Summary Course Description and Objectives. The consequences of disastrous events are escalating in many ways, for example, in terms of lives lost, injuries, economic costs, adverse social conditions, and environmental destruction. Although the emergency field has a long history, it is undergoing radical transformations given the global scale of emergencies and their impacts requiring coordinated action and sharing of information and services. The rapidity of action required when an emergency arises poses unique challenges to traditional planning and the provision of public services. The course theme is what specific actions are transferrable across communities and different hazards to promote resilience.

This course provides students with the capacity to develop planning and public service approaches to understand, diagnose and address causes, consequences, and mitigation and adaptation measures for a variety of emergencies and disasters. These events include natural hazards (such as earthquakes, volcanic eruptions, tsunamis, hurricanes, floods, and temperature extremes), accidents, terrorism and other extreme events such as climate change and environmental catastrophes that are either rapid or slow moving with often devastating impacts on social structures and the built and natural environments. To address these issues, the course draws upon environmental and land use planning, the spatial representation of hazard areas, hazard index construction, and statistical analysis of databases and risk management to gain an understanding of, reduce, respond, and adapt to disaster consequences. Students will learn effective resource allocation strategies, social justice policies, and innovative technological, environmental and social approaches for disaster mitigation, preparedness, response, and recovery. The course also includes knowledge of social and individual behaviors that are a foundation for understanding how people act in disasters, how behavioral changes may save lives and property, and how communication of risks at every stage – before, during and after disasters – occurs. Students will have the opportunity in some cases to meet professionals in emergency planning and response fields in public services, social and health services, security, and the environment. The course draws extensively on case material designed for the course.

Summary Outline of Course Topics:

- The human experience of disaster
- Crisis perceptions and communications
- Types of events generating emergencies, including: weather emergencies (hurricanes, floods, heat, snow and ice storms); environmental disasters (toxic releases, health risks); environmental extremes (climate change); terrorist threats/attacks; bioterrorism; technological accidents and their intersection with health, safety and the environment (e.g., bridge collapses and train accidents); communicable diseases; pandemics.
- Methods for measurement and spatial location of occurrences and consequences
- Interpretation of trends and patterns for frequency, severity, and impacts of consequences
- How cities cope with disaster and build resiliency for prevention and recovery
- Social equity reflected in community vulnerability and the ability to recover
- Social support systems and institutions (and finance) for disaster response and recovery
Summary Outline and Course Requirements

Course Outline

I. Introduction to the Evolution and Management of Disasters
   1. The Language of Disasters: Concepts Measuring Abrupt Change, and Vulnerabilities
   2. Approaches to Measuring and Analyzing Disasters for Strategic Choices to Reduce
      Vulnerability and Social Inequities: the Emergency and Disaster Management
      Framework and How to Recognize Extremes

II. Applying the Risk Assessment Framework: Threat and Hazard Probabilities, Vulnerability
    and Consequences
   3. Understanding and Measuring Threats and Hazards: Natural Hazards
   4. Understanding and Measuring Threats and Hazards: Climate Change
   5. Understanding and Measuring Threats and Hazards: Accidents and Terrorism
   6. Assessing and Managing Consequences: Securing Critical Public Services I
   7. Assessing and Managing Consequences: Securing Critical Public Services II

No Class (Spring Break)

III. Social/Psychological Dimensions for All Stages of Disaster Management
   8. Impacts on Social Networks, Social Justice and the Economy
   9. Attitudes and Perceptions in the Context of Emergencies
   10. Communication in Emergencies and Disasters

IV. Mitigation/Prevention, Preparedness, Response, and Recovery/Rebuilding; Planning and
    Institution Building: Common Themes Across Different Hazards
   11. Response
   12. Recovery and Rebuilding for Adaptation, Preparedness, Prevention and Mitigation
   13. Engaging Institutions: Dilemmas, Issues and Solutions

V. Course Synopsis
   14. Integration of Course Themes and Discussion of Student Papers

Selected Readings (only required books are listed below; in addition, articles are provided for
    each class in the full-length syllabus)

R. D. Bullard and B. Wright. Race, Place and Environmental Justice after Hurricane Katrina.


H. Rodriguez, E. L. Quarantelli, and R. R. Dynes, Handbook of Disaster Research, New York,

H. V. Savitch. Cities in a Time of Terror. Space, Territory, and Local Resilience. Armonk, NY:
   M.E. Sharpe, 2008.

K. M. Simmons and D. Sutter. Economic and Societal Impacts of Tornadoes. Boston, MA:
   American Meteorological Society, 2011.

K. Tierney. The Social Roots of Risk. Producing disasters, promoting resilience. Stanford, CA:

A few guest speakers are invited who provide important front line perspectives, and include
   emergency managers in emergency response and planning agencies, transportation and utility
   organizations, and risk insurance firms.
Course Instructions, Requirements, Lectures, and Readings (*Please Check for Updates)

GENERAL READINGS

Note: Only books are listed in this section. Other readings are listed under each lecture. Most required books below are read in their entirety. Assigned sections are under each lecture. Required books are available at NYU’s Professional Bookstore and at Bobst Library (reserve).

Major Readings (Selected Sections Required):


Optional Books (also on reserve in Bobst Library):


SPECIAL REFERENCE MATERIAL (NYU Classes)

Note: An NYU Classes site contains required course readings, assignments, and other materials. Students are required to access NYU Classes. Some key NYU Classes materials are:

1. Assignment Schedule and Instructions (under “Resources/Assignments” section): 2 short exercises, a midterm, a final, and in-class paper discussions (no in-class final)
2. Course readings and lecture materials that can be posted on NYU Classes under each lecture
3. Selected Case List (for classes and assignments in “Resources/Assignments” section)
4. Supplements: Occasional material (some optional) for databases, map links, and references

INSTRUCTIONS FOR OBTAINING COURSE READINGS

The location of each reading listed under the lectures is indicated next to each reading as follows:

NYU Classes: Available on the course NYU Classes site (please be sure you are registered)

Bookstore: Books available for purchase from the NYU Professional Bookstore, 726 Broadway

Internet: Available on the internet using the link provided

Library Online (mostly journal articles): Downloadable from NYU’s library – Go to library.nyu.edu. Click e-journals, enter journal name; Unique Copy Center availability

Library Reserve: Material is on reserve at Bobst Library (primarily books)

Course grading criteria: Short Assignments: 30% (15% per assignment), Mid-Term Paper: 30%, Final Paper and Class Discussion: 30%, Class Participation: 10% (discussion questions, etc.).

Academic Code: Students are required to comply with the Wagner Academic Code located on the course NYU Classes site and at http://wagner.nyu.edu/students/policies/.
TOPICS AND DETAILED READINGS

Course Objectives: To develop skills as managers and planners to grapple with disasters to:

- recognize disasters and their precursors,
- diagnose how previous disasters have been dealt with and measured, and
- be successful in avoiding the consequences altogether (recognizing that the events themselves may be unavoidable) and managing the consequences once they do happen
- apply management and planning approaches to these problems

Note: Readings listed are required unless indicated otherwise. Many are generally short. Choices are occasionally given. Reading length varies from class to class. Schedule of lectures may vary given availability of guest speakers who are specialists in emergency planning areas covered in the course. Check for updates. Summary slide presentations will be available for each class.

Part I. Introduction to the Evolution and Management of Disasters

Introduction to the concepts of emergencies and disasters, types of disasters, how events evolve into and become disasters from the commonplace to the extreme; disaster precursors and warnings, ways of measuring trends in the frequency of such events, and mitigation, preparedness, response, recovery stages in disaster planning and management.


Examples of types of events generating fundamental dilemmas and emergencies are introduced as real events, lessons learned and future directions and the strategies needed to plan for and manage them. Events are drawn from weather emergencies (hurricanes, floods, heat, snow and ice storms); environmental extremes (climate change); terrorist threats/attacks; technological accidents; communicable diseases and pandemics. Course objectives and background are introduced in terms of how to:

- Identify inflection points, i.e., be able to identify when natural conditions become emergencies or disasters and the policy debates surrounding them
- Develop action timing, e.g., conditions for immediate action to save lives and resources
- Begin to use and interpret data to discern trends and patterns for the frequency, severity, and impacts of the consequences of natural hazards, terrorism, accidents, and other extreme events to measure hazard and its uncertainties as a basis for decision-making.
- Obtain insights into the dynamic interrelationships among constantly changing physical environments, disaster events, and social and demographic characteristics.
- Develop strategies that provide choices and approaches for decision-making
- Population and development dynamics of disasters; Population and economic activity movements toward hazards; introduction to issues of social equity and vulnerability.

Definitions and Characteristics of Disasters and Related Concepts


Bookstore: H.V. Savitch, Cities in a Time of Terror, pp. 3-5.

Overview of Disaster Management Stages (to be revisited throughout the term)

Social Construction and Perspectives on Disasters
Bookstore: K. Tierney, The Social Roots of Risk, Chapters 2 and 3 (skim only; revisited later)

Introduction to Selected Disaster Patterns and Trends
Internet and NYU Classes: List of weather disasters, 1980-2014 at
   http://www.ncdc.noaa.gov/billions/events.pdf

Optional references:
   2014, Brussels, Belgium: Centre for Research on the Epidemiology of Disasters (CRED
   Preliminary assessments https://www.fema.gov/preliminary-damage-assessment-reports
   (skim just to obtain familiarity with the site which is updated continually)

2. February 2. Approaches to Measuring and Analyzing Disasters for Strategic Choices to
   Reduce Vulnerability and Social Inequities: the Emergency and Disaster Management
   Framework and How to Recognize Extremes
     Introduction to the emergency planning and management frameworks encompassing
     mitigation/prevention, preparedness, response and recovery; choices that individuals and
     decision-makers face, and risk and decision-making approaches to make those choices. Areas (to
     be applied throughout the course) include: (1) Source reduction (2) Reducing vulnerabilities and
     social inequity (3) Coping and adaptation (4) Risk acceptance (5) Resource Allocation Decision-
     making. Measurement concepts and strategies include resilience and robustness. Data collection
     and analysis methods and techniques; mapping and interpretation are covered that address
     associations among people, places and hazards.
     Introduction to cross-cutting cases of extreme events used throughout the course, for
     example, Hurricane Sandy, Hurricane Irene, the December 2010 Blizzard in NYC, BP Oil Spill,
     the Minnesota Bridge Collapse, Loma Prieta earthquake San Francisco, Haiti Earthquake, and
     others.

Introduction to Risk Concepts and Applications
Optional:
Library Online: M. Scheffer, Carpenter, S. R., Lenton, T. M., Bascompte, J., Brock, W., Dakos,
   10.1126/science.1225244

Resilience
   journey” Natural Hazards and Earth System Sciences, 13, 2707-2716. doi:10.5194/nhess-13-
   2707-2013
Part II. Applying the Risk Framework: Threat and Hazard Probabilities, Vulnerability and Consequences

Statistics and spatial delineation are used as approaches to identify and assess the risks of emergencies and planning options over the course of mitigation, preparedness, response, and recovery at different stages in risk evaluations. These stages are: Threat and Hazard Probabilities, Vulnerability, Exposure and Consequences in a Disaster Context.

3. February 9. Understanding and Measuring Threats and Hazards: Natural Hazards

The origins, characteristics, trends and measures for threats and hazards for different types of “natural” disasters: weather extremes focusing on hurricanes, extreme temperatures, and flooding; geophysical events, including earthquakes, tsunami, volcanoes. Cases include the Japan Earthquake and Tsunami (March 11, 2010); Tornado episodes in Tuscaloosa, AL and Joplin, MO (2011); northeastern U.S. snowstorms (2010-2011); Hurricane Irene (2011).
General references for types of natural hazards

**Extreme Weather Events**
(i) Hurricanes
(ii) Tornadoes
Internet and NYU Classes: Tornado Climatology Summary
http://www.ncdc.noaa.gov/oa/climate/severeweather/tornadoes.html#history
http://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology/trends
(iii) Record High Temperatures, Heat Waves and Drought

**Geophysical and Related Hazards**
(i) Earthquakes
(ii) Tsunamis
NYU Classes: National Science and Technology Council, Subcommittee on Disaster Reduction (circa 2005) Science and Technology Lessons Learned from the December 26, 2004 Indian Ocean Disaster Interim Report of the Subcommittee on Disaster Reduction. 7 pages.
(iii) Volcanoes

**4. February 16. Understanding and Measuring Threats and Hazards: Climate Change**
Climate change is introduced as a threat to the ecology and the environment. Characteristics of climate change and its potential for disaster are evaluated. Major themes emphasized are sea level rise and rapid ice melt (with other extreme events covered in Class 3).

**Short Assignment 1 due before class**
National Climate Assessment (U.S. Global Change Research Program)

Optional (internet only):
State of the Climate (NOAA):

Intergovernmental Panel on Climate Change (IPCC)

Pew Research Center

Sea Level Rise Associated with Climate Change


Rapid Ice Melt


Emissions

Adaptation Measures. Available as part of class presentation later in the semester.

Optional:

climate sections; skim as background for lectures.

5. February 23. Understanding and Measuring Threats and Hazards: Accidents, Terrorism, Environmental (and Ecological) and Environmental Health Threats

**Accidents**
Case Examples Covered in Slide Presentations (no extra readings): Bridges (e.g., Mianus Bridge, CT; Minneapolis Bridge, MN; Schoharie Bridge, NY), rail transit, dams, chemical plants, pipelines, oil rigs (BP Oil Spill), oil tankers, electric power outages, nuclear power plants

**Environmental (and Ecological) and Environmental Health Disasters as Accidents**
Measuring diversity:

Defining quarantine periods:

Measuring the occurrence of an outbreak: Specific outbreaks, e.g., SARS, H1N1, H5N1, MERS, Ebola, and others. Covered in Class (no extra readings)

Optional:


**Terrorism**, e.g., September 11, 2001 attacks in NYC; Madrid and London Rail Bombings.

Bookstore: H.V. Savitch, Cities in a Time of Terror, pp. 3-13; 26-43; 67-119.


Optional: Various references from the U.S. DHS “START” Center, U. of Maryland


Consequences of terrorism, extreme weather events, and other hazards on public services. Guest Speakers from transit and electric power organizations.

Optional:


**Midterm Due**


National Research Council (2014) An ecosystem services approach to assessing the impacts of the Deepwater Horizon oil spill in the Gulf of Mexico. Washington, DC: NAS.

Optional:


March 15. No Class. Spring Break.

Part III. Social/Psychological Dimensions of Disaster

- Attitudinal research and risk perception as it affects human behavior in emergencies such as evacuation, compliance, and receptivity to communication
- How different disasters are ranked and prioritized by the public and decision-makers
- Factors that heighten concern: lack of control, uncertainty, newness, proximity, etc.
- Application of theory and methods for trust and risk communication to crisis situations for different audiences incorporating equity and hazard type
- Theoretical foundations for behavior and perception linkages, influence diagrams, social networks, mental models, cognitive processing will enrich this area
- The disaster attention cycle – when are the general public, lawmakers and funding streams most attentive and why. Information systems: warning centers
Examples of social-psychological, risk perception and risk communication aspects of cases and case types discussed are in the areas of the course themes of weather and geophysical events, industrial accidents, and terrorist attacks.

8. March 22. Impacts on Social Networks, Social Justice and the Economy
Disasters disrupt social networks in ways that both destroy and recreate communities. Supply chain disruptions affect how people and goods movement react to massive shutdowns. The production and distribution of goods are becoming more and more concentrated which makes them vulnerable to disruptions. What are the options?

Optional:


**Short Assignment 2 due before class**

Bookstore: H.V.Savitch, Cities in a Time of Terror, pp. 44-63.

10. April 5. Communication in Emergencies and Disasters

Case studies that address common language and criteria to portray pre- and post-disaster conditions and institutional mechanisms to support communications: Communication lessons from the NYC 2010 snowstorm; Joplin tornadoes; Gulf Oil spill; oil and natural gas pipeline accidents (to be made available separately and discussed in class).

Part IV. Mitigation/Prevention, Preparedness, Response, and Recovery/Rebuilding; Planning and Institution Building: Common Themes Across Different Hazards

Recapping the techniques and approaches earlier in the term with applications to stages of disaster planning; equity and justice issues across the stages

- Pre-Disaster Stages
  - Pre-disaster planning techniques: Review of mapping and building disaster scenarios spatially to identify risk-prone vulnerable areas.
  - Anticipating and measuring the potential for emergencies using risk and vulnerability assessment
  - Prevention strategies from technology to development and behavioral dimensions
- Preparedness for initial conditions: when the lights go out, the trains stop, traffic lights are disabled, transportation arteries are blocked, water and sewerage stop running, housing is destroyed
- Response: Ability and capacity of communities to accommodate emergency conditions – e.g., case histories - Gander, Newfoundland (overwhelming of public services on 9/11/01); Houston (post-Hurricane evacuation); Asian Tsunami (2004); northeastern U.S. Hurricanes Irene and Sandy.
- Evaluating alternatives and resource deployment: risk-benefit, risk-cost methods
- Post-disaster recovery
11. April 12. Response
Guest speakers from emergency management organization


**Shaping Cities to Identify and Resist Immediate Impacts of Terrorism**

**Rescue Operations**

**Evacuation Planning**


NYU Classes: FHWA evacuation case studies

**Surge Capacity**


**Emergency Services**


Building and rebuilding community and physical environments in anticipation of prevention and overall disaster reduction, including enhancing resilience of individuals, communities, cities, regions and nations to withstand future disasters.

**General Readings**

Optional/skim – Recent government documents – executive orders, programs and plans:
- U.S. DHS (2013) National Infrastructure Protection Plan (NIPP)

**Housing and Community Rebuilding**


**Hurricane Katrina case**

- S.J. Webb, “Investing in Human Capital and Healthy Rebuilding in the Aftermath of Hurricane Katrina,” pp. 139-152.


Optional Cases (references for class discussion): **Hurricane Sandy case**

Internet: NYS Rising community program plans and Rebuild by Design  


**Haiti Earthquake case**

https://docs.unocha.org/sites/dms/CAP/HAP_2014_Haiti.pdf

**Rebuilding Infrastructure (primarily terrorism, supplementing readings for lectures 6 and 7 for weather-related disasters and infrastructure)** Read two of the four readings


**Finance**


Normal institutional approaches often have gaps and are not flexible to adapt to emergencies. These cut across economics, laws and regulations, and organizational mechanisms to adapt to new issues, rapid resource assembly and coordination. This class covers representative theory and applications for institutional arrangements across the disaster planning and management spectrum; the economics of disasters; valuing lives in different disasters and places; and laws and regulations, such as emergency waivers/exemptions.

Optional/skim – government documents:
Link to individual frameworks: http://www.fema.gov/national-response-framework

Part V. Course Synopsis

14. May 3. Integration of Course Themes and Continued Brief Discussion of Student Paper Highlights. **Objective of In-Class Discussion of Final Papers.** Students will be able to practice oral presentations, and participate in an interactive exchange with other students by presenting the key characteristics and highlights/key message from their cases.

May 17. Exam Week. Submission of final paper. Continuation of paper discussions if needed. No in-class final.