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 both rapid and slow moving with often devastating impacts on social structures and the built and natural environments. To address these issues, the course draws upon land use planning, the spatial representation of hazard areas, statistical analysis of databases and risk management to gain an understanding of and reduce disaster consequences. Students will learn effective resource allocation strategies, social justice policies, and innovative technological 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

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 and Discussion of Papers

Selected 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):

Case Fact Sheets developed for this class will be posted on NYU Classes. These cases will be used throughout the course to illustrate and be a common thread across course themes of planning and management of disaster mitigation, preparedness, response and recovery.
Course Instructions, Requirements, Lectures, and Readings

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:

Optional Book References: These books are on reserve in Bobst Library.

SPECIAL REFERENCE MATERIAL (NYU Classes)
Note: An NYU Classes site has been set up that contains required course readings, assignments, and other materials. Students are required to access NYU Classes. Some key NYU Classes materials are:
1. Schedule of Assignments and Assignment Instructions (under “Assignments” section)
2. Course readings and lecture materials that can be posted on NYU Classes
3. Case Fact Sheets (including Hurricane Sandy); Case List (used course-wide for class discussion and assignments, located in “Syllabus folder” in “Course Documents” section)
4. Supplemental Information: Occasional material for databases, map links and additional references (some optional) for lectures and assignments.

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): Article can be downloaded from NYU’s library – Go to library.nyu.edu. Click e-journals, enter journal name
Library Reserve: Material is on reserve at Bobst Library (primarily books)
TOPICS AND DETAILED READINGS

Note: Readings listed are required unless indicated otherwise. The timing of lectures may vary slightly given the availability of the few guest speakers who are specialists in the emergency planning areas covered in the course.

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 the mitigation, 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 bioterrorism; 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)

Introduction to Selected Disaster Patterns and Trends
(interactive site, skim just to obtain familiarity with the site)
Internet and NYU Classes: NOAA Satellite and Information Service, National Climatic Data
Center, Billion Dollar U.S. Weather/Climate Disasters. 1 p.
Cross-cutting Cases of Extreme Events (themes used throughout the course): Fact sheets for
Hurricane Sandy, Hurricane Irene, the December 2010 Blizzard in NYC, BP Oil Spill, the
Minnesota Bridge Collapse, Loma Prieta earthquake San Francisco, Haiti Earthquake.
Population Drivers of Consequences (to be continued in Lecture 2)
NYU Classes: Two brief U.S. Census Bureau papers on U.S. population patterns and trends.

2. February 4. 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, including resilience and robustness. Data
collection and analysis methods and techniques; mapping and interpretation to address
associations among people, places and hazards.

Introduction to Concepts and Applications
Library Online: S.L. Cutter, L. Barnes, M. Berry, C. Burton, E. Evans, E. Tate, and J. Webb
(2008) “A Place Based Model for Understanding Community Resilience to Natural
Library Online: C. Folke (2006) “Resilience: The emergence of a perspective for social-
ecological systems analyses,” Global Environmental Change, 16, 253-267.
Optional:
Internet: The National Academies, Committee on Increasing National Resilience to Hazards and
Disasters; Committee on Science, Engineering, and Public Policy (2012) Disaster Resilience:

Index Construction
Hazardous indexes compared (class distribution and NYU Classes power point slides)
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 11. Understanding and Measuring Threats and Hazards: Natural Hazards

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

References for natural hazard definitions, patterns and trends

Extreme Weather Events
(i) Hurricanes

NYU Classes: The Saffir-Simpson Hurricane Wind Scale, The Saffir-Simpson Team (Timothy Schott, Chris Landsea, Gene Hafele, Jeffrey Lorens, Arthur Taylor, Harvey Thurm, Bill Ward, Mark Willis, and Walt Zaleski), National Weather Service, National Hurricane Center

(ii) Tornadoes
Internet and NYU Classes: Tornado Climatology
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 18. 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


Sea Level Rise Associated with Climate Change

Rapid Ice Melt


Adaptation Measures. References available in class or on NYU Classes

Optional:


5. February 25. Understanding and Measuring Threats and Hazards: Accidents, Terrorism, Environmental (and Ecological) and Environmental Health Threats

Accidents – Case Examples: 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 Precipitated by Accidents
Readings on specific outbreaks, e.g., SARS, H1N1, H5N1
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 Speaker from a government transportation and infrastructure authority.

Midterm Due

Cases include: The NYC Snowstorm (December 26, 2010) – transportation and sanitation; NYC heat wave (summer 2011) – transit; Hurricanes 2004 and 2008; 2011 and 2012 – electric power.

Internet and NYU Classes:
http://www.oe.netl.doe.gov/docs/HurricaneComp0508r2.pdf

OR


Optional:
http://www3.interscience.wiley.com/cgi-bin/fulltext/123443062/PDFSTART


March 18. 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 is 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 25. 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?

Short Assignment 2 due before class

Bookstore: Jim Defede. The Day the World Came to Town. 9/11 in Gander, Newfoundland. New York: Harper 2002. (Book will be covered in class though reading should occur much earlier for Assignment 2).
Optional:

9. April 1. Attitudes and Perceptions in the Context of Emergencies

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

10. April 8. Communication in Emergencies and Disasters

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 15. Response

Short Assignment for discussion only (ungraded, no submission)


Shaping Cities to Identify and Resist Immediate Impacts of Terrorism

Rescue Operations

Evacuation Planning
NYU Classes: FHWA evacuation case studies

**Surge Capacity**

**Emergency Services**

**12. April 22.** Recovery and Rebuilding for Adaptation, Preparedness, Prevention and Mitigation

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**
Bookstore: B. Phillips, Disaster Recovery, sections to be assigned.
Optional/skim – Recent government documents – executive orders, programs and plans:
  - PPD-21
  - U.S. DHS (March 30, 2013) National Preparedness Report (NPR)
  - U.S. DHS (2013) National Infrastructure Protection Plan (NIPP)

**Housing and Community Rebuilding**

**Hurricane Katrina case**

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)


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.

Part V. Course Synopsis

14. May 6. Integration and Class Presentations (potentially extending to finals week)

   Students will be able to practice oral presentations, and participate in an interactive exchange with other students.

In-Class Discussion of Final Papers

Exam Week. May 13. Continuation of Class Presentations if needed. Make sure you are available for the exam week time period.