~13 pages (https://smartcity.go.kr/wp-content/uploads/2019/08/Smart-city-broschureENGLISH.pdf) Work on Group Presentation PowerPoint (due 11/20) ~1 hour	Homework #10 (11/16, 6:30PM)

Week 13 November 16	**Consulting or Selling to a Smart City** ● The Smart City Market ● Types of Smart City Customers ● Who to Sell to? ● What to Sell? ● Navigating Government Procurement & Budgeting	Read TechTarget's "Develop a Channel Sales Strategy for Smart City Projects" ~4 pages (https://searchitchannel.techtarget.com/feature/Develop-a-channel-sales-strategy-for-smart-city-projects) Read NewCo's "How to Sell to a Smart City" ~3 pages (https://shift.newco.co/2016/09/23/how-to-sell-the-smart-city/) Read City of Boston's "Smart City Playbook" ~4 pages (https://monum.github.io/playbook/) Finalize Group Presentation PowerPoint (due 11/20) ~2 hours Prepare to Give Group Presentation to Class (presentation date will be assigned to team) ~2 hours	Group Presentation PowerPoint Due (11/20, 11:59PM) Peer Evaluation Form Due (11/20, 11:59PM)
Week 14 November 23 (Thanksgiving Week)	Group Presentations		
Week 15 November 30	Group Presentations & Final Review Session	Prepare for Final Exam	
FINAL **December 07**	**FINAL** **(7:00 - 9:00PM)**		

OPEN EXPRESSION AND RESPECT FOR ALL

An important goal of the educational experience at USC Marshall is to be exposed to and discuss diverse, thought-provoking, and sometimes controversial ideas that challenge one's beliefs. In this course we will support the values articulated in the USC Marshall "Open Expression Statement."

STATEMENT ON ACADEMIC CONDUCT AND SUPPORT SYSTEMS

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on Research and Scholarship Misconduct.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
eeotix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
osas.usc.edu
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

*Occupational Therapy Faculty Practice - (323) 442-33*40 or otfp@med.usc.educhan.usc.edu/otfp
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.