

Syllabus of Record

Program: CET Taiwan

Course Code / Title: (TP/ENVR 350) Environmental Risk Assessment and Urban Resilience

Contact Hours: 45

Recommended Credits: 3

Primary Discipline / Suggested Cross Listings: Environmental Studies / Urban Studies, Development Studies, East Asian Studies

Language of Instruction: English

Prerequisites / Requirements: None

Description

This course focuses on sustainable development, exploring environmental risks and urban resilience. The goal is to equip students with a deeper understanding of the disaster resilience and risk of their hometown. First, the course will introduce the concept of urban disaster resilience at a city scale and explain the relevant urban resilience frameworks and policies developed by the United Nations for sustainable development. To guide students in conducting urban resilience analysis of their own cities, the course will introduce the United Nations' recent resilience city assessment methods and conduct a case study of Taipei City.

The second half of the course will focus on environmental risk assessment. It will sequentially introduce common natural hazards in Taiwan, methods for assessing social vulnerability, and thus, understanding the disaster risks in the environment. Finally, the course will teach individual response strategies in the face of disasters, community-level disaster response strategies, and the establishment and operation of shelters. In the final report, students will design a disaster prevention plan for their own communities. To help students understand disaster risks and response measures, field study course components will include a Hazard Potential Environment Survey (bicycle required), a visit to the Taipei City Disaster Response Center, and a visit to a disaster shelter.

Objectives

From their participation in this course, students:

- Develop a comprehensive understanding of environmental risks and urban resilience, including the ability to assess vulnerabilities and strengths of urban systems.
- Acquire practical skills in conducting environmental risk assessments and developing strategies to enhance urban resilience through case studies and hands-on projects.
- Gain a deep knowledge of disaster management principles and practices, including preparedness, response, recovery, and mitigation.
- Cultivate a critical perspective on the complex interplay between environmental factors, social dynamics, and urban planning in shaping disaster outcomes.
- Demonstrate the ability to develop a community-based disaster prevention plan.

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Course Requirements

Students are expected to attend each class as outlined in the CET Attendance Policy. Active participation in the classroom is essential. Reading assignments average 50-80 pages per class.

Graded assignments include:

- **Class Participation:** Actively participate in class discussions. Students are to read all assigned materials before each class session and come prepared to participate thoughtfully in discussions.

Class Participation Grading Rubric

	A – 90-100% Exemplary	B – 80-89% Proficient	C – 70-79% Developing	D – 60-69% Unacceptable	F – 0-59% Missing
Frequency of class participation	Actively contributes 2+ times per meeting	Actively contributes at least 1 time per meeting	Actively contributes at least half of the time during term	Actively contributes less than half of the time during term	Does not contribute
Quality of class participation *	Contribution is always thoughtful, accurate, and constructive, frequently interacting with peers	Contribution is mostly thoughtful, accurate, and constructive, usually interacting with peers	Contribution is somewhat thoughtful, accurate, and constructive, sometimes interacting with peers	Contribution is rarely thoughtful, accurate, and constructive, rarely interacting with peers	Does not contribute or interact with peers
Level of class preparation	Always fully prepared and on task	Mostly prepared and on task	Somewhat prepared and on task	Rarely prepared and on task	Consistently unprepared and not on task

- **Midterm Report:**
 - Student groups will analyze the urban resilience of their own city, or a city of their choosing. Students create a learning website using free online resources (such as Google Site or Canvas) to present their analysis. The analysis should include an introduction to the *UNDRR's Disaster Resilience Scorecard for Cities* and apply **Level 1: Preliminary level** for an initial assessment, addressing key targets and

indicators from the Sendai Framework along with critical sub-questions. Students select their city as an example and, based on the *Scorecard* indicators, investigate publicly available local government disaster preparedness plans, policies, and research. Using the collected evidence, they will assess and score their city's disaster resilience, assigning a score between 0 and 3 for each of the 47 indicators. The full analysis will be presented on their website.

- Each student also leads a 10-minute presentation of their analysis. The presentation should include: (1) an introduction with basic information about their city, such as geographic location, climate, area, population, and major natural hazards, (2) an assessment of their city's disaster resilience based on the Preliminary level of the UNDRR's Disaster Resilience Scorecard for Cities, and (3) their personal reflections on the analysis process and findings.
- **Final research paper:** Using the content learned in this class, students must submit a community-based disaster prevention plan of their own city or city of their choosing as a final research paper. The individual paper should be 3,500-3,750 words and should include: (1) objectives; (2) an analysis of the area's disaster potential and history of past disasters; (3) recommendations on how to form volunteer-based disaster-preparedness teams; (4) an inventory of disaster-related resources in the area (such as schools, police, fire services, parks, hospitals or clinics, hardware stores, etc.); and (5) a matrix-style script presenting a disaster response procedure based on the most common disaster in the area. It should follow the APA academic format.

Grading

- Class Participation 20%
- Midterm Report Website Creation 20%
- Midterm Report Oral Presentation 20%
- Final research paper 40%

Readings

Adger, W. Neil. "Vulnerability." *Global Environmental Change* 16 (2006): 268-281.

Ahern, Jack. "From Fail-safe to Safe-to-fail: Sustainability and Resilience in the New Urban World." *Landscape and Urban Planning* 100, no. 4 (2011): 341-343.

Alexander, David E. "Resilience and Disaster Risk Reduction: An Etymological Journey." *Natural Hazards and Earth System Sciences* 13, no. 11 (2013): 2707-2716.

Allen, Katie M. "Community-based Disaster Preparedness and Climate Adaptation: Local Capacity-building in the Philippines." *Disasters* 30, no. 1 (2006): 81-101.

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- Birkmann, Jörn, ed. *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies*. Tokyo: United Nations University Press, 2006.
- Bohle, Hans-Georg, Thomas E. Downing, and Michael J. Watts. "Climate Change and Social Vulnerability: Toward a Sociology and Geography of Food Insecurity." *Global Environmental Change* 4, no. 1 (1994): 37-48.
- Brooks, Nick. "Vulnerability, Risk and Adaptation: A Conceptual Framework." Tyndall Centre for Climate Change Research Working Paper 38, 2003.
- Büyükközkın, Gülçın, Öykü Ilıcak, and Orhan Feyziođlu. "A Review of Urban Resilience Literature." *Sustainable Cities and Society* 77 (February 2022): 103579.
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- Cannon, Terry. "Vulnerability Analysis and the Explanation of Natural Disasters." In *Disasters, Development, and Environment*, edited by Ann Varley, 13-30. Chichester: Wiley, 1994.
- Coaffee, Jon. "Protecting the Urban: The Dangers of Planning for Terrorism." *Theory, Culture & Society* 26, no. 7-8 (2009): 343-355.
- Cutter, Susan L., Bryan J. Boruff, and W. Lynn Shirley. "Social Vulnerability to Environmental Hazards." *Social Science Quarterly* 84, no. 2 (June 2003): 242-261.
- Cutter, Susan L., Kevin D. Ash, and Christopher T. Emrich. "The Geographies of Community Disaster Resilience." *Global Environmental Change* 29 (2014): 65-77.
- Davoudi, Simin, Keith Shaw, L. Jamila Haider, Allyson E. Quinlan, Garry D. Peterson, Cathy Wilkinson, Hartmut Fünfgeld, Darryn McEvoy, Libby Porter, and Simin Davoudi. "Resilience: A Bridging Concept or a Dead End?" *Planning Theory & Practice* 13, no. 2 (2012): 299-333.
- Fistola, Romano, and Rosa Anna La Rocca. "Smart City Planning: A Systemic Approach." In *Establishing Bridges: Proceedings of the 6th Knowledge Cities World Summit (KCWS-2013)*, edited by Tan Yiđitcanlar and Melih Bulu, 9-13. Istanbul: Lookus Scientific, 2013.
- Folke, Carl. "Resilience: The Emergence of a Perspective for Social-Ecological Systems Analyses." *Global Environmental Change* 16, no. 3 (2006): 253-267.

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- Godschalk, David R. "Urban Hazard Mitigation: Creating Resilient Cities." *Natural Hazards Review* 4, no. 3 (2003): 136-143.
- Holling, C. S. "Understanding the Complexity of Economic, Ecological, and Social Systems." *Ecosystems* 4 (2001): 390-405.
- Hussel, Hans-Martin, and Richard J. T. Klein. "Climate Change Vulnerability Assessments: An Evolution of Conceptual Thinking." *Climatic Change* 75 (2006): 301-329.
- IPCC. *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 2022.
- Jabareen, Yosef. "Planning the Resilient City: Concepts and Strategies for Coping with Climate Change and Environmental Risk." *Cities* 31 (2013): 220-229.
- Kaika, Maria. "'Don't Call Me Resilient Again!': The New Urban Agenda as Immunology or What Happens When Communities Refuse to Be Vaccinated with 'Smart Cities' and Indicators." *Environment and Urbanization* 29, no. 1 (2017): 89-102.
- Keim, Mark E. "Building Human Resilience: The Role of Public Health Preparedness and Response as an Adaptation to Climate Change." *American Journal of Preventive Medicine* 35, no. 5 (2008): 508-516.
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- Meerow, Sara, Joshua P. Newell, and Melissa Stults. "Defining Urban Resilience: A Review." *Landscape and Urban Planning* 147 (2016): 38-49.
- Meerow, Sara, and Melissa Stults. "Comparing Conceptualizations of Urban Climate Resilience in Theory and Practice." *Sustainability* 8, no. 7 (2016): 701.
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- Sharifi, Ayyoob, and Yoshiki Yamagata. "Principles and Criteria for Assessing Urban Energy Resilience: A Literature Review." *Renewable and Sustainable Energy Reviews* 60 (July 2016): 1654-1677.
- Sharifi, Ayyoob, and Yoshiki Yamagata. "Urban Resilience Assessment: Multiple Dimensions, Criteria, and Indicators." In *Resilience-Oriented Urban Planning*, edited by Yoshiki Yamagata and Ayyoob Sharifi, 259-276. Cham: Springer, 2016.
- Smit, Barry, and Olga Pilifosova. "Adaptation to Climate Change in the Context of Sustainable Development and Equity." *Sustainable Development* 8, no. 2 (2003): 54-66.
- Smit, Barry, and Johanna Wandel. "Adaptation, Adaptive Capacity and Vulnerability." *Global Environmental Change* 16 (2006): 282-292.
- UN-Habitat and DiMUR. "City Resilience Action Planning Tool." 2020.
https://unhabitat.org/sites/default/files/2020/05/cityrap_tool_booklet_2020.pdf.
- UNDP and ODI. *An Analytical Review: A Decade of Urban Resilience*. New York: United Nations Development Programme and London: Overseas Development Institute, 2023.
- UNDRR. *Disaster Resilience Scorecard for Cities: Detailed Level Assessment*. Geneva: United Nations Office for Disaster Risk Reduction, July 2025.
- UNDRR. *Mapping the Campaign's Outcomes and Greatest Achievements in Brazil to Continue Building Urban Resilience*. Geneva: United Nations Office for Disaster Risk Reduction, 2022.
- UNISDR. *Words into Action Guidelines: National Disaster Risk Assessment*. Geneva: United Nations Office for Disaster Risk Reduction, 2017.

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United Nations. United Nations Common Guidance on Helping Build Resilient Societies. New York: United Nations, 2020.

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Outline of Course Content

Topic 1: Introduction to Urban Resilience and Environmental Risk Assessment

- Define urban resilience and environmental risk.
- Explore the relationship between the two concepts.
- Discuss the importance of urban resilience in the context of climate change and urbanization.

Topic 2: International Policy Frameworks for Shaping Urban Risk and Resilience and Global and Regional Initiatives to Strengthen Urban Resilience

- Examine international agreements and conventions related to disaster risk reduction and urban resilience.
- Analyze the role of international organizations in promoting urban resilience.

Topic 3: United Nations' Assessment Methods for Urban Resilience

- Explore the UN's Sustainable Development Goals (SDGs) and their relevance to urban resilience.
- Examine the UN's Sendai Framework for Disaster Risk Reduction and its implications for cities.

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- Discuss the UN's assessment tools and methodologies for measuring urban resilience.

Topic 4: Case Study: Urban Resilience Analysis of Taipei City

- Conduct an in-depth analysis of Taipei City's resilience to natural hazards.
- Assess the city's strengths and weaknesses in terms of disaster preparedness, response, and recovery.
- Develop recommendations for improving Taipei City's resilience.

Topic 5: Understanding Natural Hazards

- Explore the different types of natural hazards (e.g., earthquakes, floods, typhoons).
- Discuss the factors that contribute to the severity and frequency of natural hazards.
- Analyze the impacts of natural hazards on urban areas.

Topic 6: Social Vulnerability Assessment

- Define social vulnerability and its components.
- Explore the factors that contribute to social vulnerability.
- Discuss the relationship between social vulnerability and disaster risk.

Topic 7: Environmental Risk Assessment

- Define environmental risk and its components.
- Explore the methods used to assess environmental risk.
- Discuss the relationship between environmental risk and urban resilience.

Topic 8: Individual Preparedness for Disaster Risk

- Discuss the importance of individual preparedness.
- Provide practical tips for creating a disaster preparedness plan.
- Explore the role of technology in disaster preparedness.

Topic 9: Community-Based Response to Disaster Risk

- Explore the role of communities in disaster risk reduction.
- Discuss the benefits of community-based disaster management.
- Analyze case studies of successful community-based disaster response initiatives.

Topic 10: Establishment and Operation of Shelters

- Explore the different types of shelters.
- Discuss the planning and management of shelters.
- Analyze the challenges and opportunities associated with shelter operations.

Field Study Classes

- Field Study Class 1: Hazard Potential Environment Survey
- Field Study Class 2: Taipei City Disaster Response Center
- Field Study Class 3: Disaster Shelter