

## **SUMA PS4330 Syllabus - Spring 2017**

### **General Course Information:**

“Disaster Risk Management and Sustainable Urban Resilience”

SUMA PS4330

Columbia School of Professional Studies (SPS): Sustainability Management

### **Course Description:**

<http://sps.columbia.edu/sustainability-management/courses#SUMAPS5330>

### **Instructor Information:**

Klaus H. Jacob; Adjunct Professor, Earth Institute, Columbia University

Office Hours: for 1 hour after class or by appointment.

### **Prerequisites:**

None for CU Graduate students. Others by permission of Instructor.

### **Course Objectives:**

The aim of this one“ semester 3“ point course is to provide students with insights and skills they need to manage 'natural' and man“ made disasters during their professional careers; and manage these risks by trying to build sustainable resilience in communities and institutions at risk. Sustainable resilience is understood here as measures, both physical and social, that not only serve present but also future generations equitably, i.e. current resilience measures must not create undue liabilities for future generations.

The course provides a conceptual framework that should allow students to develop and include policies into their future professional activities with the aim to minimize the exposure of people or entire populations to disasters and foster the populations' sustained disaster resilience. Students upon completion of the course should:

- have some understanding of the power and size distribution of natural and technological processes that during extreme events can lead to disasters;
- understand that certain aspects of natural and technological hazards are predictable, while others are not;
- appreciate that the risks taken by society, whether willingly or unwillingly, can generally be quantified in advance, accepting some uncertainty;
- have gained a basic understanding how risks can be managed using certain tools before, during and after extreme events;
- understand that often well intended aid to communities, whether as societal,

economic or engineered aid or relief projects, whether on a local, regional, national or international scale, can expose these communities to risks that were not intended or not carefully enough assessed in advance;

- gain some understanding of the primary institutions and organizations on national (US) and international scales, which explicitly or implicitly are involved in management of natural and man-made disasters;
- know how to deepen on their own their understanding of the complex interaction between nature, the built environment and vulnerable societies during disasters, and improve their professional skills in risk management by introducing them to sources of information available on this subject in a wide variety of media;
- be able to cherish and apply the notion that disasters are manageable, and that as individuals and professionals we can make a difference, albeit mostly in incremental steps.

**Method of Instruction.** The FORMAT of the course is largely a series of instructor's lectures, guest lectures, student presentations, but also contains seminar-style discussions, the latter depending on the size of class. At the first 5 to 10 minutes of each session, disasters of the week (globally), or course-relevant political events may be discussed as warranted. Please bring relevant information to the class and be prepared to present it concisely (including your own comments). The class material is posted in advance for each lecture. Students are expected to be thoroughly familiar with the posted material and reading assignments BEFORE the each lecture. This will allow more time for discussions of the material for each class, rather than passive listening to the instructor's lecturing. You can make a difference!

This course requires, at a minimum, a 6-hour effort per week during the semester, including assigned course tasks. It typically corresponds to about 1/5 of your total semester effort. This includes the weekly 2-hour class, assigned readings prior to each class, answering short weekly quizzes, preparation of a term-paper topic declaration (max. 2 pages), which provides a brief outline for the final paper; and the final term paper itself (max. 10 pages); plus a short presentation of your topic to the class (during reserved sessions of the course; see below important note under "Method of Evaluation"). The topic for the outline/oral presentation/final paper is chosen by each student according to his/her preferences (for declaration deadline see below), but needs to be discussed with, and approved by the instructor. I suggest that you have discussed your topic with the instructor in person, but definitely declared by E-mail, and approved by the instructor's return Email not later than for Lecture #4. This is VERY SOON into the course (4 weeks)! So start to work on choosing your topic, FIRST thing after Lecture #1 !! The choice of topic for your term paper is a tough decision to make so early, but necessary to allow you sinking your teeth into the chosen topic. If you want, you can come with a tentative topic to the 1st lecture ! Depending on your topic, you may be asked to join a student working team, or you may self select the team given the offered group topics and how they match against you own paper topic. The TA's and/or instructor will have the final choice of which team you will be affiliated with.

### **Student Tasks, Assignments, Deliverables and Grading:**

The following items bear on this subject:

**1. Class Participation and Reporting on Current Events.** Students are expected to bring to class comments on and sources for current events that occurred during the prior week and are reasonably related to the course topic. Students should be prepared to present them during the first few minutes in each class. They may concern disasters globally, nationally or locally and any policy developments that relate to them or the course topic in general; they may include short-term responses and long-term sustainability and resilience issues. You also will be asked to respond in a timely manner to weekly, short quizzes, after each lecture. Your performance in this and general class participation during the semester will contribute a **15%** weight to your overall course grade.

**2) Term-Paper Outline (2pages).** Students are expected to come up each with a topic of their own for their term paper. After the approval process with the instructor is completed (for timing see table near the end of the syllabus), each student prepares a 2-page (approximately 600 words) paper summary that describes the title, objective, expected research approach, some expected key results (to be modified as subsequent research may require); and at least 5 key references of the most pertinent sources that students expect to use. The grade for this effort will be weighted to contribute **15%** to the student's overall course grade. After this step, the student will have chosen his student team affiliation or will be assigned to a team.

**3. Oral Presentation.** Each team will make an oral presentation to the class about its chosen/assigned team topic. It is up to the team whether it wishes to use audio-visual aids for the oral presentation (or not). We expect about 9 teams. Each team will have about 30 minutes (including Q&A). Each team will self-select a team lead presenter (ca. 12 minutes), but in addition each team member will have about 1 minute to talk about her/his special contribution and focus. The purpose of this exercise is two-fold: i.) to practice team work; ii.) to get feed-back from the class, TAs and instructor that can be still incorporated into the final term-paper (see item 4); and iii.) to present the essence of a research project and its key findings and recommendations in a very short assigned time (just a few minutes). This is a skill that needs to be honed for life. This effort will be weighted to contribute **30%** of the total course grade.

**4. Final Term Paper.** At the end of the course, each student will deliver her/his term paper on the chosen (and early-on approved) topic. The length of the paper will be limited to at most 10 pages (12-point-font / 1.5 line spacing for text; 11-font / single line spacing for figure and table captions and for references). The 10-page limit includes text and figures, tables, footnotes and references. The length limitation will be strictly enforced, again largely to help students to learn how to focus on the essence of their research, results and recommendations, and summarize these efforts in clear and crisp writing together with clear organization and formatting. The first 2-3 pages and its references of the paper can be common to all members of a given team, but the remaining text, references, tables and figures are student-specific contributions. That way you can distinguish yourself from your team. This final effort will contribute the remaining **40%** of the total course grade

for each student.

The combination of the 4 deliverables will allow the students to show whether they have fully digested and understood the tools and methods for hazard and risk assessment and for disaster risk management as taught in this course (and are made available on its *Canvas (CV)* website; and to what degree the students are able to use skillfully the policy options for attaining sustainable urban resilience that were discussed during this course, but need to be fine-tuned to each case chosen by each student for his/her term paper topic. Note the table near the end of the syllabus for the dates when the deliverables are due, together with a summary that repeats for how each of the 4 deliverables contributes to the overall course grade. Each of the 4 items above will be graded on a point scale of 1 to 100 points. After weighting and combining them, the final point scale (100 points max.) will be translated into a letter grade that then will be entered in the student's record held by the University's Registrar.

### **COURSE BACKGROUND-INFORMATION & KEY ISSUES:**

*Key Words: Disasters, Risk, Vulnerability, Resilience, Sustainability, Governance, Civilization, Urban Planning, Landuse, Infrastructure, Sustainable Development.*

"Natural and other disasters exert a high toll on the lives, livelihoods and economic development of many countries - especially of poorer ones, and on the poorest sectors of populations within otherwise quite developed countries. Annual economic losses associated with natural disasters alone averaged \$ 75.5 billion in the 1960s, \$ 138.4 billion in the 1970s, \$ 213.9 billion in the 1980s and \$ 659.9 billion in the 1990s, and continue to rise rapidly [into the trillions] in the 2000s. While the majority of these asset losses are concentrated in the developed world, they fail to adequately capture the impact of the disaster on the poor who often bear the greatest cost in terms of lives, livelihoods, and of rebuilding their shattered communities and infrastructure. Today, 85 percent of the people exposed to earthquakes, tropical cyclones, floods and droughts live in countries having either medium or low human development" (Quote from UNDP, 2004, but still valid, or even more so since the Indian Ocean Tsunami, Fukushima, Katrina, Sandy and other events).

Disasters, whether of natural or man-made origin, reflect and amplify preexisting social stresses. Successes or failures to manage the risks from disasters and reducing their impacts depend on how well the local context for the physical and social conditions are understood and accounted for. Natural and technological disasters, as opposed to civil strife, war, or public health pandemics occur when natural or technological processes impose overwhelming forces on a vulnerable society during extreme events.

NATURAL hazards are normal, albeit extreme events of the Earth's dynamics. Causes for natural disasters can include rapid- and slow-onset events or processes. They include draughts, floods, storms, heat waves, cold spells, landslides, earthquakes, tsunamis, volcanic eruptions and other natural processes. Hazards

associated with climate change are partly natural and partly man-made. Because the underlying process is gradual and global, yet can be locally diverse or sudden, they require special efforts by the scientific community to convey the associated risks.

EXTREME natural and man-made events become disasters only when they affect exposed vulnerable societies. Vulnerability, or lack of resilience, can be caused by many social factors, but includes high concentration of populations or assets in harms way. Vulnerability differs fundamentally between more developed countries (MDCs) and less developed countries (LDCs), and on a smaller scale, between affluent and deprived sectors within diverse communities. In LDCs, vulnerability is associated with poverty, inequity, and lack of access to coping resources and information, or with greed that may place people or entire populations into harm's predictable way. Public and private institutions often lack the political capacity, the will, or the resources to build sufficient disaster resilience by persistent assessment, planning and sustained risk-mitigating actions.

SUSTAINABLE URBAN RESILIENCE: To build disaster-resilient urban institutions and communities requires a comprehensive understanding of their social and physical vulnerabilities before remedies to build resilience can be attempted. Often the seemingly easiest measures to build resilience are protective rather than adaptive, but many of them tend to make communities in the long term even more vulnerable (e.g. building storm barriers, dams, dikes and levees that may be overtopped by a combination of future severe storms and rising sea level fuelled by global climate change). The course will emphasize the importance of social resilience rather than relying primarily on physical resilience whether protective or adaptive in nature.

In this Course we pose the following questions: Are disasters the result of an unresolved dichotomy between long-term persistence of natural and cultural processes, vs. the short-term horizon of political perceptions and shortsighted development decisions? Are disasters scientifically "predictable"? How do urbanization and industrialization increase human vulnerability to natural and technological hazards or even create new hazards? How do the effects of disasters differ in less vs. more developed countries and cities? How can the risks be assessed and managed? How does disaster risk management relate to sustainable development?

We assess science-, technical, policy- and humanitarian needs and opportunities for pre-event mitigation and preparedness and post-event relief and recovery. We explore the role of global economic development to the rapidly increasing risk exposure. Some of this development is unsustainable. Some development is promoted via loans to developing countries for large infrastructure projects. Some loans are made after major disasters to restore or develop needed infrastructure. Many of these projects are not properly assessed for the existing hazards to which they are exposed, nor for the new risks they may generate. How can external disaster relief best serve indigenous needs to sustain livelihoods, and help to build the locally needed resilience and coping capacity? Under what conditions can disaster mitigation become a local and global cultural value with equitable effects? Can disasters be managed without first solving all other societal ills of the affected region? Can science and engineering make a unique contribution

to reduce risk exposure and directly build local capacity and disaster resilience, without having to submit to sometimes oppressive or uncivil political norms?

Students are challenged to find their own answers to some of these questions using their own research and reasoning but assisted and guided by a formal framework of tools and concepts provided by this course and enriched by TA input and guest lectures.

### **TEXT BOOKS AND CLASS MATERIAL:**

There is only one required course book (Wisner et al., see below). This book is available by ordering it from used-book stores over the Internet (check out <http://books.google.com>). Either buy new or used editions, or lend from libraries, but read! I recommend you consider buying used copies over the net or from other sources quite cheaply. I am not obsessed with you using the latest edition of this or any other textbooks, even if they are listed as such in the references below. This and any other below listed book recommended for this course should be intensively studied in conjunction with individual lectures as noted below. Additional reading and supporting materials, and all full PowerPoint Lectures will be posted on the CANVAS (CV) website several days before the day of each lecture.

#### THE ONLY REQUIRED COURSE TEXT BOOK IS:

Wisner, B., P. Blaikie, T. Cannon & I. Davis: "At Risk: Natural Hazards, People's Vulnerability, and Disasters. Routledge; 2014 (Revised 2nd Edition). ISBN 0-415-25216-4 (pbk); ca. \$75. (as of 2014). (Note: from Amazon.com used copies were available from \$40 and up, as of Jan 2017). Older editions of the book go under a DIFFERENT author sequence. Stay with the above! A limited page by page preview can be done (copyrighted) from:

<https://books.google.com/books?id=4M6AAgAAQBAJ&printsec=frontcover#v=onepage&q&f=false>

#### Additional, Recommended Books/Reports You should read for this course (may be updated periodically):

1) **Abbott**, Patrick L.: "Natural Disasters". 9th Edition. McGraw-Hill, (if new, around \$170!!). Cheaper used copies, of this or earlier editions can be obtained from your favorite used-book source, or Amazon.com );

2) **Birkmann**, J. (Editor) Measuring vulnerability to natural hazards: towards disaster-resilient societies. United Nations University Press, c 2013, 720 p.,

Alternatively:

(a) Click on this course's Library Reserve Link and choose E-book reserve where a copy of an earlier 2006 edition of this book can be browsed, albeit only page-by-page. Printouts of more than one page are a bit cumbersome, and even browsing the book is wieldy.

(b) See PDF file of a Research Brief written by J. Birkmann, 2005. referenced in pertinent sessions of this course, and/or downloaded on CV

3) **Perrow**, Charles: "Normal Accidents. Living with High-Risk Technologies". Basic Books (US), 1999. pp. 386.

4) **SIRR** Report NYC (June 2013) <http://www.nyc.gov/html/sirr/html/report/report.shtml> and One New York (2015) and others at:

<http://www.nyc.gov/html/plany/html/publications/publications.shtml>

5) **ClimAID** Report <http://www.nyserda.ny.gov/climaid>

download by Chapter !

6) **HUD/ RBD** Competition Reports and Material: Rebuild by Design:

<http://www.rebuildbydesign.org/>

7) **Bosher**, Lee (Editor): "Hazards and the Built Environment – Attaining Built-In Resilience". 382 pages. Routledge, London & New York. 2008. ISBN 978-0-415-42730-2 (Paperback).

8) **Klinenberg**, Eric: Heat Wave: A Social Autopsy of Disaster in Chicago. University of Chicago Press, 2003.

9) Thompson-**Fullilove**, Mindy: Root Shock. How Tearing up city neighborhoods hurts America, and what we can do about it. One World Ballantine Books, New York. 2004.

10) **Jacobs**, Jane: The Death and Life of Great American Cities. Random House, New York, 1961 (and later editions).

Here is the list of books that will be likely to be CU library reserved for this course (Note: This list may be updated in Jan 2017 as needed):

Author	Title	Link/call number
Abbott, Patrick L.	Natural disasters	GB5014 .A24 2004
Birkmann, Jörn.	Measuring vulnerability	E-Reserves
Birkmann, Jörn.	Measuring vulnerability	GB5014 .M4 2006.
Bosher, Lee	Hazards & Built Env.	TH441 .B67 2008
Perrow, Charles	Normal accidents	T54 .P47 1984
Wisner, Benjamin	At risk	GB5014 .A82 2004

### INDIVIDUAL SESSION OUTLINES:

**Thu 1/19; Session 1:** Course Overview, Vision, Course Tasks, Resources, Format, Student Topic & Team Options. Basic Definitions: Peril, Hazard, Risk, Vulnerability, Resilience, Sustainability. The Role of Cities.

REQUIRED READING: (You are strongly advised to read this prior to the 1. Lecture):

- Wisner et al: Part 1: Framework and Theory; pp. 1-124.

HIGHLY RECOMMENDED READING:

- Abbott: Natural Disasters, Chapter 1 and Chapter 16.
- Material in Canvas (CV) Lecture-1 Folder

**Thu 1/26; Session 2: Natural Disasters 1 and Key Vulnerabilities (Geophysical Hazards: mostly Earthquakes including Tsunamis, Volcanoes, Landslides)**

REQUIRED READING:

- Wisner et al.: Part 2, Chapter 8 on Earthquakes & Volcanoes.

RECOMMENDED READING

- Abbott: Chapters 2 through 8; Earth's Energy Flow, Plate Tectonics, Earthquakes, Volcanoes;

- Material in Canvas (CV) Lecture-2 folder
- For those interested in Landslides:  
Chapter 8 (Mass Movements) in Abbott;  
and a review article, Chapter 2 in  
<http://siteresources.worldbank.org/INTDISMGMT/Resources/0821363328.pdf?resourceurlname=0821363328.pdf>

**Thu 2/02; Session 3: Natural Disasters 2** and Key Vulnerabilities (Hydrological and Weather Related Hazards: mostly Floods, Droughts, Wild Fires, Tornados, Tropical Storms, Winter Storms).

REQUIRED READING:

- Wisner et al: Part 2, Chapters on Floods and Coastal Storms; Draughts, Wildfires,

RECOMMENDED READING:

- Chapter 3 of  
<http://siteresources.worldbank.org/INTDISMGMT/Resources/0821363328.pdf?resourceurlname=0821363328.pdf> WB: Natural Disasters Hotspots, Case Studies: Ch. 3 – Storms in Coastal Areas.
- Abbott: Chapters on Severe Weather, Hurricanes, Floods
- Material in CV Lecture-3 Folder.

**Thu 2/09; Session 4: Natural Disasters 3** Climate Change (trends; mitigation vs. adaptation), Sea Level Rise, Coastal Risks; Uncertainties; IPCC, NPCC; Flexible Planning & Adaptation; Time Horizons.

REQUIRED READING:

- IPCC Fifth Assessment Report (AR5): Climate Change 2014 Synthesis Report – Summary for Policy Makers: (see CV Files and resources for Lecture 4.)

[https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5\\_SYR\\_FINAL\\_SPM.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf)

RECOMMENDED:

[http://www.nyc.gov/html/planyc2030/downloads/pdf/npcc\\_climate\\_risk\\_information\\_2013\\_report.pdf](http://www.nyc.gov/html/planyc2030/downloads/pdf/npcc_climate_risk_information_2013_report.pdf) Note an update Jan 2015 can be found here:

<http://www.nyc.gov/html/planyc2030/html/publications/publications.shtml> with a link to <http://onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc> . Note you can download content by Chapter as PDFs (for free !!).

- Chapter 3 of WB Hot Spots Case Studies  
<http://siteresources.worldbank.org/INTDISMGMT/Resources/0821363328.pdf?resourceurlname=0821363328.pdf>
- Abbott: P.L., Natural Disasters: Chapter on Climate Change (In most editions Chapter 9).
- Synthesis Report for Copenhagen Climate Summit, also downloadable from: <https://www.pik-potsdam.de/news/press-releases/files/synthesis-report-web.pdf>
- <http://www.realclimate.org/index.php/archives/2015/01>
- Future flood losses in major coastal cities. Stephane Hallegatte, et al. (2013). Nature Climate Change 3, 802–806 (2013) doi:10.1038/nclimate1979  
[https://www.researchgate.net/publication/260701937\\_Future\\_flood\\_losses\\_in\\_major\\_coastal\\_cities](https://www.researchgate.net/publication/260701937_Future_flood_losses_in_major_coastal_cities)
- Peter H. Gleick & Matthew Heberger (2012): The Coming Mega Drought (The



southwestern U.S. looks a lot like Australia before its nine-year dry spell). Scientific American 306, 14 (2012). Published online: 28 December 2011  
doi:10.1038/scientificamerican0112-14.

<http://www.hep.fsu.edu/~wahl/artic/SA/mag/2012/201201.pdf>

Additional Resources see File L04.3 in the Files/Resources Folder of CV.

**IMPORTANT NOTE:** At latest by today you should have discussed with instructor in person, and submitted to him by E-mail, and have approved by same via return E-mail, your choice of topic of your term paper, whose formal 2-page (more for teams, see guide) declaration/outline is due a week from today. **You also should have discussed and finalized with TAs and Instructor your affiliation with one of the student working teams.**

**Thu 2/16: Session 5: Disaster Risk Management (DRM) 1:** Risk Equation and Implications (Landuse & Zoning vs. Codes & Engineering), Basic Options (Protection, Adaptation, Relocation); Intergenerational Justice; Time Horizons and Sustainable Resilience.

REQUIRED READING: TBD

- See files in CV for this session 5.

**IMPORTANT NOTE:** Today, at the start of Session 5, is the deadline for handing in a hard-copy of your 2-page OUTLINE of your declared and approved Term Paper Topic (2-pages max.: title and statement of topic, brief outline, 1 Figure optional, and at least 5 key references). **Also post on CV a version of Outline as PDF; The outline should indicate with which Student Working Team, you are affiliated.**

**Thu 2/23: Session 6: DRM 2:** The Legal + Regulatory Framework, Role of Governments (Local, State, Federal). UN, IGOs & NGOs. Development Banks, Insurance/Reinsurance, Home Rule. Policies & Politics -- National & International. Global Trends.

REQUIRED READING: TBD

RECOMMENDED READING:

- See files in CV for this session 6.

**Thu 3/02: Session 7: DRM 3:** Emergency Management: The view from the Practitioner: Guest lecture by Becky May. NYC Dprtm. Emergency Management.

**Thu 3/09: Session 8: DRM4:**

Urban Forms, Stages of Development, Infrastructure, Urban Vulnerability & Resilience. The Role of Urban Planning and Design. REQUIRED READING: TBD  
RECOMMENDED READING: see files in CV for this session 8.

**Spring Recess Mon 3/13 – Fri 3/17 [No class on Thu 3/16]**

**Thu 3/23: Session 09:**

**Part 1: Post-Event Rebuilding Programs; e.g. post-Katrina & Sandy, SIRR, RBD.**

**Part 2: Societal Factors of Vulnerability & Resilience**

REQUIRED READING: SIRR and 'One City Built to Last' Reports for NYC, HUD/RBD

reports as detailed on Canvas.

RECOMMENDED READING: see files in CV for this session 9.

**IMPORTANT NOTE:** Today, 9AM (!) is closure time for choosing the preferred date for your team to present your team's topic. If your team has not declared your presentation date, your team will be assigned to a date (Sessions 10 through 12) by the TAs or Instructor.

**Thu 3/30: Session 10: Student Team Presentations/Discussions 1**

Check out posted presentations in Canvas.

**Thu 4/06: Session 11: Student Team Presentations/Discussions 2**

Check out posted presentations in Canvas.

**Thu 4/13: Session 12: Student Team Presentations/Discussion 3;**

(if not needed, then we will have a Regular or Guest Lecture on Topic TBD)

Check out posted presentations in Canvas.

**Thu 4/20, Session 13:** : International, City Based Efforts: **Guest Lecture** with Michael Berkowitz, CEO of 100 Resilient Cities, Rockefeller Foundation.

REQUIRED READING: TBA on Canvas

RECOMMENDED READING: see files in CV for this session 13.

**Thu 4/27: (Last) Session 14: Guest Lecture.** Topic and Speaker to be determined

REQUIRED READING: TBA on Canvas

OPTIONAL READING: TBA on Canvas

**IMPORTANT NOTE:** same day (4/27) is Term Paper Due Date. Deliver your **hardcopy** paper in person to instructor in classroom at the beginning of class **and** have **prior to class** uploaded a **PDF-file copy** of it electronically on the Canvas class website. No exceptions, no excuses "the printer broke down" etc. no late submissions, whether hard- or soft copy or otherwise!! Plan ahead!

=====End Of Session Descriptions=====

**COURSE REFERENCES (Incomplete, expect updates):**

Some are required reading, some are optional, as indicated for individual Sessions on Canvas/CourseWorks. If they are not downloadable files, check out books from combined CU/Barnard Libraries; this list is in alphabetic order, not sequenced by other priorities:

Abbott, Patrick L.: "Natural Disasters". 7th or later Edition. McGraw-Hill  
Birkmann, J. (Edit.) Measuring vulnerability to natural hazards: towards disaster resilient societies. Tokyo, New York: United Nations University Press, Dec. 2006, 524 p. [24 p. of plates]. (available on Course's E-Reserve !)

Bosher, Lee (Editor): "Hazards and the Built Environment – Attaining Built-In Resilience". 382 pages. Routledge, London & New York. 2008. ISBN 978-0-415-42730-2 (Paperback).

Burby, Raymond J., Cooperating with Nature. Joseph Henry Press,

Washington, D.C.; 1998; pp.356.

Burton, Ian; Kates, Robert W., and White, Gilbert P., *The Environment as Hazard*. 2nd revised Ed. New York: The Guilford Press: 1993. 290 pp.

Coch, Nicholas K., *Geohazards - Natural and Human*. Prentice Hall, Englewood Cliffs, NJ.: 1995 pp. 481.

Cardona, O.D. 2005: *Indicators of Disaster Risk and Risk Management: Program for Latin America and the Caribbean*. Summary Report. Washington, DC: Inter-American Development Bank, 43 pp.

<https://publications.iadb.org/bitstream/handle/11319/4801/Indicators%20of%20Disaster%20Risk%20and%20Risk%20Management.pdf?sequence=1>

and a related paper: <https://www.unisdr.org/2005/HFdialogue/download/tp3-paper-system-indicators.pdf>

Dilley, M., Chen, R.S., Deichmann, U., Lerner-Lam, A.L. and Arnold, M. with Agwe, J. Buys, P., Kjekstad, O., Lyon, B. and Yetman, G. (2005): *Natural Disaster Hotspots: A Global Risk Analysis*. Washington, D.C: International Bank for Reconstruction and Development/The World Bank and Columbia University.

<http://www.ldeo.columbia.edu/chrr/research/hotspots>

FEMA, *Multihazard - Identification and Risk Assessment*. The Cornerstone of the National Mitigation Strategy. FEMA, Washington DC. 1997. pp. 369 plus Appendices. <https://www.fema.gov/media-library/assets/documents/7251>

Godschalk, David R., Timothy Beatley, Philip Berke, David J. Brower, and Edward J. Kaiser, Charles. C. Bohl, and R. Mathew Goebel. *Natural Hazard Mitigation - Recasting Disaster Policy and Mitigation*. Washington DC: Island Press. 1999. 575 pp. <https://www.amazon.com/Natural-Hazard-Mitigation-Recasting-Disaster/dp/1559636025>

Hochrainer, S. (2006). *Macroeconomic Risk Management Against Natural Disasters: Analysis focused on governments in developing countries* (Paperback) approx. \$ 79.- , 201 pages, duv Publishers (December 1, 2006), ISBN-10: 3835005944; ISBN-13: 978-3835005945. Modified and updated versions of this book as reports:

[https://www.gfdrr.org/sites/gfdrr/files/Hocrainer\\_Macro\\_Impacts.pdf](https://www.gfdrr.org/sites/gfdrr/files/Hocrainer_Macro_Impacts.pdf)

<http://www.preventionweb.net/english/hyogo/gar/2013/en/bgdocs/Hocrainer%20et%20al.%202013.pdf>

Instituto de Estudios Ambientales (IDEA), National University of Colombia-Manizales, 2005: *Indicators of Disaster Risk & Risk Management: Program for Latin America & the Caribbean*. Summary Report. Washington, DC: Inter-American Development Bank, 53pp.

<https://publications.iadb.org/bitstream/handle/11319/4801/Indicators%20of%20Disaster%20Risk%20and%20Risk%20Management.pdf?sequence=1>

<http://idea.bid.manizales.unal.edu.co/documentos/Allan%20Lavell%20EM%20Barcelona%20Nov%202003.pdf>

<http://www.imf.org/external/np/seminars/eng/2013/caribbean/pdf/belize.pdf>

Kunreuther, Howard; Roth, Richards, *Paying the Price*. Joseph Henry Press, Washington, D.C. 1998. 300pp.

Mileti, Dennis S.: *"Disasters by Design - A Reassessment of Natural Hazards in*

the United States". Washington DC, Joseph Henry Press; 1999. pp. 351.

Perrow, Charles: "Normal Accidents. Living with High-Risk Technologies". Basic Books (US), 1999. pp. 386.

Smith, Keith: "Environmental Hazards: Assessing Risk and Reducing Disaster" 3rd edition, New York. Routledge; 2002;

Wisner, B., P. Blaikie, T. Cannon & I. Davis: "At Risk: Natural Hazards, People's Vulnerability, and Disasters. Routledge; 2004 (2nd Edition). ISBN 0-415-25216-4 (pbk);

United Nations Development Programme (UNDP). 2004: Reducing Disaster Risk: A Challenge for Development. New York: United Nation Development Programme, Bureau for Crisis Prevention and Recovery.

[http://www.planat.ch/fileadmin/PLANAT/planat\\_pdf/alle\\_2012/2001-2005/Pelling\\_Maskrey\\_et\\_al\\_2004\\_-\\_Reducing\\_Disaster\\_Risk.pdf](http://www.planat.ch/fileadmin/PLANAT/planat_pdf/alle_2012/2001-2005/Pelling_Maskrey_et_al_2004_-_Reducing_Disaster_Risk.pdf)

### **BASIC WEB RESOURCES (expect updates).**

Some of Which Provide Links To Other Helpful Sites and References

[http://en.wikipedia.org/wiki/Social\\_vulnerability](http://en.wikipedia.org/wiki/Social_vulnerability) (okay overview with links and references)

<http://reliefweb.int/> (by UN OCHA, searchable by country, Latest Emergencies, humanitarian relief actions in progress)

<https://www.disasterscharter.org/web/guest/home> maps/charts of current & recent events

<http://hisz.rsoe.hu/index.php> and <https://hisz.rsoe.hu/> displays current events globally

<https://hazards.colorado.edu/> (very good general research source,) i.e.:

<https://hazards.colorado.edu/resources/web-resources>

<http://temblor.net/> an excellent and up to date website on earthquakes

<http://www.ifrc.org> (Red Cross / Red Crescent); e.g. download:

<http://www.ifrc.org/en/publications-and-reports/world-disasters-report/world-disasters-report/>

<http://www.ifrc.org/en/publications-and-reports/world-disasters-report/wdr2010/> World Disaster Report 2010 - Focus on urban risk. Definitely check this out !!

<http://www.paho.org/> (PAHO)

<http://www.paho.org/disasters/>

[https://www2.usgs.gov/natural\\_hazards/](https://www2.usgs.gov/natural_hazards/) US Geological Survey. All natural hazards site, real time & generic

[http://sciencepolicy.colorado.edu/socasp/toc\\_img.html](http://sciencepolicy.colorado.edu/socasp/toc_img.html) (Societal Aspects of Weather)

<http://www.cred.be/> (Epidemiology of Disasters, Current Events, Data Bases)

<http://www.emdat.be/database> (International Disaster Data Base; excellent resource for your research; a MUST for your research !!)

<https://www.fema.gov/> (US Federal Emergency Management Agency)

### **Additional Web Sites:**

<http://www.iiasa.ac.at/Research/CAT/research.html>

<http://www.iiasa.ac.at/Research/CAT/links.html#hazards>

<http://www.iiasa.ac.at/Research/CAT/links.html>  
<https://epd.wisc.edu//dmc/>  
<https://www.gfdrr.org/> explore !!  
<http://siteresources.worldbank.org/INTUWM/Resources/340232-1205330656272/CitiesandClimateChange.pdf>  
<http://www.worldbank.org/en/topic/disasterriskmanagement>  
<https://www.usaid.gov/who-we-are>  
<https://www.usaid.gov/who-we-are/organization/bureaus/bureau-democracy-conflict-and-humanitarian-assistance/office-us>  
<http://www.who.int/en/>  
<http://www.who.int/hac/en>  
<http://www.unisdr.org>  
<http://reliefweb.int/>  
<http://reliefweb.int/disasters> check out current and recent disasters  
<http://www.undp.org>  
<http://www.undp.org/content/undp/en/home/search.html?q=disaster>  
<http://www.undp.org/content/undp/en/home/sustainable-development-goals/>  
<http://www.un.org/popin>  
<http://www.unfpa.org>  
<http://www.unfpa.org/publications>  
<http://www.unep.org>  
<http://web.unep.org/disastersandconflicts/>  
<http://www.grid.unep.ch/>  
<http://www.grid.unep.ch/index.php?lang=en>  
<https://www.ncdc.noaa.gov/gosic>  
<http://www.ldeo.columbia.edu/chrr> a CU-EI center for hazard and risk research  
<http://www.ldeo.columbia.edu/chrr/research/hotspots> Global Hotspots Project  
<https://riskcenter.wharton.upenn.edu/>  
<https://riskcenter.wharton.upenn.edu/publications/global-risks/>

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### **Important Dates and Method of Evaluation:**

<u>Item.....</u>	<u>Due Date.....</u>	<u>Grade Share</u>
General Class Participation .....	Entire Course.....	15%
Topic Outline (max 2 page)*.....	Thu Feb 16* .....	15%*
Oral Topic Presentations .....	3/30, 4/6, 4/13 .....	30%
Final 10-page term paper	Thu 4/27	40%

\* Note: You must have your topic discussed/approved via Email exchange with the instructor a week earlier, by the day of Session 4 (Thu, Feb 9).

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