

## Course and Contact Information

*Course:* “**Environmental Hazard Management**” - EMSE 6240 (CRN 87757)

*Course web page:* <https://blackboard.gwu.edu/> - PowerPoint lecture slides, syllabus, assignments, announcements, and other course-related information and updates will be available here. Please, check regularly.

## Instructor

*Name:* Iryna Payosova

*E-mail:* [irynap@gwu.edu](mailto:irynap@gwu.edu) and [ipayosova@yahoo.com](mailto:ipayosova@yahoo.com)

*Office hours:* By appointment, 6:30 PM – 7:30 PM on Mondays, in-person or online. To schedule either in-person or online meeting, please send the e-mail or WhatsApp message at least 2 hours in advance.

## Bulletin Course Description

This course is designed to serve as a bridge between crisis/emergency management and environmental management. The causes and effects of extreme natural and anthropogenic hazards will be explored, including: organizational responsibilities, shared governance, management approaches, environmental security, directed technologies, and the social factors related to environmental hazard assessment and risk reduction. An introduction and examples (case-studies) of the various types of natural, technological and social hazards will be provided. Hurricane Katrina, Chernobyl NPP accident, the oil fires in Kuwait, desert locust infestation, COVID-19, and other recent crises will be used to illustrate possible prevention, response and mitigation tools. Additionally, the course will focus on the cultural, institutional and technical capacities that bear upon environmental disaster management, global adjustment patterns, and national and international risk reduction and mitigation measures. The role of both intentional and unintentional anthropogenic influence in environmental hazards and disasters will be outlined. The emerging area of environmental security will be introduced as a response to intentional acts that use the environmental processes to propagate terror, property destruction, and death.

## Prerequisites

General familiarity with environmental science and policy concepts, as well as calculus, are assumed.

## Learning Outcomes

As a result of completing this course, students will be able to understand:

1. Terminology and concepts central to environmental hazard management process.
2. How to identify and analyze environmental, technological, and mixed hazards.
3. Importance of life-cycle approach when evaluating hazard/risk presented by engineering projects.
4. Historical context of environmental hazard management, emergency management and the evolution of hazards risk management, in the United States and internationally.
5. The concept of mitigation plan and how mitigation plan is developed.
6. How to scope vulnerability.
7. How to analyze and assess risk.
8. How to identify and assess risk reduction measures.
9. How risk reduction efforts may be financed and implemented.
10. What legislation and organizations, nationally and internationally, are relevant to the process of environmental hazard management.

**Average amount of direct instruction** or guided interaction with the instructor: 2.5 hours per week (150 minutes); **average minimum amount of independent** (out-of-class) learning expected: 5 hours per week (300 minutes). For additional details please refer to the official GW credit hour policy.

**Required Textbook and readings:**

Author(s)	Title	Edition
Keith Smith (Routledge of London and New York)	"ENVIRONMENTAL HAZARDS Assessing Risk and Reducing Disaster" <i>{EH}</i>	6 <sup>th</sup> or 7 <sup>th</sup>

- Before each class check the Blackboard website for extra reading assignments, documents or web links.

**Other recommended relevant books and sources:**

- *“Designing resilience: preparing for extreme events” {DR}* by L.K. Comfort, A. Boin and C.C. Demchak (University of Pittsburg Press).
- *“Risk and Uncertainty Assessment for Natural Hazards”*, Jonathan Rougier (Editor), Steve Sparks (Editor), Lisa J. Hill (Editor), Cambridge University Press; 1st edition (February 21, 2013).
- FEMA library: <https://www.fema.gov/tl/emergency-managers/practitioners/case-study-library>
- ThinkHazard.org
- EmDat.be
- ReliefWeb.int
- GFDRR.org
- WHO Global Health Observatory: <https://www.who.int/data/gho>

**Tentative Class Schedule**

Date, Th	Topics	Required readings and assignments
Aug. 22	1. Introduction to Environmental Hazard Management a. Administrative matters b. Class introductions c. Definitions and subject matter d. Course main focus: what is covered vs. not	{EH}: Chapter 1 & 14
Aug. 29	2. Classifying and measuring the dimensions of environmental disaster: a. Classification of natural and human-impact disasters involving the environment b. Audits of disaster and statistical analysis c. Aggravating factors (ReliefWeb.int)	{EH}: Chapter 2 & 3
Sept. 5	3. The role of risk assessment and disaster management	{EH}: Chapter 4 + Readings on BB, {EPP} pp. 16-21
Sept. 12	4. Responding to environmental hazards: accepting, mitigating, and sharing the loss a. Planning and responding to inevitable occurrences b. Planning and responding to "unexpected" disasters c. Disaster insurance and disaster aid	{EH}: Chapter 5 & readings on BB +{EPP} pp. 148-149
Sept. 19	5. Adjustment to hazard: Prevention and mitigation of loss due to environmental disaster: a. Engineered and physical structures b. Land use planning c. Legal and social controls	{EH}: Chapter 5 & readings on BB

Sept. 26	6. US & international legislation. Organizations.	{DR} Chapters 6, 11, 12; {EPP} pp. 231-232; 256-261; + Readings on BB; <a href="https://www.fema.gov/pdf/dae/200809.pdf">https://www.fema.gov/pdf/dae/200809.pdf</a> <a href="http://www.ifrc.org/publications/disaster-law-database/">http://www.ifrc.org/publications/disaster-law-database/</a> <a href="https://www.iea.ulaval.ca/en">https://www.iea.ulaval.ca/en</a>
<b>Oct. 3</b>	<b>Midterm exam</b>	
<b>Oct. 10</b>	<b>Fall break, no classes</b>	
Oct. 17	7. Severe storm hazards & tidal waves; hurricanes, typhoons, cyclones; Temperature extremes; wildfires	{EH}: Chapter 9; Chapter 10 sections B, F, G, H <a href="https://www.climate.gov/enso">https://www.climate.gov/enso</a> <a href="https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/">https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/</a> Hurricane forecasting: <a href="https://www.noaa.gov/explainers/hurricane-forecasting">https://www.noaa.gov/explainers/hurricane-forecasting</a>
Oct. 24	8. Hydrological hazards: a) Floods (natural, anthropogenic, mixed) b) Droughts (natural, anthropogenic, mixed)	{EH}: Chapters 11 & 12 Floods: <a href="https://www.wri.org/aqueduct">https://www.wri.org/aqueduct</a> Dust storms: <a href="https://www.earthdata.nasa.gov/learn/find-data/near-real-time/hazards-and-disasters/dust-storms">https://www.earthdata.nasa.gov/learn/find-data/near-real-time/hazards-and-disasters/dust-storms</a>
Oct. 31	9. Tectonic hazards: volcanoes Mass movements: landslides, snow avalanches	{EH}: Chapter 7 & 8 <a href="https://volcano.si.edu/gvp_currenteruptions.cfm">https://volcano.si.edu/gvp_currenteruptions.cfm</a> <a href="https://earthquakes.volcanodiscovery.com/">https://earthquakes.volcanodiscovery.com/</a>
Nov. 7	10. Tectonic hazards: earthquakes, tsunamis Group project progress reports (1 page + in-class presentation).	{EH}: Chapter 6 <a href="https://www.usgs.gov/programs/earthquake-hazards/hazards">https://www.usgs.gov/programs/earthquake-hazards/hazards</a>
Nov. 14	11. Epidemics. Famine. Displaced populations. Overpopulation of species/animal and insects infestation (including invasive species);	{EH}: Chapter 10 sections C, D, E; + Readings on BB Locust Watch: <a href="https://www.fao.org/locust-watch/en">https://www.fao.org/locust-watch/en</a> + archive of locust infestation maps: <a href="https://www.fao.org/ag/locusts/en/archives/1340/2517/2518/index.html">https://www.fao.org/ag/locusts/en/archives/1340/2517/2518/index.html</a> )
Nov. 21	12. Technological hazards: chemical, transport, nuclear. Wars & terrorism- induced environmental hazards and/or disasters.	{EH}: Chapter 13 + Readings on BB
<b>Nov. 28</b>	<b>Thanksgiving break, no classes</b>	
Dec. 5	13. Group projects presentations and final report; Brief review q's for final exam.	Readings on BB
<b>Dec. 12</b>	<b>Final exam</b>	
NOTE: In accordance with the university policy, final exam is scheduled during the final exam period and not in the last week of the semester.		

### Assignments and Grades

#### Grading

1. Mid-term examination 30%

2. Final examination	35%
3. Individual assignment	10%
4. Group case study assignment	20%
5. Class participation	5%

**Letter Grade**

97.00 – 100.00 A+	93.00 - 96.99 A	90.00 - 92.99 A-
87.00 - 89.99 B+	83.00 - 86.99 B	80.00 - 82.99 B-
77.00 - 79.99 C+	73.00 - 76.99 C	70.00 - 72.99 C-
67.00 - 69.99 D+	63.00 - 66.99 D	60.00 - 62.99 D-
≤ 59.99 F		

**(1-2) Examination (65 points total for midterm and final exam)**

Mid-term exam focuses on the material of the first part of the course. Final exam will be **cumulative**. Final exam will focus on the material from the second part of the course, and how to apply the concepts and skills learned in the first part of the course to prepare, address and mitigate various types of hazards. Both the midterm and final exams are closed books closed notes, no use of Internet is allowed, no communication with each other is allowed. Academic integrity policy applies.

Students are expected to be present at both the mid-term and final exam. If force majeure circumstances prevent you from attending the exam on a specified date/time, a make-up exam can be scheduled up to 2 (two) days before or after the official exam date, with proper verification of the circumstances and department approval. Failure to contact the instructor or lack of the valid reason for missing the exam will result in a grade of 0 for the exam.

**(3) Individual case study assignment (10 points total) due dates vary for each student**

Students will be asked to propose by the second class the topic from the lectures they would like to investigate in their individual assignment. The key requirement for the topic is that it should be either one of:

1. Have some relevance to student’s professional activity;
2. Have relevance to some events in student’s life, something you had first-hand experience of;
3. Be the case student has interest in and was extensively following/reading about in the past.

Students will be then asked to:

- 1) Using concepts learned in the course write an (up to) 3-page summary report (bibliography does not count in this page limit, charts/graphs/images if any do not count toward this page limit), and
  - 2) Prepare 5-10-minute presentation (with or without ppt slides) and present in class their “case study”.
- Students are expected to use various information sources: journals, Internet, talking to colleagues & friends, interviewing subject matter experts, library, etc. If textbook will be used as a sole source of information, the presentation will not receive full credit. There are no requirements for the format of the in-class presentation. It may be supported by several power point slides. It should be concise, with clear examples and key points. The presentation will be followed by questions from class and/or the instructor.

**(4) Group case study assignment (20 points total)**

In this assignment you will be offered to select the topic from the list, and will receive more specific instructions on what should be investigated and covered. This will be a group project, up to 3 people in each group. The group will analyze a real-life scenario, and answer accompanying questions, using the concepts and tools they learn in this course. Each group will submit the progress report **on November 7** (one page, 5 points), final report **on December 5** (up to 5 pages, 10 points), and will present their findings and recommendations in class (5 points). The grade will be given to the group/team; every member of a given team will receive the same grade as his/her teammates. Grading policy will also be posted on the course BlackBoard page in the “Announcements” section.

**(5) Class participation (5 points total)**

In each class instructor will ask questions based on the content of the lecture, the textbook, and additional readings assigned for that day. Students are encouraged to also ask questions in the class, initiate and engage in discussions. If you disagree with some points in the reading materials, or want to elaborate on them, please present your opinion. Class participation grade will be based on the answers to questions in class, and on participation level overall. Silent attendance of each class will not earn the full “class participation” grade.

**Appeals:** If you wish to appeal your grade on any assignment or exam, this may be done within five (5) days from the date when the grade is announced.

## University policies

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### Academic Integrity Code

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the [Code of Academic Integrity](#). If you have any questions about whether particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you should contact Conflict Education and Student Accountability (CESA), formerly known as Student Rights and Responsibilities (SRR), to learn more about your rights and options in the process. Consequences can range from failure of assignment to expulsion from the University and may include a transcript notation. For more information, refer to the CESA website at [students.gwu.edu/code-academic-integrity](http://students.gwu.edu/code-academic-integrity) or contact CESA by email [cesa@gwu.edu](mailto:cesa@gwu.edu) or phone 202-994-6757.

### University policy on observance of religious holidays

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Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see [provost.gwu.edu/policies-procedures-and-guidelines](http://provost.gwu.edu/policies-procedures-and-guidelines).

### Use of Electronic Course Materials and Class Recordings

Students are encouraged to use electronic course materials, including recorded class sessions, for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) if you have questions or need assistance in accessing electronic course materials.

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## Academic support

### Academic Commons

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[Academic Commons](#) is the central location for academic support resources for GW students. To schedule a peer tutoring session for a variety of courses visit [go.gwu.edu/tutoring](http://go.gwu.edu/tutoring). Visit [academiccommons.gwu.edu](http://academiccommons.gwu.edu) for study skills tips, finding help with research, and connecting with other campus resources. For questions email [academiccommons@gwu.edu](mailto:academiccommons@gwu.edu).

### GW Writing Center

GW Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at [gwu.mywconline](http://gwu.mywconline).

## Support for students in and outside the classroom

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### *Disability Support Services (DSS) 202-994-8250*

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) to establish eligibility and to coordinate reasonable accommodations.

### **Student Health Center** 202-994-5300, 24/7

The Student Health Center (SHC) offers [medical](#), [counseling/psychological](#), and [psychiatric](#) services to GW students. More information about the SHC is available at [healthcenter.gwu.edu](http://healthcenter.gwu.edu). Students experiencing a medical or mental health emergency on campus should contact GW Emergency Services at 202-994-6111, or off campus at 911.

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# GW Campus Emergency Information

GW Emergency Services: 202-994-6111

For situation-specific instructions, refer to [GW's Emergency Procedures guide](#).

## GW Alert

GW Alert is an emergency notification system that sends alerts to the GW community. GW requests students, faculty, and staff maintain current contact information by logging on to [alert.gwu.edu](#). Alerts are sent via email, text, social media, and other means, including the Guardian app. The Guardian app is a safety app that allows you to communicate quickly with GW Emergency Services, 911, and other resources. Learn more at [safety.gwu.edu](#).

## Protective Actions

GW prescribes four protective actions that can be issued by university officials depending on the type of emergency. All GW community members are expected to follow directions according to the specified protective action. The protective actions are Shelter, Evacuate, Secure, and Lockdown (details below). Learn more at [safety.gwu.edu/gw-standard-emergency-statuses](#).

### Shelter

- Protection from a specific hazard
- The hazard could be a tornado, earthquake, hazardous material spill, or other environmental emergency.
- Specific safety guidance will be shared on a case-by-case basis.

**Action:** Follow safety guidance for the hazard.

### Evacuate

- Need to move people from one location to another.
- Students and staff should be prepared to follow specific instructions given by first responders and University officials.

**Action:**

- Evacuate to a designated location.
- Leave belongings behind.
- Follow additional instructions from first responders.

### Secure

- Threat or hazard outside of buildings or around campus.
- Increased security, secured building perimeter, increased situational awareness, and restricted access to entry doors.

**Action:** Go inside and stay inside. Activities inside may continue.



## **Lockdown**

- Threat or hazard with the potential to impact individuals inside buildings.
- Room-based protocol that requires locking interior doors, turning off lights, and staying out of sight of corridor window.

### **Action:**

- Locks, lights, out of sight
- Consider Run, Hide, Fight

- **Classroom emergency lockdown buttons**

Some classrooms have been equipped with classroom emergency lockdown buttons. If the button is pushed, GWorld Card access to the room will be disabled, and GW Dispatch will be alerted. The door must be manually closed if it is not closed when the button is pushed. Anyone in the classroom will be able to exit, but no one will be able to get in.

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### **For joining the lectures virtually (for example during sick leave etc.):**

1. Course content, lecture slides and additional materials will be available on course page in the BlackBoard.
2. In-class lectures will be aired via Zoom. Video is not required, microphone and speakers/headphones will be needed.
3. GWU student support services are available (e.g., technical requirements and support, student services, obtaining a GWorld card, and state contact information) at [online.gwu.edu/student-support](https://online.gwu.edu/student-support)
4. Access to GW BlackBoard, e-mail, MS Office suit (Word, Excel, Power Point), Adobe/pdf, and Internet will be needed through this course.
5. Computer equipment requirements: computer, microphone, headphones/speakers, standard software as listed above.

The George Washington University  
Department of Engineering Management and Systems Engineering  
School of Engineering and Applied Science

**“Environmental Hazard Management”** (EMSE 6240) Syllabus agreement

I \_\_\_\_\_, on this day \_\_\_\_\_

have received the information regarding the course “Environmental Hazard Management” (EMSE 6240). I understand that this information is available in writing in the course syllabus. I have reviewed the information, have asked questions, and thoroughly understand my responsibilities as I participate in this course.

The information addressed included:

1. Description of the course.
2. Course prerequisites.
3. Learning outcomes that state descriptions of behaviors or skills that students will be able to demonstrate at the end of the course or unit. See [assessment.gwu.edu/course-assessment](http://assessment.gwu.edu/course-assessment).
4. Average amount of direct instruction or guided interaction with the instructor and average minimum amount of independent (out-of-class) learning expected per week.
5. Required textbooks and/or other materials and recommended readings.
6. Week-by-week schedule of topics to be presented.
7. Description of assignments and other course assessments that delineate how student performance will be evaluated.
8. Statement regarding the GW Academic Integrity Code.
9. Statement regarding the University policy on observance of religious holidays.
10. Statement regarding the use of electronic course materials and class recordings.
11. Information regarding Academic Commons and the GW Writing Center.
12. Information regarding Disability Support Services.
13. Information regarding the Student Health Center (medical, counseling/psychological, and psychiatric services)
14. GW campus emergency information.

I further understand that I have the opportunity to request additional information and/or explanation of the above as needed.

Student signature \_\_\_\_\_

Instructor signature \_\_\_\_\_