Introduction to Social Network Analysis

Mapping Power and Social Change

New College of Florida • Fall 2026 • Monday & Thursday, 4:00–5:20 p.m.

Instructor
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Office Hours
Tuesday and Thursday, 10:00–11:00 a.m.;
Tuesday, 2:00–3:00 p.m.; and by appointment

Course Number / Section
Announced on Canvas

Meeting Time
Monday and Thursday, 4:00–5:20 p.m.

Location
Academic Center 211

Canvas
Announcements, handouts, data, and scripts

Course Overview

Why can a well-connected family become politically decisive? In fifteenth-century Florence, *the Medici* were wealthy—but so were their rivals. Part of what distinguished them was structural: a pivotal **position in a web** of marriage and business ties that wealth and formal office alone cannot fully explain. Why do some behaviors spread across a country while others die out? Who in Congress actually connects the two parties—and who in a law firm connects its offices? Why do friendships, congregations, and political conversations all cluster among similar people?

These are questions about **relationships**—who is connected to whom, and what the pattern of connections does. This is a social science course about how relationships produce **power, community, opportunity, and social change**—and it teaches you to use network tools to *make those structures visible*: to turn relational data into maps you can read, question, and defend.

Each unit follows a recurring sequence: **substantive question** → **network concepts** → **guided application**. Concepts and cases meet on Monday; the applied lab meets on Thursday. In most applied meetings, students prepare relational data in R, calculate a small number of network measures using instructor-provided scripts, and explore and visualize the network in Gephi. No previous statistics, programming, or network analysis is required.

This course introduces network thinking and computational tools for studying relationships across the social sciences. Students examine how friendship, advice, collaboration, participation, communication, and institutional ties shape groups, organizations, behavior, and diffusion. Cases are drawn from sociology, psychology, political science, organizational studies, public health, and political economy. Using R and Gephi, students learn to construct, visualize, compare, and interpret networks while distinguishing structural evidence from causal explanation.

The course serves as an early foundation for the Computational Social Science track within the political methodology curriculum and prepares students for advanced study in network analysis,

political data science, and computational modeling.

Required Materials and Software

- **Main textbook:** Borgatti, S. P., Everett, M. G., Johnson, J. C., and Agneessens, F. 2022. *Analyzing Social Networks Using R*. SAGE. Cited below as **BEJA**.
- **Recommended visualization reference:** Cherven, K. 2015. *Mastering Gephi Network Visualization*. Packt. Cited below as **Cherven**. Listed by unit under *Optional*; the instructor handouts and the current Gephi documentation are the technical authority, and where the current Gephi interface differs from the book, the handout governs.
- **Unit handouts:** each unit has an instructor handout covering the week's case, the concepts the texts do not cover, the data, and the lab workflow.
- **Substantive readings:** short selections from classic and recent studies.
- **Software:** R, RStudio, and Gephi are free.

Learning Outcomes

By the end of the course, students should be able to:

1. Formulate a social-scientific question that can be investigated using relational data.
2. Define nodes, ties, attributes, network boundaries, direction, weight, and one-mode or two-mode structure.
3. Convert a prepared source table into an edge list and node table using a guided, reproducible workflow.
4. Construct and inspect networks in R using instructor-provided scripts.
5. Explain and interpret paths, components, density, communities, degree, betweenness, bridges, articulation points, introductory brokerage, and simple versus complex contagion.
6. Create readable and substantively defensible network visualizations in Gephi.
7. Distinguish a network pattern from a causal explanation and identify plausible alternative interpretations.
8. Evaluate how measurement, boundary, threshold, projection, and visualization choices affect a conclusion.
9. Present a concise substantive argument supported by network evidence and qualified by an explicit limitation.

Course Format

Most units use two meetings:

- **Monday — Question and concepts:** a network concept or analysis, and the social-science case in which it was applied.
- **Thursday — Applied meeting (Lab):** Monday's concepts and analysis, practiced directly. Real-world data behind a Monday case is often unavailable or too complex for one session, so labs use simple prepared datasets—and, where necessary, data constructed in R—chosen to make the concept visible. R and Gephi are used when they fit the week's objective, not mechanically every week.

Evaluation

Component	Weight	Due
Participation and preparation	10%	Throughout
Gephi assignments (3 total: one before the midterm, two after)	10%	Sep 28 • Nov 5 • Nov 23
Midterm examination	30%	Thu, Oct 15
Network paper proposal	5%	Mon, Nov 16
Network paper presentation	5%	Nov 30 or Dec 3
Network paper	40%	Fri, Dec 11

Participation and Preparation

Participation includes completing assigned preparation, attending class, contributing to class discussions, and working constructively with classmates. Because the applied meetings are cumulative, regular attendance matters. Students remain responsible for materials and announcements from any missed class.

Gephi Assignments (3 × short assignments, 10%)

Three short assignments practice what the labs teach. Each uses data from class or data provided by the instructor: students produce their own Gephi visualization and write a short interpretation. Assignment 1 (due Mon, Sep 28) covers attribute and community maps; Assignment 2 (distributed Thu, Oct 29; due Thu, Nov 5) covers centrality maps; Assignment 3 (distributed Thu, Nov 12; due Mon, Nov 23) covers measurement-comparison maps from the Unit 11 lab. Graded on the defensibility of the visual choices and the discipline of the interpretation, not on decoration.

Midterm Examination (30%, Thu, Oct 15)

The midterm covers Units 1–7: conceptual reasoning, small hand calculations on toy networks (degree, density, components, shortest paths), network construction choices, and the interpretation of maps, tables, and short outputs. Students should be able to choose a relevant concept or measure, explain what it means in context. No R or Gephi syntax is tested.

Network Paper (proposal 5% • presentation 5% • paper 40%)

A 6–8 page paper in which students use a network to answer a research question. The paper includes at least one figure, at least two relevant network measures, a clear finding, and interpretation. Its purpose is to practice turning network output into a disciplined social-scientific argument.

- **Paper launch (previewed Mon, Nov 2; full session Thu, Nov 5 lab).** Two weeks before the proposal deadline, the instructor introduces the datasets and data archives for the paper—network data, and data that can be turned into networks, spanning disciplines such as sociology, psychology, political science, and economics—so every student leaves with a first-choice and a backup dataset for their question.
- **Proposal (5%, due Mon, Nov 16).** About two pages: the research question, the chosen data and how it will be used as a network (nodes, ties, boundary), and an outline of the paper. Feedback returns within a week so the paper can adjust while adjustment is cheap.
- **Presentation (5%, Nov 30 or Dec 3).** A short presentation of preliminary findings in the final week, with peer questions about construction, evidence, and limitations.

- **Paper (40%, due Fri, Dec 11).** Submitted on Canvas.

Essential Course Policies

- **Late work:** Unless an extension has been arranged, a late assignment, proposal, or paper loses five percentage points from its score for each class meeting it is late. Contact the instructor before the deadline when illness, emergency, caregiving, approved travel, or another serious circumstance interferes with completion.
- **Academic integrity and AI:** Follow the New College Academic Honor Code. AI tools may be used for brainstorming, explaining unfamiliar concepts, and troubleshooting code. They may not generate the interpretation or prose submitted for credit. Any substantive AI assistance must be briefly disclosed. Students remain responsible for verifying all output and explaining every submitted analytical decision.
- **Accessibility and accommodations:** Students who need accommodations should contact the Accessible Learning Center and share the accommodation letter with the instructor early in the semester. Requests are handled confidentially, and no accommodation requires disclosing a diagnosis to the instructor.
- **Communication:** Announcements, handouts, data, scripts, and assignment submission all run through Canvas; students are responsible for checking it between meetings.

Course Schedule

Labels: ***Reading*** *= assigned preparation.* ***Case reference*** *= the scholarly source behind the day's case; not assigned reading.* ***Optional*** *= not required (Cherven sections, software references, and enrichment).*

Unit 1

How can relationships become power?

Mon
Aug 17

Course orientation

Reading: Course syllabus

Case: The rise of the Medici, shown in class as a network figure—a social-scientific case of family, economic, and political relations, not only political history. The figure raises the semester's founding claim—power can come from *position*, not only from wealth or office—and its founding caution: a network map is a hypothesis about power, not a proof of it.

Case reference: Padgett, John F., and Christopher K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400–1434." *American Journal of Sociology* 98(6): 1259–1319.

Topics: How network structure helps account for advantage; brief introduction to the syllabus, the weekly rhythm, and the assignments.

Thu
Aug 20

Getting the tools and a first network map

Reading: Unit 1 handout

Optional: Cherven, Ch. 1; Bastian, Mathieu, Sebastien Heymann, and Mathieu Jacomy. 2009. "Gephi: An Open Source Software for Exploring and Manipulating Networks." *ICWSM*.

Applied work: Installation; how R, RStudio, and Gephi relate and how to download them; guided tours of both interfaces; then the first exercise—open the instructor-provided official airline sample network (interface-practice data), explore nodes, ties, labels, and layouts, and export a figure. Everyone leaves having made their first network map.

Unit 2

What counts as a social connection?

Mon
Aug 24

Nodes, ties, attributes, and boundaries

Reading: BEJA, Chapter 3

Case: What is a tie? Start close to home: is the classmate you study with, the coworker you eat lunch with, and the friend you ask for advice the same kind of connection? Each definition produces a different network from the same people. At research scale, the same holds for organizations: in studies of U.S. national policy domains such as energy and health, the same organizations form different networks depending on whether ties are defined as communication, resource exchange, or joint action—and, as a classroom comparison inspired by these findings will show, who looks central can change with the definition. A campaign donation is one tie definition among many.

Case reference: Knoke, David. 1990. *Political Networks: The Structural Perspective.* New York: Cambridge University Press, Ch. 5 (Community power structures) and Ch. 6 (Elites in the nation state).

Topics: Nodes versus attributes; directed and undirected ties; binary and weighted ties; inclusion rules and boundary specification; how the same case can generate different networks.

Thu
Aug 27

Loading, inspecting, and exporting a real network

Reading: BEJA, Chapter 5; Unit 2 handout

Optional: Cherven, Ch. 2

Data: Florentine family marriage and business networks (`flomarriage`, `flobusiness`, loaded in R) as the sole student workflow; a directed, weighted network appears briefly as an instructor demonstration only (details in the Unit 2 handout).

Applied work: Load both Florentine relations in R; count nodes and ties; see how one set of actors carries two different tie definitions; export one network and open it in Gephi with readable labels.

Unit 3

Why are ties clustered among similar actors?

Mon
Aug 31

Attributes, assortative mixing, and competing explanations

Reading: McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27: 415–444.

Case: Do similar people become friends—or do friends become similar? Adolescent friends often resemble one another, but a network map alone cannot say whether that reflects selection, influence, shared opportunities, or measurement. Knecht's longitudinal Dutch classroom study found more consistent evidence for friendship *selection* than for friends becoming behaviorally similar over time—a result that itself teaches the course's causal caution. The political version of the same structure: among politically engaged Twitter users, communication ties clustered strongly by ideology—echo chambers as homophily at work, with algorithmic feeds one candidate explanation among several. The key distinction: *choice* homophily versus *induced* homophily.

Case reference: Knecht, Andrea. 2008. *Friendship Selection and Friends' Influence.* PhD dissertation, Utrecht University; Boutyline, Andrei, and Robb Willer. 2017. "The Social Structure of Political Echo Chambers." *Political Psychology* 38(3): 551–569.

Topics: Attribute clustering and assortative mixing; selection, influence, opportunity, institutions, and measurement as competing explanations.

Thu Sep 3

Mapping within-group and between-group ties

Reading: BEJA, Chapter 3; Unit 3 handout

Optional: Cherven, Ch. 4

Data: the UK faculty friendship network (`UKfaculty`, `igraphdata` package)—81 faculty members, directed weighted friendship ties, school affiliation as a node attribute.

Applied work: Inspect the network and its affiliation attribute; compare the observed same-school tie share against a simple baseline using supplied R code; create two Gephi views of the same network, with and without attribute color.

Mon Sep 7 *Labor Day — no class.*

Unit 4

Why do some groups stay connected while others fragment?

Thu Sep 10

Paths, components, density, and fragmentation *(single integrated session)*

Reading: BEJA, Chapter 10; Unit 4 handout

Optional: Cherven, Ch. 6

Case: A 34-member karate club fractured in a real dispute—and the map drawn *before* the split already showed two loosely joined regions. Which ties held the group together, and which paths crossed the divide? (The club returns next week.) The same questions arise at international scale: two centuries of alliance, trade, and institutional networks whose cohesion and polarization shift with wars and institutions (Maoz 2010, Ch. 3). Fragmentation is sometimes a *choice*, made for operational security.

Case reference: Zachary, Wayne W. 1977. "An Information Flow Model for Conflict and Fission in Small Groups." *Journal of Anthropological Research* 33(4): 452–473; Maoz, Zeev. 2010. *Networks of Nations.* New York: Cambridge University Press, Ch. 3.

Topics: Walks, paths, and shortest paths; connected components; density and its limits; how surprisingly short paths can connect apparently distant actors.

Applied work: (Same session.) Compare three prepared networks—including two of identical size *and* identical tie count whose component structures nonetheless differ; identify components by eye, then verify density and component counts with supplied R code.

Unit 5

Can we detect groups before they are announced?

Mon Sep 14

Cohesion, communities, and known groups

Reading: BEJA, Chapter 11

Case: Can an algorithm find the coming split before it happens? In class, the karate club's eventual factions are hidden; students predict the division; one community-detection method runs; the real post-split membership is revealed and a second method shows how two defensible approaches can produce *two plausible partitions*. The published political application: communities detected in the 108th Senate correspond strongly, but imperfectly, to party (Zhang et al. 2008); the mismatches are where the politics is.

Case reference: Zachary (1977, full citation in Unit 4); Zhang, Yan, A. J. Friend, Amanda L. Traud, Mason A. Porter, James H. Fowler, and Peter J. Mucha. 2008. "Community Structure in Congressional Cosponsorship Networks." *Physica A* 387(7): 1705–1712.

Topics: Community as a structural pattern; modularity as a guided measure; detected communities versus known attributes; dependence on resolution, algorithm, and network construction.

Thu
Sep 17

Community detection as evidence, not a verdict

Reading: BEJA, Chapter 11 (review); Unit 5 handout
Optional: Cherven, Chs. 6 and 7

Data: the UK faculty friendship network (practice); the karate club (demonstration).

Applied work: Run an instructor-selected community-detection method; cross-tabulate detected communities against known school affiliations—without treating school as the "true" partition; produce two Gephi maps with the same layout, attribute color and detected-community color. **Gephi Assignment 1 is distributed** (due Mon, Sep 28; specification in the Unit 5 handout).

Unit 6

How do shared activities become networks?

Mon
Sep 21

Two-mode networks: from boardrooms to congressional bills

Reading: BEJA, Chapter 13; Fowler, James H. 2006. "Connecting the Congress: A Study of Cosponsorship Networks." *Political Analysis* 14(4): 456–487.

Case: A handful of directors sit on several corporate boards at once, tying firms into one elite web—people connected to the boards they share, the modern *interlocking directorate*. That is a **two-mode** structure, and it is everywhere: students and courses, members and committees—and Congress, where legislators connect to the bills they sponsor or cosponsor; Fowler (2006) shows this public act of signing on carries real information about legislative support and connection, while implying nothing automatic about friendship or agreement.

Case reference: Easley, David, and Jon Kleinberg. 2010. *Networks, Crowds, and Markets: Reasoning About a Highly Connected World.* New York: Cambridge University Press, Ch. 4 (affiliation networks and corporate board interlocks).

Topics: One-mode versus two-mode structure; affiliation tables; edge weights and repeated participation; why shared participation does not automatically imply friendship, agreement, or effectiveness.

Thu
Sep 24

Building a two-mode network from a source table

Reading: BEJA, Chapter 13 (review); Unit 6 handout
Optional: Cherven, Ch. 3

Data: the Southern Women attendance table (18 × 14, `latentnet` package; collected by Davis, Gardner, and Gardner for *Deep South*, 1941)—real, classic, and hand-checkable—then a curated extract of the **real 108th Senate senator–bill network** (100 senators, 3,035 bills, with party and bill attributes; `backbone` package).

Applied work: Convert the Southern Women table into edge and node files with a supplied script and verify the two-mode structure in R; then inspect the Senate extract and record what changes with scale.
Due Mon, Sep 28: Gephi Assignment 1

Unit 7

What changes when we project a network?

Mon
Sep 28

The duality of persons and groups

Reading: BEJA, Chapter 13 (review); Breiger, Ronald L. 1974. "The Duality of Persons and Groups." *Social Forces* 53(2): 181–190.

Case: Breiger's classic insight: people are connected through the groups they share, and groups through the people they share—two networks hidden in one table, worked through together on a small incidence matrix. The Southern Women table then yields two real projections—woman-to-woman ties through shared events, event-to-event ties through shared attendees—before the same operation runs on Congress: members tied by cosponsoring the same bills, a direct map of shared sponsorship activity in which *which* bills tied them is not recoverable from the projection alone.

Topics: Projection as a research decision; edge weight as shared activities; information lost in projection; why projected networks look deceptively dense.

Thu
Oct 1

Projection lab

Reading: Unit 7 handout

Optional: Cherven, Ch. 5

Applied work: Produce both projections of the Southern Women table—women and events; then open an instructor-prepared Senate projection with two pre-thresholded versions, watch the density problem at full scale, and state whether the interpretation *changes* between the two thresholds.

Mon–Thu
Oct 5, 8

Fall Break — no class.

Mon
Oct 12

Columbus Day/Indigenous People's Day — no class.

Thu
Oct 15

Midterm examination

Due: Midterm Examination (30%)

The examination covers Units 1–7: conceptual reasoning, small hand calculations on toy networks, network construction choices, map and output interpretation, defensible claims, and limitations. No R or Gephi syntax is tested.

Unit 8

Who is structurally central—and does that mean powerful?

Mon
Oct 19

Degree, paths, and betweenness

Reading: BEJA, Chapter 9; Freeman, Linton C. 1979. "Centrality in Social Networks: Conceptual Clarification." *Social Networks* 1(3): 215–239.

Case: Two ways to matter: the most connected actor and the actor on everyone else's shortest paths are often *different people*. The Krackhardt kite makes the point unforgettable: its degree and betweenness leaders are different actors, and two others tie for the closeness lead—degree checked by hand on the full kite in class, shortest paths traced on a reduced version. The psychology of the same idea: the *friendship paradox*—on average your friends have more friends than you do—and Harvard students *nominated as friends* experienced the flu epidemic about two weeks earlier than a randomly drawn comparison group, making central people early-warning sensors.

Case reference: Christakis, Nicholas A., and James H. Fowler. 2010. "Social Network Sensors for the Early Detection of Contagious Outbreaks." *PLOS ONE* 5(9): e12948.

Topics: Degree as direct connection; betweenness as position on shortest routes (closeness as guided exposure); why the most connected actor need not be the most intermediary actor; centrality as structural evidence, not automatic proof of influence or power.

Thu
Oct 22

Mini-Classes for Spring 2027 — no class.

Unit 9

Which ties and actors make a network vulnerable?

Mon
Oct 26

Bridges, articulation points, and robustness

Reading: BEJA, Chapter 10; Albert, Réka, Hawoong Jeong, and Albert-László Barabási. 2000. "Error and Attack Tolerance of Complex Networks." *Nature* 406: 378–382.

Case: What happens to an organization when its most consulted adviser leaves—and does removing the most central actor destroy a network, or cause it to adapt? In the networks Albert, Jeong, and Barabási studied, random node loss did little damage but targeted removal of hubs shattered connectivity. The extended transfer test: Colombian trafficking networks answered decapitation by shifting from centralized "wheel" structures to decentralized "chains" that were harder to dismantle (Kenney 2009)—with financial contagion as a brief second illustration (Haldane 2009).

Case reference: Kenney, Michael. 2009. "Turning to the 'Dark Side': Coordination, Exchange, and Learning in Criminal Networks." In Miles Kahler, ed., *Networked Politics.* Ithaca: Cornell University Press, Ch. 5; Haldane, Andrew G. 2009. "Rethinking the Financial Network." Speech, Bank of England.

Topics: Bridge edges versus articulation-point nodes; targeted versus random removal; robustness and fragmentation; limits of transferring results across different kinds of networks—and the caveat that real networks *rewire* after a removal.

Thu
Oct 29

Lab for Units 8 and 9: centrality and the stress test

Reading: Units 8 and 9 handouts

Optional: Cherven, Chs. 6 and 7

Data: the Krackhardt kite and the Lazega law-firm advice network (71 attorneys; the firm returns in Unit 10).

Applied work: Gephi-centered, no coding: compute degree and betweenness with Gephi's Statistics panel and size nodes by each in turn; then the stress test in Gephi itself—on an undirected advice-presence version of the network, compare three instructor-pretested removals (the most consulted adviser, an actual articulation point, and a noncentral comparison actor), tracking largest-component share and reachability from an instructor-supplied metric table rather than component count alone. Whether the network fragments or merely loses efficiency *is the finding*—a central actor need not be an articulation point. (Candidate nodes are supplied; timing, steps, and a troubleshooting buffer in the handout; an R path exists as an optional extension only.) **Gephi Assignment 2 is distributed** (due Thu, Nov 5; specification in the Unit 9 handout). The stress test itself is assessed formatively through the in-class exit ticket—Assignment 2 covers the centrality maps.

Unit 10

Who connects separated groups?

Mon
Nov 2

Bridges, brokers, and the meaning of position

Reading: BEJA, Chapter 8; Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78(6): 1360–1380. ; Burt, Ronald S. 1992. *Structural Holes: The Social Structure of Competition.* Harvard University Press, Ch. 1 ("The Social Structure of Competition").

Case: Seventy-one attorneys in one corporate law firm, three networks at once—advice, friendship, co-work. Who brokers across the firm's three offices, and is it the senior partners? Weak ties are more likely to bridge separated circles and can carry nonredundant information (Granovetter); actors who bridge disconnected clusters gain informational advantage but may face cross-pressure and distrust (Burt). Brokerage is an opportunity, not a guaranteed outcome.

Case reference: Lazega, Emmanuel. 2001. *The Collegial Phenomenon: The Social Mechanisms of Cooperation Among Peers in a Corporate Law Partnership.* Oxford: Oxford University Press, Ch. 2 (the firm, its three offices, and the network study) and Ch. 3 (the advice, friendship, and co-work exchange system); Ch. 6 (cross-office integration) as enrichment.

Topics: Weak ties, bridges, and brokers as three distinct ideas; connecting groups versus agreeing with them; opportunity, constraint, and the danger of inferring motives from position. **Final ten minutes:** preview of the network-paper dataset menu, ahead of Thursday's launch.

Thu
Nov 5

Brokerage lab and paper launch

Due: Gephi Assignment 2

Reading: Unit 10 handout

Optional: Cherven, Chs. 5 and 6

Data: the Lazega law-firm networks (advice, friendship, co-work; office, practice, and seniority attributes), then the 108th Senate cosponsorship projection with an instructor-supplied edge-weight threshold (filtering rule documented in the handout).

Applied work: Identify cross-office ties and candidate brokers in the law firm using three supplied indicators—degree, cross-group degree (an instructor-defined descriptive indicator), and betweenness; then a short Senate coda answers Unit 8's question empirically: are the highest-degree senators the same people as the leading cross-party connectors? **Paper launch:** the instructor presents the approved dataset menu; every student leaves with a first-choice and a backup dataset for their question.

Unit 11

How does measurement change the network we see?

Mon
Nov 9

One school, several networks

Reading: Mastrandrea, Rossana, Julie Fournet, and Alain Barrat. 2015. "Contact Patterns in a High School." *PLOS ONE* 10(9); Unit 11 handout.

Case: Would email records, meeting attendance, friendship nominations, and retweets reveal the same coalition? The school case answers with unusually rich evidence: the same school, measured four ways during the same study period—wearable sensors, contact diaries, friendship nominations, online links—yields strikingly different networks, because the instruments operationalize partly different relations. No single measurement captures every socially relevant relationship.

Topics: Operationalization and boundary; recall and observation windows; missing and asymmetric reports; why networks are constructed through measurement choices rather than simply found.

Thu
Nov 12

Comparing networks produced by different measures

Reading: Unit 11 handout

Optional: Cherven, Ch. 3

Data: anonymized high school sensor-contact and friendship-nomination networks (SocioPatterns collaboration), distributed as prepared classroom files.

Applied work: Compare the two measurement networks on comparable quantities—node coverage, within-class tie share, and density computed on the same documented node universe, with friendship nominations symmetrized by a stated rule for the main comparison (reciprocity discussed only within the original directed friendship network); create matched Gephi views with identical node positions and scales; identify one conclusion that changes across measurements and one that remains stable. **Gephi Assignment 3 is distributed** (due Mon, Nov 23; specification in the Unit 11 handout).

Unit 12

How does network structure shape diffusion?

Mon
Nov 16

Simple contagion, complex contagion, and structure

Due: Network paper proposal (5%)

Reading: Centola, Damon. 2010. "The Spread of Behavior in an Online Social Network Experiment." *Science* 329(5996): 1194–1197; Unit 12 handout.

Case: Centola's experiment: participants in an online health community decided whether to adopt a new health behavior—and clustered networks spread the behavior farther and faster than random ones, the signature of complex contagion. Simple contagion can benefit from long-range ties; complex contagion—costly, risky behavior—often requires redundant reinforcement that clustered ties provide. Two field comparisons: among Freedom Summer applicants, ideological commitment mattered, and prior activism, organizational integration, and ties to other participants distinguished those who went (McAdam 1986); and Mormon missionaries converted about 0.1% of door-to-door contacts but roughly half of those first met in a member's home—the channel *is* the network (Stark and Bainbridge 1980).

Case reference: McAdam, Doug. 1986. "Recruitment to High-Risk Activism: The Case of Freedom Summer." *American Journal of Sociology* 92(1): 64–90. ; Stark, Rodney, and William Sims Bainbridge. 1980. "Networks of Faith: Interpersonal Bonds and Recruitment to Cults and Sects." *American Journal of Sociology* 85(6): 1376–1395.

Topics: Exposure versus adoption; simple versus complex contagion as analytical ideal types; clustering, bridges, and reinforcement; generative demonstration rather than prediction of a specific event.

Thu
Nov 19

Diffusion experiment

Reading: Unit 12 handout

Optional: Cherven, Chs. 4 and 8

Data: three prepared networks of contrasting structure with the same size and comparable mean degree (constructed in R; design in the Unit 12 handout).

Applied work: Run an instructor-provided diffusion script across the three networks. Each paired comparison uses the same seed nodes across network and contagion conditions—chosen so the two-neighbor reinforcement rule can actually start—with additional pre-generated seed sets used for sensitivity analysis, holding size, mean degree, and time horizon constant, so the comparison isolates the adoption rule; interpret median adoption trajectories and their variation in R. A generative illustration, not a replication of Centola's experiment. No simulation programming is required.

Unit 13

How did network position contribute to the Medici's rise?

Mon Nov 23

Florence revisited and paper workshop *(single session; Thanksgiving break Thu, Nov 26)*

Due: Gephi Assignment 3

Reading: Padgett, John F., and Christopher K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400–1434" (full citation in Unit 1), revisited—this time the **multiplex sections**; Unit 13 handout.
Optional: Verbrugge, Lois M. 1979. "Multiplexity in Adult Friendships." *Social Forces* 57(4): 1286–1309. —the classic definitional treatment of multiplex ties.

Case: The question the course opened with, answered with something *new*: the course's first **multiplex** analysis. Marriage and business are layered together for the first time, and the finding lives in the *mismatch*. Find Padgett and Ansell's answer.

Topics: Multiplexity as the session's one new concept—tie overlap across relations, per-layer centrality discrepancy, and what the mismatch means (every prior tool is an input; the layered combination is the new output); the cross-setting question—do centrality, brokerage, and community mean the same thing across a Renaissance elite, a law firm, and a school?

Thu Nov 26 *Thanksgiving Break — no class.*

Unit 14 — Preliminary Findings

Mon Nov 30

Preliminary findings I

Due: Presentation, first group (5%)

Focus: Presentations.

Thu Dec 3

Preliminary findings II and final synthesis

Due: Presentation, second group (5%)

Focus: Presentations.
Final synthesis: The social sciences supply the questions, network analysis supplies the concepts, R supports the evidence, and Gephi makes the structure visible—and structure is evidence, not a self-sufficient causal explanation.

Final Examination Period

- **Mon–Tue, Dec 7–8 — Reading/Hurricane Makeup Days:** No regular class unless the College announces a required makeup arrangement.
- **Dec 9–11 — Assigned examination slot:** No conventional final examination is planned; the instructor will announce any optional consultation or contingency use of this period on Canvas.
- **Fri, Dec 11 — Network paper due by 5:00 p.m.:** Submit the paper on Canvas.