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**SYLLABUS**

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**Managing the health risks of climate change**  
**G H/ENV H 418/518 (3 credits)**  
**Lectures Mondays / Wednesdays 2:30 – 3:50pm**  
**Room: Mary Gates Hall 231**

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**Instructors:**

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**Office hours** will be held after class or by appointment. Offices are at 4225 Roosevelt Way NE #100. Suite 2330. Telephone number: (206) 543-6342

**Requirements:** None. This is a broad course open to students without specific training in the areas of climate change, environmental sciences, and/or public health.

**Course description**

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Climate change is causing injuries, illnesses, and deaths, with increases in global temperature projected to further increase morbidity and mortality from most climate-sensitive health outcomes if actions are not taken to rapidly increase adaptation and reduce greenhouse gas emissions. Of particular concern are heat-related morbidity and mortality and ozone-related mortality if emissions needed for ozone formation remain high. Urban heat islands often amplify the impacts of heatwaves in cities.

Risks for some vector-borne diseases, such as malaria and dengue fever, are projected to increase with warming from 1.5°C to 2°C, including potential shifts in their geographic range and changes in their seasonal distribution. Undernutrition is projected to increase with additional warming. Separately, increasing concentrations of carbon dioxide are expected to reduce the nutritional quality of significant cereal crops. Other potentially large risks are insufficiently quantified, such as the impacts of climate variability and change on a range of climate-sensitive health outcomes, such as diarrheal diseases, occupational heat stress, mental health, and migration and displacement. Vulnerable populations and regions will be differentially affected, with the potential to increase poverty and inequities.

Adaptation (adjustments in response to actual or expected climatic shifts) and mitigation (efforts to reduce to the likelihood of dangerous climate change by limiting greenhouse gas emissions) are the primary policy responses to address the health risks of climate change. Health adaptation can reduce the current and projected burdens of climate-sensitive health outcomes over the short term in many countries, but the extent to which it could do so past

mid-century will depend on emission and development pathways. Under high emission scenarios, climate change will be rapid and extensive, leading to fundamental shifts in the burden of climate-sensitive health outcomes that will be challenging for many countries to manage. Unmanaged disease burdens could erode gains made in public health, economic development, and living standards worldwide. Sustainable development pathways could delay but not eliminate associated health burdens.

Students in this course will gain foundational knowledge in the health effects of climate change, methods for quantifying climate change health effects, adaptation needs and strategies, and health benefits of mitigation activities.

### **Overall learning objectives**

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Students will be able to:

- Identify the major health risks of climate variability and change, including the sources of vulnerability to those risks
- Analyze the methods and tools for assessing risks for specified populations domestically and in several international settings
- Enumerate key issues in implementing, monitoring, evaluating, learning from, and continuously updating, adaptation policies and programs
- Outline the health co-benefits of mitigation policies to reduce greenhouse gas emissions
- **Graduate student only** - Evaluate policy options to address the health risks of climate variability and change

### **Required readings**

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Required readings will be posted on Canvas and will include:

- IPCC Summary for Policy Makers for the Special Report on Warming of 1.5°C (2018)
- USGCRP 2018 *4<sup>th</sup> US National Climate Assessment: Human Health chapter*
- Watts et al. 2018 *Lancet Countdown on Health and Climate Change*

Students also will be assigned readings from the recent literature.

### **Expectations of students**

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Students are expected to prepare for and participate in class discussions, demonstrate knowledge of assigned readings, and demonstrate teamwork/professionalism. Grades for each assignment will be posted online, accessible through the course website. (see *Grades*)

### **Grades**

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Grading will be based on presentations and position papers (40%) and an independent project /paper (60%).

**Presentation 1:** Groups of students will develop a presentation and position paper (1,500 – 2,000 words excluding references) on an aspect of the national or international political context for managing the health risks of climate variability and change. Grading will be based on a clear statement of the issue(s) chosen, a description of the background and arguments to support a particular perspective, and the group's assessment of the validity and robustness of the chosen issue. The position paper and a copy of the presentation will be due **January 23rd at noon**. The presentation and position paper will be considered in grading and all members of a group will receive the same grade.

**Presentation 2:** Groups of students will develop a presentation and position paper (1,500 – 2,000 words excluding references) on *either* an aspect of communicating the health risks of climate change and options to manage these risks within the context of a local or national case study *or* the health co-benefits of climate change mitigation and options for pursuing mitigation by emphasizing health co-benefits within the context of a local or national case study. Grading will be based on a clear statement of the case study chosen and why, a description of how the case study is an example of best practice or an example of where communication could improve understanding or action on managing the risks of climate change, and a discussion of specific approaches to improve communication, with an evaluation of their likely effectiveness. The position paper and a copy of the presentation will be due **February 13th at noon**. The presentation and position paper will be considered in grading and all members of a group will receive the same grade.

**Project** (undergraduate student only): Each student will develop an individual paper on some aspect of managing the health risks of climate variability and change. This can be a subject covered by the readings or some other aspect of climate change that is of particular interest. A one-paragraph summary of the topic for the individual project will be due **February 6th at noon**. The paper will be 5-10 double-spaced pages and contain a minimum of 5 references that are peer-reviewed, scholarly articles found in scientific journals. The paper will be due **March 4th at noon**. Please include your last name in the file name.

**Project** (graduate student only): Each student will develop an individual paper on some aspect of managing the health risks of climate variability and change. This can be a subject covered by the readings or some other aspect of climate change that is of particular interest. A one-paragraph summary of the topic for the individual project will be due **February 6th at noon**. The paper will be 10-15 double-spaced pages and contain a minimum of 10 references that are peer-reviewed, scholarly articles found in scientific journals. In addition to the added length and number of references, it is expected that this paper reflects a level of thought and analysis reflective of a graduate student. The student will give a short presentation summarizing the case study for class discussion. The paper will be due **March 4th at noon**. Please include your last name in the file name.

### **UW Disability Statement**

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Access and Accommodations: Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you experience barriers based on a disability or temporary health condition, please seek a meeting with DRS to discuss and address them. If you have already established accommodations with DRS, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course.

Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu

### Academic Integrity Statement

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the SPH Academic Integrity Policy. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct website.

### Classroom climate

The UW School of Public Health seeks to ensure all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. We encourage students with concerns about the classroom climate to talk to your instructor, your advisor, a member of the departmental or SPH Diversity Committee and/or the program director. [vg@uw.edu](mailto:vg@uw.edu) is a resource for students with classroom climate concerns.

### Course session schedule:

Class	Instructor	Topic	Assigned Readings
<b>WEEK 1</b> Class 1 MON 1/7	Ebi	Introduction and overview	USGCRP <i>4<sup>th</sup> US National Climate Assessment: Human Health</i> chapter Watts et al. 2018 <i>Lancet Countdown</i>
<b>WEEK 1</b> Class 2 WED 1/9	Bond	Weather, climate, climate variability, and climate change	IPCC AR5 SPM Working Group I USCRP <i>Executive Summary Climate Science Special Report</i>
<b>WEEK 2</b> Class 3 MON 1/14	Ebi	Political context for climate science, process for international assessments, and progress toward mitigation goals	UNFCCC < <a href="https://unfccc.int/resource/docs/convkp/conveng.pdf">https://unfccc.int/resource/docs/convkp/conveng.pdf</a> > and the Paris Agreement < <a href="https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement">https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</a> >
<b>WEEK 2</b> Class 4 WED 1/16	Ebi	Framework for understanding and managing risks; vulnerability and adaptation assessments	Berry et al. 2018 (international) Ebi and Villalobos 2015 (guidance) Ebi et al. 2018 (indicators) Levison et al. 2018 (local)
<b>WEEK 3</b> MON 1/21	Martin Luther King Day		
<b>WEEK 3</b>	Ebi	Team presentations	

Class 5 WED 1/23		on political context	
<b>WEEK 4</b> Class 6 MON 1/28	Hess	Health and risk communication	Jang_CC_Frames_Twitter 2014 Maibach_CCHH_UC_2015 Six Americas
<b>WEEK 4</b> Class 7 WED 1/30	Ebi	Methods for assessing current and projecting health risks of climate change	Ebi et al. 2018 (detection attribution) Ebi et al. 2018 (risks 1.5_2C) Xun et al. 2010 (methods) WHO 2014: Exec Summary, Ch. 1, Ch. 8
<b>WEEK 5</b> Class 8 MON 2/4	Snow day		
<b>WEEK 5</b> Class 9 WED 2/6	Hess	Thermal extremes and their health impacts	Arbuthnott et al. 2016 Bunker et al. 2016 Gasparrini et al. 2015 Sanderson et al. 2017
<b>WEEK 6</b> Class 10 MON 2/11	Ebi	Extreme weather and climate events and their health impacts / disaster risk management	Bell et al. 2017 (overview) McGregor & Ebi 2018 (ENSO) Sampson et al. 2018 (floods) Schmitt et al. 2016 (economics) Yusa et al. 2015 (drought)
<b>WEEK 6</b> Class 11 WED 2/13	Ebi	Student presentations on communication	
<b>WEEK 7</b> MON 2/18	President's Day		
<b>WEEK 7</b> Class 12 WED 2/20	Ebi	Food security	Lindgren et al. 2018 (sustainable food systems) Loladze 2014 (micronutrients) Springmann et al. 2018 (sustainable diets) Weyant et al. 2018 (nutritional quality) Wheeler & von Braun 2013 (food security) Zhao et al. 2017 (crop yields) Zhu et al. 2018 (nutritional quality rice)
<b>WEEK 8</b> Class 13 MON 2/25	Morin	Infectious diseases	Levy et al. 2016 Semenza 2015

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<b>WEEK 8</b> Class 14 WED 2/27	Ebi	Air quality and its health impacts	Demain 2018 (asthma) Katelaris and Beggs 2018 (allergies) Landrigan et al. 2017 (overview) Orru et al. 2017 (ozone) Reid and Maestas 2018 (wildfires)
<b>WEEK 9</b> Class 15 MON 3/4	Ebi	Health system adaptation to climate change	Bowen 2013 (governance adaptation) Ebi et al. 2016 (using climate information) Ebi 2017 (lessons learned) Hess & Ebi 2016 (heat early warning systems) Morin et al. 2018 (vectorborne disease early warning systems) WHO 2015 (climate-resilient health systems)
<b>WEEK 9</b> Class 16 WED 3/6	Hess (panopto) / class time to work on presentations	Mitigation and health co-benefits	Chang et al. 2017 Quam et al. 2017 IPCC AR5 WGIII SPM
<b>WEEK 10</b> Class 17 MON 3/11		Student presentations of individual projects	
<b>WEEK 10</b> Class 18 WED 3/13		Student presentations of individual projects	
		NO Final Exam	