Course title: Climate Change and Public Health			
Course code: NRC 139	**No. of credits:** 3	**L-T-P:** 36-6-0	**Learning hours:** 42
Pre-requisite course code and title (if any):			
Department: Energy and Environment			
Course coordinator(s):	**Course instructor(s):**		
Contact details:			
Course type: Elective	**Course offered in:** 2nd Semester		

Course description

This course covers the public health effects of climate change from the perspectives of changing demographic and epidemiological transition and social and behavioural sciences. Attendees will learn how climate change impacts create risks for human health. The course will also address cross-cutting issues to climate change and health, and provide regional perspective to linkages between climate change and health in the context of South Asian countries.

Course objectives

- To build a strong perspective among students to the current public health challenges and its determinants of climate change.
- Describe global perspective to the major climatic risks to the human health and survival.
- To introduce students with the cross-cutting issues including food and nutrition, gender and social determinants of health and its linkages to climate change and public health.

Course Contents

Module	Topic	L	T	P
1.	**Introduction to Population Studies and Public Health** Basics of global demographic change; epidemiological transition; definition, scope and principles of public health; determinants of health.	4		
2.	**Climate Change and Public Health** Outlines some of the key issues related to climate change and health; direct and indirect effects of climate change on human health; what makes individuals and populations vulnerable to the effects of climate change	4		
3.	**Climate Sensitive Diseases and Mortality** Water stress, water- and foodborne diseases; vector borne diseases and climate change; air quality and human health; temperature extremes and its impact on mortality.	10	2	
4.	**Cross-Cutting Issues to Climate Change and Public Health** Climate change, food and nutrition; mental health, cognition and challenges to climate change; social determinants of health pathways for climate change; policy perspective: response, adaptation and mitigation to climate change in public health.	10	2	
5.	**Regional Perspective: Climate Change and Public Health in South Asia** This module discusses public health issues caused by climate change in south Asia: extreme temperature regions;	8	2	

	malaria and dengue; urbanization and health (urban heat island; industrial pollution and heat stress etc.); adaption responses to climate change on health.			
	Total	**36**	**6**	**0**

Evaluation procedure

- Test 1: 20%
- Assignment based presentation: 30%
- Test 3: 50%

Learning outcomes

At the end of the course, the students will be able to

- Understand the global demographic and epidemiological shift and its linkages to public health
- Understand climate change impact on health in the context of public health
- Understand emerging cross-cutting issues to climate change and public health

Pedagogical approach

Classroom teaching will involve power point presentations, case study analysis and assignment based seminar.

Materials

Suggested readings

1. Aleksandrowicz L, Green R, Joy EJM, Smith P, Haines A., 2016. The impacts of dietary change on greenhouse gas emissions, land use, water use, and health: a systematic review. *PLOS ONE*, 11: e0165797.
2. Campbell-Lendrum, D., Manga, L., Bagayoko, M. and Sommerfeld, J., 2015. Climate change and vector-borne diseases: what are the implications for public health research and policy? *Phil. Trans. R. Soc. B*, *370*(1665), p.20130552.
3. Costello, A., Abbas, M., Allen, A., et al., 2009. Managing the health effects of climate change. *The Lancet*, *373*(9676), pp.1693-1733.
4. Dhara, V.R., Schramm, P.J. and Luber, G., 2013. Climate change & infectious diseases in India: Implications for health care providers. *The Indian journal of medical research*, *138*(6), p.847.
5. Frumkin, H., Hess, J., Luber, G., Malilay, J. and McGeehin, M., 2008. Climate change: the public health response. *American Journal of Public Health*, *98*(3), pp.435-445.
6. Frumkin, H., McMichael, A.J. and Hess, J.J., 2008. Climate change and the health of the public. *American Journal of Preventive Medicine*, *35*(5), pp.401-402.
7. Hess, J.J., Eidson, M., Tlumak, J.E., Raab, K.K. Luber, G., 2014. An evidence-based public health approach to climate change adaptation. *Environmental health perspectives*, *122*(11), p.1177.
8. Kinney, P.L., 2008. Climate change, air quality, and human health. *American journal of preventive medicine*, *35*(5), pp.459-467.
9. Luber, G. and McGeehin, M., 2008. Climate change and extreme heat events. *American journal of preventive medicine*, *35*(5), pp.429-435.
10. McMichael, A.J., Woodruff, R.E. and Hales, S., 2006. Climate change and human health: present and future risks. *The Lancet*, *367*(9513), pp.859-869.
11. Mekonnen MM, Hoekstra AY., 2011 The green, blue and grey water footprint of crops and derived crop products. *Hydrol Earth Syst Sci*, 15: 1577–600.
12. Pathak H, Pramanik P, Khanna M, Kumar A., 2014 Climate change and water

availability in Indian agriculture: impacts and adaptation. *Indian J Agr Sci* 84: 671–9.
13. Patz, J.A., Campbell-Lendrum, D., Holloway, T. Foley, J.A., 2005. Impact of regional climate change on human health. *Nature*, *438*(7066), p.310.
14. Shindell, D., Kuylenstierna, J.C., Vignati, E., et al., 2012. Simultaneously mitigating near-term climate change and improving human health and food security. *Science*, *335*(6065), pp.183-189.

Website

1. United Nations Climate Change: https://unfccc.int/news/climate-change-impacts-human-health
2. Centre for Disease Control and Prevention: https://www.cdc.gov/

Journals

1. Bulletin of the World Health Organization: http://www.who.int/bulletin/en/
2. International Journal of Epidemiology: https://academic.oup.com/ije
3. Environmental Health Perspective https://ehp.niehs.nih.gov/
4. British Medical Journal: https://www.bmj.com/
5. Health & Place: https://www.journals.elsevier.com/health-and-place
6. Social Science & Medicine: https://www.journals.elsevier.com/social-science-and-medicine
7. International Journal of Environmental Research and Public Health: http://www.mdpi.com/ journal/ ijerph

Additional information (if any)

Student responsibilities

The students are expected to submit assignments in time and come prepared with readings when provided.

Course Reviewers

The course is reviewed by the following experts.

1. Dr. Sanghmitra S. Acharya, Professor, Centre of Social Medicine and Community Heath, Jawaharlal Nehru University (JNU), New Delhi.
2. Dr. Sutapa Aggrawal, Professor, Public Health Foundation of India (PHFI), New Delhi.