



NYU

**COLLEGE OF GLOBAL
PUBLIC HEALTH**

GPH GU-xxxx: Complex Systems, Disasters, and the Social Ecology of Health

Class Schedule: TBD

Class Location: TBD

Semester and Year: **Spring 2019**

Professor: **David Abramson, PhD MPH**

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Email: david.abramson@nyu.edu

Office: **715 Broadway, room 1214**

Office Hours: **Fri 1 – 3 pm, or by appt.**

COURSE DESCRIPTION:

Much of a population’s health and well-being is dependent upon numerous complex systems, ranging from biological systems, through social and cultural systems, to public health and medical systems, to critical infrastructure and lifeline systems, to larger environmental and ecological systems. This course will explore the systems that contribute to a social ecology of health, considering the theoretical approaches for studying such systems, and examining methodological approaches for studying complex adaptive systems and their relationship to health. A major aspect of the course will be to employ disaster case studies as a means of understanding such complex systems. This course will be particularly valuable for students interested in systems thinking as it relates to public health research.

COURSE OBJECTIVES:

Through multi-disciplinary approaches and dialogue, students will be able to: (1) describe the contribution of complex systems to population health and well-being; (2) describe several theoretical bases for the relationship between risk, resilience, vulnerability, and health; (3) employ systems-thinking to solve population health and disaster problems; (4) assess a number of methodological strategies for measuring and analyzing the relationship of complex systems and health; and (5) design research studies incorporating systems thinking and methodologies.

PRE-REQUISITES:

This is a doctoral-level course. Other students will be accepted with the permission of the instructor. Pre-requisites for this course include GPH-GU 2106 Epidemiology and GPH-GU 2140 Global Issues in Social & Behavioral Health. Non public health students should discuss with the instructor what other courses might substitute for these required courses.

COMPETENCIES COVERED IN THE COURSE:

Learning Objective	Doctoral Competency	Course Components
1. Students will be able to	Critically assess major theories,	Classes 1 – 10

Learning Objective	Doctoral Competency	Course Components
<p>describe how systems thinking has been applied to social-ecological analyses</p> <p>2. Students will be able to describe how systems thinking has been applied to complex events, such as disasters and complex emergencies</p>	<p>trends, and debates in the social and behavioral sciences</p> <p>literature regarding health</p>	<p>Commentary postings</p> <p>Readings Leader discussions</p>
<p>Students will be able to develop research designs that incorporate systems methodologies, such as network analyses, agent-based modeling, etc.</p>	<p>Develop skills used to choose appropriate research designs and statistical methods for answering public health questions in the field of social and behavioral sciences</p>	<p>Classes 11-14</p> <p>Final Paper</p>

COURSE REQUIREMENTS AND EXPECTATIONS:

- 1. Class Attendance and Participation (14 points):** This is a course about inter-dependent systems, and the class itself represents a system. For our “class system” to operate smoothly students should make a habit of attending regularly, complete the required readings ahead of time, and be prepared to discuss the readings in class.
- 2. Weekly article commentary postings (36 points):** Prior to each week’s class, students should post a two-paragraph commentary on one or more of the readings to the course board in NYU Classes. This commentary can either be an original comment or be in response to another student’s commentary. The commentary should not be a descriptive re-hash or summary of the article, but instead offer a critical analysis or insight. Students are encouraged to link several of the week’s readings in their commentary. **Students are expected to post at least 6 commentaries during the 14-week semester.** Each commentary will be worth up to 6 points each (ranging from 6 = substantial, original commentary, 3 = an adequate and sufficient commentary, 1 = reflective that the student read the article, but neither original nor insightful, 0 = no or minimal commentary). **No points will be awarded if the posting occurs more than one week after the readings are due.** The deadline for posting the commentaries will be midnight at the end of the seventh day after the class. For example, if this is a Monday class, the postings are due no later than midnight on the following Sunday night.
- 3. Readings Leader (20 points):** For this assignment you will lead a discussion of the week’s readings. Each discussion leader will begin with a brief summary of the relevance of the week’s readings and then prompt discussion with a series of questions posed to the class. This discussion will generally last between 15-20 minutes. Students will be graded on their knowledge of the readings and ability to succinctly summarize them (up to 10 points) and on the effectiveness of the questions they pose to elicit group discussion (up to 5 points).
- 4. Final Paper (30 points):** The purpose of this research paper is to encourage you to apply and synthesize the information you have learned about disasters, complex systems, and the social ecology of health. Students will have several options for the paper: (1) Option 1: A Critique of Systems Approaches. This paper should identify an event or phenomenon (such as a disaster case); describe at least 2 systems approaches that were conducted to analyze the event (include

a description of the papers' methods, findings, and conclusions); analyze the strengths and weaknesses of these approaches; and consider additional approaches or strategies that can be employed. (2) Option 2: A Research Proposal to study some aspect of how systems affect health and well-being in the context of disasters. This can be modeled upon an NIH R03 pilot project: 6 single-spaced pages, following NIH formatting guidelines. It should include a description of a case event or phenomenon; an elaboration of research questions that reflect an examination of systems or how they operate to influence health or well-being (and these questions should reflect a systems approach or a social-ecological approach); a brief literature review that supports these questions and methodologies; and a preliminary research design.

The Final Paper is due at 11:59 pm (EST) on TBD. The paper should be approximately 6 single-spaced pages, not including references, data tables, or graphics. Citations should follow APA style (see <http://www.apastyle.org>). A penalty of five percent (5%) of total points will be assessed for every day that any assignment is overdue.

Readings: This course is organized around a set of readings that will be used to guide lectures and class discussions. The readings will also be used as a basis for the commentaries, the group case presentation, and as a foundation for the final paper. Students are expected to complete all readings prior to the class period for which they are assigned. Not all reading topics will be discussed in the lectures; however, you are still responsible for all of the material covered in the required readings.

GRADING RUBRIC:

Item:	Percentage or Points:
Class attendance and participation	14 points
Weekly article commentary postings	36 points
Readings leader	20 points
Final paper	30 points

GRADING SCALE:

A: 93-100	C+: 77-79
A-: 90-92	C: 73-76
B+: 87-89	C-: 70-72
B: 83-86	D+: 67-69
B-: 80-82	D: 60-66
	F: <60

NYU CLASSES:

NYU Classes will be used extensively throughout the semester for assignments, announcements, and communication. NYU Classes is accessible through at <https://home.nyu.edu/academics>

TECHNOLOGY POLICY:

Laptops or tablets may only be used for note-taking or to reference the course readings in the classroom. Use of laptops, tablets, or cellphones for other purposes (e.g., email, social media, Internet

browsing) is disruptive to the spirit of class engagement and participation, and is not allowed. If you need to make a call or answer an urgent text or email, please step out of the classroom.

COURSE OUTLINE:

Class	Date	Topics	Readings / Materials/ Assignments Due
1		An Introduction to Systems Thinking and Public Health	Refer to Syllabus for weekly readings
2		Cascading Consequences: An Introduction to Disasters and Complex Systems <i>Case: Cascadian Subduction Zone</i>	Refer to Syllabus for weekly readings
3		When Culture Meets Science and Public Health: Technological Accidents in a Social Context <i>Case: West Virginia Water Contamination</i>	Refer to Syllabus for weekly readings
4		Complex Adaptive Systems: Dysfunction, Equilibrium, and Adaptation <i>Case: Tohoku Earthquake and the Fukushima Meltdown</i>	Refer to Syllabus for weekly readings
5		Access to Capital: Conservation of Resources Theory and the Socio-Ecological Model of Disaster Recovery <i>Case: Hurricane Katrina</i>	Refer to Syllabus for weekly readings
6		Children and Disasters: Risk, Resilience, and Child Development <i>Case: The SHOREline Project – an intervention</i>	Refer to Syllabus for weekly readings
7		Speed versus Deliberation – Urban Planning, Hazard Mitigation, and Sustainable (Re)Development: Community Engagement and the Complex Economics of Disasters <i>Case: Joplin tornado</i>	Refer to Syllabus for weekly readings:
8		Community Resilience <i>Case: Mary Queen of Vietnam in New Orleans East</i>	Refer to Syllabus for weekly readings
9		Politics, Policies, and Political Ecology <i>Case: Hurricane Katrina</i>	Refer to Syllabus for weekly readings:
10		The Promise and Peril of Place: Environmental Vulnerability, Climate Change, and Hazardscapes. (Supplemental discussion: Exposure and the Exposome) <i>Cases: 2018 Hurricane Maria in Puerto Rico and the 1995 Chicago Heat Wave</i>	Refer to Syllabus for weekly readings
11		Measuring and Analyzing Complex Systems I: Applying <u>network analytic approaches</u> and <u>ecometrics</u> to system problems <i>Case: Deepwater Horizon oil spill</i>	Refer to Syllabus for weekly readings
12		Measuring and Analyzing Complex Systems II: Applying <u>agent-based modeling</u> approaches to system problems <i>Case: Zika, Smallpox, Ebola</i>	Refer to Syllabus for weekly readings
13		Measuring and Analyzing Complex Systems III: Applying <u>system dynamic approaches</u> to complex problems <i>Case: Hurricane Sandy</i>	Refer to Syllabus for weekly readings

Class	Date	Topics	Readings / Materials/ Assignments Due
14		Systems Thinking and Ecological Frameworks: Course summary and student presentations of potential frameworks for final papers	Refer to Syllabus for weekly readings
15		FINAL PAPER DUE	

SYLLABUS READING LIST:

Class 1: An Introduction to Systems Thinking and Public Health

Required Readings

1. Leischow SJ et al (2008). "Systems Thinking to Improve the Public's Health." *American Journal of Preventive Medicine*, 35(2S):S196-S203.
2. Peters DH (2014). "The application of systems thinking in health: why use systems thinking?" *Health Research Policy and Systems* 12:51-56.
3. Homer JB and GB Hirsch (2006). "System Dynamics Modeling for Public Health: Background and Opportunities." *Am J Public Health*. 96(3):452-458
4. Meadows DH (2008). Part One: System Structure and Behavior, pp. 11-72, in Thinking in Systems: A Primer. Chelsea Green Publishing, White River Junction VT.

Class 2: Cascading Consequences

Required Readings

1. Edwards, M.L.K. (1998). "An Interdisciplinary Perspective on Disasters and Stress: The Promise of an Ecological Framework." *Sociological Forum* 13(1): p. 115-132
2. Bates, F.L. and C. Pelanda (1993). An Ecological Approach to Disasters, in Disasters, Collective Behavior, and Social Organization, R.R. Dynes and K.J. Tierney, Editors. 1993, University of Delaware Press: Newark.
3. Schulz, K (2015). "The Really Big One." *The New Yorker*, July 20, 2015.

Supplemental Readings

1. Ostrom, E., Institutional Rational Choice - An Assessment of the Institutional Analysis and Development Framework, in *Theory of the Policy Process*, P.A. Sabatier, Editor. 1996, Westview Press: Boulder, CO. p. 35-71. Pay particular attention to pp 39-41, in which Ostrom distinguishes frameworks, models, and theories.
2. Glanz, K., BK Rimer, SM Su (2005). *Theory at a Glance: A Guide for Health Promotion Practice*. National Cancer Institute. (with particular emphasis on section describing The Ecological Perspective, pp. 17-19)
3. S Cleary (2009). Cognitive Constraints and Behavioral Biases (chapter 4, pp. 64-78), in Learning from Catastrophes, edited by Howard Kunreuther and Michael Useem. Wharton School Publishing: NJ.
4. Tierney KT, MK Lindell, RW Perry (2001), Conceptualizing Disasters and Their Impacts (chapter 1, pp 1-24), in Facing the Unexpected: Disaster Preparedness and Response in the United States. J Henry Press: Wash DC.

Class 3: When Culture Meets Science and Public Health

Required Readings

1. Osnos, E (2014). "Chemical Valley: The coal industry, the politicians, and the big spill." *The New Yorker*, April 7, 2014, pp.

2. Erickson, Kai. Everything in Its Path. (Part One: Feb 26, 1972, pp. 21-50; and Part Three: Collective Trauma, pp. 186-245., Simon and Schuster, 1976).
3. Wisner B, Blaikie P, Cannon T, Davis I (2008). The Disaster Pressure and Release Model (chapter two, pp. 49-86), in At Risk: Natural Hazards, People's Vulnerability, and Disasters. Routledge Press: New York.

Supplemental Readings

1. Stoto, Piltch-Loeb, and Savoia (2015). The Public Health System Response to the West Virginia Water Crisis. Harvard School of Public Health report, Jan 9, 2015

Class 4: Complex Adaptive Systems

Required Readings

1. L Comfort and N Kapucu (2006). "Inter-organizational coordination in extreme events: The World Trade Center Attacks, September 11, 2001." *Natural Hazards*. 39:309-327.
2. Comfort et al (2013). Networks of Action in Catastrophic Events. *Earthquake Spectra*. 29(S1):S387-S402.
3. Sterman J (2006). "Learning from Evidence in a Complex World." *American Journal of Public Health* 96:505-514.

Supplemental Readings

Class 5: Access to Capital

Required Readings

1. Hobfoll, S. E. (1989). "Conservation of resources: A new attempt at conceptualizing stress." *American Psychologist* 44(3): 513-524.
2. Abramson DM, L Grattan, B Mayer, et al (2015). The Resilience Activation Framework: A conceptual model of how access to social resources promotes adaptation and rapid recovery in post-disaster settings. *Journal of Behavioral Health Services and Research*. 42(1): 42-57.
3. Ager A (2012). Annual Research Review: Resilience and child well-being – public policy implications. *Journal of Child Psychology and Psychiatry*. 54(4): 488-500.

Required Audio

1. This American Life: Lower 9 + 10 (Katrina Ten Year Anniversary_ -- <http://m.thisamericanlife.org/radio-archives/episode/565/lower-9-10> (In particular: Act 2, "Second Stop")

Supplemental Readings

1. Benight, C. C., G. Ironson, et al. (1999). "Conservation of resources and coping self-efficacy predicting distress following a natural disaster: A causal model analysis where the environment meets the mind." *Anxiety, Stress & Coping* 12(2): 107 - 126.
2. Norris, F.H., et al., *60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981- 2001*. *Psychiatry*, 2002. 65(3): p. 207-39.
3. Nakagawa, Y., & Shaw, R., *Social capital: A missing link to disaster recovery*. *International Journal of Mass Emergencies and Disasters*, 2004. 22(1): p. 5-34.

Class 6: Children and Disasters

Required Readings

1. Peek, L. (2008). "Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience - An Introduction." *Children, Youth and Environments* 18(1): 1-29.
2. Abramson, D. M., Y. S. Park, et al. (2010). "Children as Bellwethers of Recovery: Dysfunctional Systems and the Effects of Parents, Households, and Neighborhoods on Serious Emotional Disturbance in Children After Hurricane Katrina." *Disaster Med Public Health Prep* 4(Supplement_1): S17-27.
3. Shonkoff, J., Neuroscience, molecular biology, and the childhood roots of health disparities. *JAMA*, 2009. 301(21): p. 2252-2259.
4. Bronfenbrenner, U., *Ecology of the Family as a Context for Human development: Research perspectives*. *Developmental Psychology*, 1986. 22(6): p. 723-742.

Supplemental Readings

1. Anda, R.F., et al., *The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology*. *Eur Arch Psychiatry Clin Neurosci*, 2006. 256(3): p. 174-86.
2. McEwen, B.S., *Protective and damaging effects of stress mediators*. *N Engl J Med*, 1998. 338(3): p. 171-9.
3. Felitti, V.J., et al., *Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study*. *Am J Prev Med*, 1998. 14(4): p. 245-58.

Class 7: Speed Versus Deliberation

Required Readings

1. Abramson, D. M. and D. Culp (2012) "The May 2011 Joplin Tornado: The Context and Progress of Long-Term Recovery After Six Months."
2. Olshansky, R.B. and S.E. Chang, *Planning for Disaster Recovery: Emerging Research Needs and Challenges*. *Progress in Planning*, 2009. 72(Emerging Research Agendas in Urban Planning): p. 200-209.
3. Olshansky RB et al (2013). "Disaster and Recovery: Processes Compressed in Time." *Natural Hazard Review*. 13:173-178

Supplemental Readings

1. Olshansky RB and L Johnson (2010). "Planning for New Orleans," in Clear as Mud: Planning for the Rebuilding of New Orleans, pp 39-72. American Planning Association: Chicago IL.

Class 8: Community Resilience

Required Readings

1. Norris, F., S. Stevens, et al. (2008). "Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness." *American Journal of Community Psychology* 41(1): 127-150.
2. Aldrich D and M Meyer (2015). "Social Capital and Community Resilience." *American Behavioral Scientist*, 59(2): 254-269.
3. Bonanno, G. A. B., C. R.; Kaniasty, K.; La Greca, A. M. (2010). "Weighing the Costs of Disaster: Consequences, Risks, and Resilience in Individuals, Families, and Communities." *Psychological Science in the Public Interest* 11(1): 1-49.
4. Masten, A.S. and J. Obradovic, "Disaster Preparation and Recovery: Lessons from Research on Resilience in Human Development." *Ecology and Society*, 2008. 13(1).

Supplemental Readings

1. Boon HJ, A Cottrell, D King, RB Stevenson, J Millar (2012). "Bronfrenbrenner's bioecological theory for modeling community resilience to natural disasters." *Natural Hazards*. 60:381-408.
2. Bonanno, G. A. (2004). "Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events?" *Am Psychol* 59(1): 20-28.
3. Sherrieb, K., F. Norris, and S. Galea, Measuring Capacities for Community Resilience. *Social Indicators Research*. 99(2): p. 227-247.

Class 9: Politics, Policies, and Political Ecology

Required Readings

1. Smith, G. (2011). *Planning for Post-Disaster Recovery: A Review of the United States Disaster Assistance Framework*. Fairfax, VA, Public Entity Research Institute. (pages TBD)
2. TA Birkland (2007). "September 11, Learning, and Policy Change" (chapter 2, pp 31-60) and "Disaster , Learning and the Possibility of Change" (chapter 5, pp 157-190), in Lessons of Disaster: Policy Change After Catastrophic Events. Georgetown University Press: Wash DC.
3. JB Greenberg and TK Park (1994). Political Ecology. *Journal of Political Ecology*, 1(1):1-12.

Supplemental Readings

1. Rose A, Porter K, Dash N, et al (2007). Benefit-Cost Analysis of FEMA Hazard Mitigation Grants. *Natural Hazards Review*, Nov: 97 – 111.
2. Rivlin, G (2015). Katrina: After the Flood (epilogue, chapters 1, 2, 5, 17, 24, 25, prologue). NY NY: Simon and Schuster.

Class 10: The Promise and Peril of Place

Required Readings

1. Cutter, S. L., B. J. Boruff, et al. (2003). "Social Vulnerability to Environmental Hazards." *Social Science Quarterly* 84(2): 242-261.
2. Klinenberg, E (2015). Heat Wave: A Social Autopsy of Disaster in Chicago, chapters 1 and 2 (pp 37-128). Chicago, IL: University of Chicago press.

Supplemental Readings

1. Palinkas, L (2012). A conceptual framework for understanding the mental health impacts of oil spills: Lessons from the Exxon Valdez oil spill. *Psychiatry: Interpersonal and Biological Processes*. 75(3): 203-222.
2. Rappaport, SM (2010). Implications of the Exposome for Exposure Science. *Journal of Exposure Science and Environmental Epidemiology*. 21:5-9.
3. Wild, CP (2012). The Exposome: From Concept to Utility. *International Journal of Epidemiology*. 41(1):24-32

Class 11: Measuring and Analyzing Complex Systems I – Ecometrics and Network Analyses

Required Readings

1. Raudenbush, S. W. and R. J. Sampson (1999). "Ecometrics: Toward a Science of Assessing Ecological Settings, with Application to the Systematic Social Observation of Neighborhoods." *Sociological Methodology* 29: 1-41.
2. Abramson, D. M., T. Stehling-Ariza, et al. (2010). "Measuring Individual Disaster Recovery: A Socioecological Framework." *Disaster Med Public Health Prep* 4(Supplement_1): S46-54.
3. ADD Network Analysis readings (Brian Mayer on Hurricane Sandy)

4. Meadows DH (2008). Chapter Six: Leverage Points – Places to Intervene in a System, pp. 145-165, in Thinking in Systems: A Primer. Chelsea Green Publishing, White River Junction VT.

Supplemental Readings

TBD

Class 12: Measuring and Analyzing Complex Systems II – Agent-Based Modeling

1. Josh Epstein guest lecturer: agent-based modeling; ADD readings (e.g., Agent Zero)

Class 13: Measuring and Analyzing Complex Systems III – Dynamic Systems and Big Data Strategies

Required Readings

1. JM Links et al (2017). J COPEWELL: A Conceptual Framework and System Dynamics Model for Predicting Community Functioning and Resilience After Disasters. *Disaster Medicine and Public Health Preparedness*. DOI: 10.1017/dmp.2017.39
2. TBD: Smallpox Case Study (Columbia MSPH case program) or Ebola case (text to be identified).
3. TBD: Big Data article

Supplemental Readings

COURSE POLICIES:

Please be sure to read the [University Policy on Religious Holidays](#) and the policy [on safety, weather emergencies, and disruptions](#).

There are a number of religious holidays in the fall semester. Students observing those holidays should contact me as soon as possible to ensure that you are not penalized for absences or late assignments and that your journal forum discussion is not scheduled for a holiday.

STUDENTS WITH DISABILITIES:

Students with disabilities should contact the Moses Center for Students with Disabilities regarding the resources available to them, and to determine what classroom accommodations should be made available. More information about the Moses Center can be found here:

<https://www.nyu.edu/life/safety-health-wellness/students-with-disabilities.html>. Students requesting accommodation must obtain a letter from the Moses Center to provide to me as early in the semester as possible.

STATEMENT OF ACADEMIC INTEGRITY:

The NYU College of Global Public Health values both open inquiry and academic integrity. Students in the program are expected to follow standards of excellence set forth by New York University. Such standards include respect, honesty and responsibility. The CGPH does not tolerate violations to academic integrity including:

- Plagiarism
- Cheating on an exam
- Submitting your own work toward requirements in more than one course without prior approval from the instructor
- Collaborating with other students for work expected to be completed individually
- Giving your work to another student to submit as his/her own

- Purchasing or using papers or work online or from a commercial firm and presenting it as your own work

Students are expected to familiarize themselves with the CGPH and University's policy on academic integrity as they will be expected to adhere to such policies at all times – as a student and an alumni of New York University.

Plagiarism

Plagiarism, whether intended or not, is not tolerated in the CGPH. Plagiarism involves presenting ideas and/or words without acknowledging the source and includes any of the following acts:

- Using a phrase, sentence, or passage from another writer's work without using quotation marks;
- Paraphrasing a passage from another writer's work without attribution;
- Presenting facts, ideas, or written text gathered or downloaded from the Internet as your own;
- Submitting another student's work with your name on it;
- Submitting your own work toward requirements in more than one course without prior approval from the instructor;
- Purchasing a paper or "research" from a term paper mill.

Students in the CGPH and CGPH courses are responsible for understanding what constitutes plagiarism. Students are encouraged to discuss specific questions with faculty instructors and to utilize the many resources available at New York University.

Disciplinary Sanctions

When a professor suspects cheating, plagiarism, and/or other forms of academic dishonesty, appropriate disciplinary action is as follows:

- The Professor will meet with the student to discuss, and present evidence for the particular violation, giving the student opportunity to refute or deny the charge(s).
- If the Professor confirms that violation(s), he/she, in consultation with the Program Director may take any of the following actions:
 - Allow the student to redo the assignment;
 - Lower the grade for the work in question;
 - Assign a grade of F for the work in question;
 - Assign a grade of F for the course;
 - Recommend dismissal.

Once an action(s) is taken, the Professor will inform the Program Director and inform the student in writing, instructing the student to schedule an appointment with the Associate Dean for Academic Affairs, as a final step. The student has the right to appeal the action taken in accordance with the CGPH Student Complaint Procedure.