

Syllabus
EESC V1201y, Spring 2011
Environmental Risks and Disasters
(<http://www.ldeo.columbia.edu/~ekstrom/Courses/V1201>)
Professor [Goran Ekstrom](mailto:ekstrom@ldeo.columbia.edu)
(845-365-8427, ekstrom@ldeo.columbia.edu)

Work:

Lectures Tuesday and Thursday, 9:10-10:25, 602 Hamilton Hall.

There will be problem sets. These will involve "scientific insight" type questions, calculations exploring physical relationships, and the statistical manipulation of data.

Discussion section meets once per week. Discussion will focus on topics relevant to the problem sets.

Text: *Natural Disasters, 7th edition* by P. L. Abbott (available at Book Culture). The 6th edition is also fine.

Lecture notes and additional readings will be posted on the course web site.

Lecture Topics:

Week 1. What is risk? (1).

- Lecture 1 (1/18): Introduction. Risks in many different forms.
 - Lecture 2 (1/20): Quantification of risk. The risk of dying. Chance and probability.
 - Reading: Abbott, Chapter 1.
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Week 2. What is risk? (2).

- Lecture 3 (1/25): Risk perception and adjusting to the risk. The value of life. Patterns of natural disaster losses.
 - Lecture 4 (1/27): The phenomenology of tornados. Atmospheric stability.
 - Reading: Probability and statistics handout. Abbott, Chapter 11.
 - First discussion section. (Discussion section meets once per week.)
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Week 3. Natural disasters (1).

- Lecture 5 (2/1): Mitigation of tornado hazards.
 - Lecture 6 (2/3): The phenomenology and effects of hurricanes.
 - Reading: Abbott, Chapter 11 and 13.
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Week 4. Natural disasters (2).

- Lecture 7 (2/8): Hurricane mechanics. The Coriolis effect.
 - Lecture 8 (2/10): Hurricane prediction and hazard mitigation.
 - Reading: Abbott, Chapter 13.
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Week 5. Natural disasters (3).

- Lecture 9 (2/15): Plate tectonics. Phenomenology of earthquakes.
 - Lecture 10 (2/17): Earthquake mechanics.
 - Reading: Abbott, Chapters 3 and 4.
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Week 6. Natural disasters (4).

- Lecture 11 (2/22): The effects of earthquakes. Mitigation of earthquake hazards.
 - Lecture 12 (2/24): Planning for earthquakes. Prediction and problems of mitigation.
 - Reading: Abbott, Chapters 5, 6, and 7.
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Week 7. Natural disasters (5).

- Lecture 13 (3/1): Phenomenology of volcanos. Volcano hazards.
 - Lecture 14 (3/3): Volcano prediction and hazard mitigation.
 - Reading: Abbott, Chapters 8 and 9.
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Week 8. Natural disasters (6).

- Lecture 15 (3/8): The hazard of impacts from space objects.
 - Lecture 16 (3/10): Midterm.
 - Reading: Abbott, Chapter 17.
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Spring Recess, 3/14 - 3/18

Week 9. Exposure risks (1).

- Lecture 17 (3/22): Exposure risks. Dose and response.
 - Lecture 18 (3/24): Radon. Biological effects of radiation.
 - Reading: Handout on exposure hazards.
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Week 10. Exposure risks (2).

- Lecture 19 (3/29): Exposure risks and radon epidemiology. Other exposures to radiation.
 - Lecture 20 (3/31): Asbestos and related health effects.
 - Reading: Handouts on radioactivity and radon.
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Week 11. Exposure risks (3).

- Lecture 21 (4/5): Exposure risks and asbestos. Arsenic and other exposure hazards.
 - Lecture 22 (4/7): Flooding and the hydrology of watersheds. River flow and river flooding.
 - Reading: Handout on asbestos. Abbott, Chapter 13.
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Week 12. Environmental change and control (1).

- Lecture 23 (4/12): Mitigation of flooding hazard.
 - Lecture 24 (4/14): Coastal processes and hazards.
 - Reading: Abbott, Chapter 13.
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Week 13. Environmental change and control (2).

- Lecture 25 (4/19): Coastal erosion and coastal development.
 - Lecture 26 (4/21): Global warming and sea-level change.
 - Reading: Abbott, Chapter 12.
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Week 14. Environmental change and control (3).

- Lecture 27 (4/26): How do we mitigate future risks when the future is far away?
 - Lecture 28 (4/28): Conclusion.
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*[Goran Ekstrom](#), Department of Earth and Environmental Sciences, Columbia University
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