

Course Information

Course Number:	URSC 689
Course Title:	Network Science of Cities
Section:	601
Time:	05:30 pm-08:30 pm, Every Tuesday, Fall 2022
Location:	ARCA 303
Credit Hours:	3

Instructor Details

Instructor:	Xinyue Ye
Office:	Langford A 306
Phone:	
E-Mail:	xinyue.ye@tamu.edu
Office Hours:	by appointment

Course Description

Human being is always curious about how things are related in the world. For thousands of years people are looking for ways to model the world through arts, natural sciences, and social sciences. Network Modeling is one of the prevalence and breakthrough technologies that trying to unravel the mystery of connectivity of the world. Cities are systems composed of flows and networks. Nowadays, urban researchers are using network science with Geographic Information Science (GIS) to explore and analyze the evolving connections among urban elements. In the meantime, more and more virtual networks have spatial characteristics which bring researchers opportunity to study information diffusion and human behavior across urban space. This course will focus on theoretical and substantive themes within network and flow in the cities. Basic knowledge of network elements as well as tools for spatial network analysis and visualization will be covered in this course followed by several case studies.

Course Prerequisites

Graduate student classification or approval of instructor. Prior programming experience is not required, although it will be beneficial. Prior or concurrent course work in statistics analysis is encouraged.

Special Course Designation

N/A

Course Learning Outcomes

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

- 1. Master the major theoretical ideas supporting network science research in cities.*
- 2. Understand data/model/tools in physical, virtual, and perceived spaces for network analytics.*
- 3. Gain knowledge of big data and their application in urban planning and management.*

4. *Design a research agenda drawing on network science approaches covered in this course.*

Textbook and/or Resource Materials

No textbook. Instructor will assign a set of papers as mandatory assigned reading.

Grading Policy

There are two homework assignments and one term project. All of them are open book. Your grade in this course will be based on the following elements:

Term Project (50 points): It needs to be delivered as a publishable paper and presentation (ppt).

Two homework assignments (20 points for each assignment; total 40 points): no score will be assigned to work which misses the deadline.

Class Discussion and Attendance (10 points): You are assigned to read the materials and need to be prepared to discuss.

Total Points: 100 Points (90- = A, 80-89 = B, 70-79 = C, 60-69 = D, 0-59 = F)

Course Schedule

Date	Topic
W1	Course Introduction (Why Networks)
W2	Cities as Systems
W3	Hierarchies and Networks (Homework 1 assigned)
W4	Space Syntax
W5	Distance in Complex Networks
W6	Urban Simulation (Homework 1 due)
W7	ABM and Hierarchy
W8	Human Dynamics across Social Media and Social Networks
W9	Urban Visual Analytics of Flow and Network (Homework 2 assigned)
W10	Geospatial Multimedia Data for Collaborative Field Research
W11	Open Knowledge Network for Spatial Decision Support
W12	Spatial Synthesis and Convergence Research (Homework 2 due)
W13	Spatial Information Diffusion
W14	Digital Twin and Future Cities
W15	Final Presentation and Term Project Due

Learning Resources

The University Writing Center (UWC) is here to help you develop and refine the communication skills important to your success in college and beyond. The UWC provides this help in a welcoming atmosphere

that respects all Aggies' backgrounds and abilities. Our trained peer consultants are available to work with you on any kind of writing or speaking project, including research papers, lab reports, application essays, or creative writing, and at any stage of your process, whether you're deciding on a topic or reviewing your final draft. You can also get help with public speaking, presentations, and group projects. We can work with you in person at our Evans or BLCC locations or via Zoom or email. To schedule an appointment or to view our handouts, videos, or interactive learning modules, visit writingcenter.tamu.edu. If you have questions, need help making an appointment, or encounter difficulty accessing our services, call 979-458-1455 or email uwc@tamu.edu.

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work,

should the instructor request it, may be sufficient grounds to initiate an academic misconduct case” ([Section 20.1.2.3, Student Rule 20](#)).

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You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

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Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University’s goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

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Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services \(CAPS\)](#).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX webpage](#).

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

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Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

Campus-Specific Policies

Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to howdy.tamu.edu and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete [FERPA Notice to Students](#) and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.

COVID Fall 2022 Statement

To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.

College and Department Policies

Statement of Inclusion

Texas A&M University is committed to enriching the learning and working environment for all visitors, students, faculty, and staff by promoting a culture that embraces inclusion, diversity, equity, and accountability. Diverse perspectives, talents, and identities are vital to accomplishing our mission and living our core values

Care of Facilities

Please respect your facilities in the School of Architecture (studio space, photo lab, shop, labs, etc.)

The use of spray paint, spray adhesive or other surface-altering materials is not permitted in the Langford Complex, except in designated zones (we do have spray booth facilities located on our complex). Students who violate this rule will be liable for the expenses associated with repairing damaged building finishes and surfaces.

Throughout the semester and at the end of the semester, your area must be clean of all trash. You are responsible for cleaning your studio, desk, and locker at the end of each semester.

No power tools may be used in the design studio. No dust or odor-producing processes may be conducted in the studio. No wet casting processes may be conducted in the studio. The School of Architecture shop and spray booth facilities must be used for the above-mentioned processes. Professional behavior and conduct are expected of each student.

All studio desks must be covered. In addition, students must have at minimum an 18" x 24" cutting mat at their desk.

Studio Policy (Required of all studios)

All students, faculty, administration, and staff of the Department of Architecture at Texas A&M University are dedicated to the principle that the Design Studio is the central component of an effective education in architecture. They are equally dedicated to the belief that students and faculty must lead balanced lives and use time wisely, including time outside the design studio, to gain from all aspects of a university education and world experiences. They also believe that design is the integration of many parts, that process is as important as product, and that the act of design and of professional practice is inherently interdisciplinary, requiring active and respectful collaboration with others.

Students and faculty in every design studio will embody the fundamental values of optimism, respect, sharing, engagement, and innovation. Every design studio will therefore encourage the rigorous exploration of ideas, diverse viewpoints, and the integration of all aspects of architecture (practical, theoretical, scientific, spiritual, and artistic), by providing a safe and supportive environment for thoughtful innovation. Every design studio will increase skills in professional communication, through drawing, modeling, writing, and speaking.

Every design studio will, as part of the syllabus introduced at the start of each class, include a clear statement on time management, and recognition of the critical importance of academic and personal

growth, inside and outside the studio environment. As such, it will be expected that faculty members and students devote quality time to studio activities, while respecting the need to attend to the broad spectrum of academic life. Every design studio will establish opportunities for timely and effective review of both process and products. Studio reviews will include student and faculty peer review. Where external reviewers are introduced, the design studio instructor will ensure that the visitors are aware of the Studio Culture Statement and recognize that the design critique is an integral part of the learning experience. The design studio will be recognized as a place for open communication and movement, while respecting the needs of others, and of the facilities.