

**UNU Institute for the Advanced Study of Sustainability (UNU-IAS)**  
**Autumn 2017 Semester Course**

As of 11 July 2017

**Title of Course: Resilience and Adaptation Science (RAS)**

**Coordinators:** Dr. Riyanti Djalante, Dr. Osamu Saito,

**Course Schedule:** From 5 Oct. until 21 Dec. 2017

**Purpose and learning outcomes:** This course will cover a range of issues on the science and impacts of climate change, adaptation and mitigation to climate change, governance and climate resilience. Topics include climate and atmospheric science, hazard, risks, vulnerability and resilience assessment, impacts of climate change on the environment and in different sectors, adaptation and mitigation to climate change, governance of climate change from theories to implementations.

**Course Outline**

<b>Lecture</b>	<b>Date</b>	<b>Content</b>	<b>Instructor</b>
Lecture 1	3 Oct (Tue), 11:00-12:30	Introduction of the course	Dr. Riyanti Djalante Dr. Osamu Saito
Lecture 2	5 Oct (Thu) ( 14:30-17:30	Climate Change Science	Dr. Riyanti Djalante
Lecture 3	17 Oct. (Tue), 11:00-12:30	Climate Change Impacts: Air, Land, Biota	Dr. Riyanti Djalante
Lecture 4	19 Oct. (Thu), 11:00-12:30	Climate Change Impacts: Water, Ocean	Dr. Riyanti Djalante
Lecture 5	14 Nov. (Tue), 11:00-12:30	Key concepts: Hazards, vulnerability, risks, resilience and adaptive capacity	Dr. Riyanti Djalante
Lecture 6	16 Nov. (Thu), 11:00-12:30	Approaches for Measuring and Assessing Hazards, vulnerability, risks, resilience and adaptive capacity	Dr. Riyanti Djalante
Lecture 7	21 Nov. (Tue), 11:00-12:30	Climate Change Adaptation in different sectors: health, water	Dr. Riyanti Djalante
Lecture 8	23 Nov. (Thu), 11:00-12:30	Climate Change Adaptation in different sectors: agriculture, forestry	Dr. Riyanti Djalante Dr. Riyanti Djalante
Lecture 9	28 Nov. (Tue), 11:00-12:30	Integration of Disaster risk reduction and climate change adaptation at different scales	Dr. Riyanti Djalante
Lecture 10	29 Nov. (Wed), 11:00-12:30	Integration of Disaster risk reduction and climate change adaptation at different sectors	Dr. Riyanti Djalante
Lecture 11	30 Nov. (Thu), 9:30-11:00	Community based, and ecosystem-based DRR and CCA	Dr. Riyanti Djalante

Lecture	Date	Content	Instructor
Lecture 12	12 Dec. (Tue), 11:00-12:30	Governing climate change: Theories	Dr. Riyanti Djalante
Lecture 13	14 Dec. (Thu), 11:00-12:30	Governing climate change: From International Frameworks to actions at the national and local level	Dr. Riyanti Djalante
Lecture 14	19 Dec. (Tue), 11:00-12:30	Climate change mitigation	Dr. Riyanti Djalante
Lecture 15	21 Dec. (Thu), 11:00-12:30	Final exam	Dr. Riyanti Djalante

### **Assessment:**

- Class participation: 30%
- Assignments: 20%
- Final exam: 50%

### **Text books and reading materials:**

- Pachauri, Rupendra K., et al. *Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change*. IPCC, 2014.
- Intergovernmental Panel on Climate Change. *Climate Change 2014–Impacts, Adaptation and Vulnerability: Regional Aspects*. Cambridge University Press, 2014.
- Smit, Barry, and Johanna Wandel. "Adaptation, adaptive capacity and vulnerability." *Global environmental change* 16.3 (2006): 282-292.
- Gallopín, Gilberto C. "Linkages between vulnerability, resilience, and adaptive capacity." *Global environmental change* 16.3 (2006): 293-303.
- Klein, Richard JT, Robert J. Nicholls, and Frank Thomalla. "Resilience to natural hazards: How useful is this concept?." *Global Environmental Change Part B: Environmental Hazards* 5.1 (2003): 35-45.
- Turner, Billie L., et al. "A framework for vulnerability analysis in sustainability science." *Proceedings of the national academy of sciences* 100.14 (2003): 8074-8079.
- Adger, W. Neil, et al. "Social-ecological resilience to coastal disasters." *Science* 309.5737 (2005): 1036-1039.
- Thomalla, Frank, et al. "Reducing hazard vulnerability: towards a common approach between disaster risk reduction and climate adaptation." *Disasters* 30.1 (2006): 39-48.
- Vörösmarty, Charles J., et al. "Global water resources: vulnerability from climate change and population growth." *science* 289.5477 (2000): 284-288.
- Alcamo, Joseph, Martina Flörke, and Michael Märker. "Future long-term changes in global water resources driven by socio-economic and climatic changes." *Hydrological Sciences Journal* 52.2 (2007): 247-275.
- Costello, Anthony, et al. "Managing the health effects of climate change." *The Lancet* 373.9676 (2009): 1693-1733.
- Haines, Andy, et al. "Climate change and human health: impacts, vulnerability and public health." *Public health* 120.7 (2006): 585-596.
- Rosenzweig, Cynthia, and Martin L. Parry. "Potential impact of climate change on world food supply." *Nature* 367.6459 (1994): 133-138.
- Dale, Virginia H., et al. "Climate change and forest disturbances." *BioScience* 51.9 (2001): 723-734.

- Kirilenko, Andrei P., and Roger A. Sedjo. "Climate change impacts on forestry." *Proceedings of the National Academy of Sciences* 104.50 (2007): 19697-19702.
- Millar, Constance I., Nathan L. Stephenson, and Scott L. Stephens. "Climate change and forests of the future: managing in the face of uncertainty." *Ecological applications* 17.8 (2007): 2145-2151.
- Smit, Barry, and Mark W. Skinner. "Adaptation options in agriculture to climate change: a typology." *Mitigation and adaptation strategies for global change* 7.1 (2002): 85-114.
- Adger, W. Neil, et al. "Adaptation to climate change in the developing world." *Progress in development studies* 3.3 (2003): 179-195.
- Adger, W. Neil, Nigel W. Arnell, and Emma L. Tompkins. "Successful adaptation to climate change across scales." *Global environmental change* 15.2 (2005): 77-86.
- Füssel, H-M. "Adaptation planning for climate change: concepts, assessment approaches, and key lessons." *Sustainability science* 2.2 (2007): 265-275.
- Huq, Saleemul, et al. "Mainstreaming adaptation to climate change in least developed countries (LDCs)." *Climate Policy* 4.1 (2004): 25-43.
- Schipper, Lisa, and Mark Pelling. "Disaster risk, climate change and international development: scope for, and challenges to, integration." *Disasters* 30.1 (2006): 19-38.
- Betsill, M. M., & Bulkeley, H. (2006). Cities and the multilevel governance of global climate change. *Global Governance: A Review of Multilateralism and International Organizations*, 12(2), 141-159.
- Folke, Carl, et al. "Adaptive governance of social-ecological systems." *Annu. Rev. Environ. Resour.* 30 (2005): 441-473.
- Termeer, Catrien, Art Dewulf, and Maartje Lieshout. "Disentangling scale approaches in governance research: comparing monocentric, multilevel, and adaptive governance." *Ecology and society* 15.4 (2010).
- Walker, Brian, et al. "Resilience, adaptability and transformability in social-ecological systems." *Ecology and society* 9.2 (2004).
- Djalante, Riyanti, Cameron Holley, and Frank Thomalla. "Adaptive governance and managing resilience to natural hazards." *International Journal of Disaster Risk Science* 2.4 (2011): 1-14.
- Lebel, Louis, et al. "Governance and the capacity to manage resilience in regional social-ecological systems." *Ecology and Society* 11.1 (2006).
- Folke, Carl, et al. "Resilience and sustainable development: building adaptive capacity in a world of transformations." *AMBIO: A journal of the human environment* 31.5 (2002): 437-440.