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Urban Resilience and Adaptation for India and Mongolia
curricula, capacity, ICT and stakeholder collaboration to support green & blue infrastructure and nature-based solutions

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Revised Course

Ecosystem Approach for Disaster Risk Reduction

Semester -I: July – December

Coordinator	Prof P K Joshi
Credits	4 Credits
Lecturers	Prof P K Joshi
Level	M.A.
Host institution	Special Centre for Disaster Research (SCDR), Jawaharlal Nehru University, New Delhi
Course duration	One Semester [July - December]

Summary

This one full semester elective course provides the Master level students of Disaster Studies the basic understanding of ecosystem and landscape approaches for disaster risk reduction. Besides, it will also introduce students to concepts, tools, methods of ecosystem, landscape and integrated for disaster risk reduction, specifically for climate and water related disasters. The course will touch upon frameworks at international, national and sub-national contexts. The course includes individual assignments.

Target Student Audiences

Semester - III Students of M.A.

Prerequisites

- Nil

Aims and Objectives

This course has been designed with a view to help students in developing a comprehensive understanding and knowledge of importance of integrating ecosystem-based disaster risk reduction into development planning. It would emphasize on the need and preparedness for ecosystem management, landscape approach and nature-based solutions for disaster risk reduction, climate change and development. The main objectives of the course are: (i) to help students in understanding disaster typology, risk, and their impacts; (ii) to comprehend ecosystem and landscape approaches and measures for disaster risk reduction; and (iii) to enumerate possible pathways, and options for disaster risk reduction and sustainable development.

General Learning Outcomes:

By the end of the course, students will successfully:

- Understand the disaster risk related factors and their impacts,
- Learn and appreciate importance of ecosystem and landscape-based disaster risk reduction and planning,
- Identify and visualize the entry points for integration ecosystem and landscape-based approaches in disaster risk reduction across sectors.

Overview of Sessions and Teaching Methods

The course will make most of interactive and self-reflective methods of teaching and learning including mainly lectures and presentations. It will start with an overview of integration ecosystem, environment and landscape to disaster-risk reduction concepts and related concepts. Subsequently it will build the science and practice of assessment methods and integration of geospatial approaches. The sessions will take help of blended teaching and learning approaches for interaction lecturing on different course components.

Course Workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)	Self-Study (hours)
In-class activities				
Lectures and Presentations	Introduction to the course work Basics and interconnections of ecology, environment and ecosystem. Introduction to EcoDRR, Natural resources management and traditional environmental wisdom and disasters.	Mid Semester Examination	06	06
Lectures and Presentations	Introduction to fundamentals of disaster risk reduction, Disaster typology and linkages of environment and ecosystem. Ecosystem Structure and Function, MDGs and SDGs, Convention of Biological Diversity, Biodiversity Act, 2002, Environmental Impact Assessment. , ~~development and disasters~~ ~~Revisiting the concepts of hazard, risk, vulnerability, disaster, mitigation, risk reduction and its evolution~~ ~~Disaster risk management (emergency, response, relief; resilience, reconstruction, recovery)~~	Mid Semester Examination	08	08

Lectures and Presentations	Disaster risk mitigation - evolution in the concept and framework from 'Response and Relief' to 'Mitigation and Preparedness'. Approaches in disaster management– engineering based solutions; community based solutions; ecosystem approach; landscape approach; integrative systems and NBS, and externality based response and relief approach, etc. Risk reduction, climate change adaptation and environment	Mid Semester Examination	06	06
Lectures and Presentations	Disaster risk management - UN-PEDRR (Partnership for Environment and Disaster Risk Reduction), Strategic Environmental Assessment (SEA) and its linkages with ecosystem approach to disaster risk reduction (EcoDRR). Legislations, Codes & Standards, Risk sensitive land use planning, Safety auditing in disaster risk planning, reduction and management	End Semester Examination	08	08
Lectures and Presentations	Tools and approaches for EcoDRR and CCA Millennium Ecosystem Assessment (MEA), Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), importance of the ecosystem services (provisioning, regulating, supporting and cultural) and human well being		06	06
Lectures and Presentations	Ecological and Landscape approaches, Integrated systems and NBS for mountain hazards: landslides, debris flow, rock fall and avalanches; coastal hazards: storms, flooding, rising sea level; urbanization: heat island effect, flooding, urban resilience; forest: fires, health and pest management, agriculture and water resources management and climate change. Integrated ecosystem management, water resources management, coastal zone management, fire management, protected area management and	End Semester Examination	06	06

	community based ecosystem and disaster risk management			
Lectures and Presentations	Geospatial tools for ecosystem and Landscape based disaster risk reduction (decision tools). Cost Benefit Analysis for EcoDRR ~~for Ecosystem-Based Disaster Risk Reduction Interventions~~	End Semester Examination	06	06
Independent work				
Individual Assignments	Ability to interpret data, and to use the concepts, tools, and methods for communicating information	Individual Presentations	10	10
Total			***56***	***56***

Grading

The students' performance will be based on the following:

- Quizzes/Surprise Test – 10%
- Mid Semester Examination – 30%
- End Semester Examination – 50%
- Individual Assignments – 10%

Grade	Grade Point	FGPA	Class/Division
A+	9	8.5 and above	High First Class
A	8	7.5 and above but less than 8.5	Middle First Class
A-	7	6.5 and above but less than 7.5	Lower First Class
B+	6	5.5 and above but less than 6.5	High Second Class
B	5	4.5 and above but less than 5.5	Middle Second Class
B-	4	3.5 and above but less than 4.5	Lower Second Class
C+	3		
C	2		
C-	1		
F	0		

Course Schedule: **Semester-III: July - December**

Course Assignments

The Structure of Individual Assignments will be as follows:

- Conducting Interviews in the field.
- Review of research articles and working paper with given objectives.

Literature

- Buyck, C., Miththapala, S., Monty, F., and Murti, R. (2017). Ecosystems protecting infrastructure and communities: lessons learned and guidelines for implementation. IUCN

- Depietri, Y., McPhearson, T. (2017). Integrating the Grey, Green, and Blue in Cities: Nature-Based Solutions for Climate Change Adaptation and Risk Reduction. In: Kabisch, N., Korn, H., Stadler, J., Bonn, A. (eds) Nature-Based Solutions to Climate Change Adaptation in Urban Areas. Theory and Practice of Urban Sustainability Transitions. Springer, Cham. https://doi.org/10.1007/978-3-319-56091-5_6
- de Macedo et al. (2021) Urban green and blue infrastructure: A critical analysis of research on developing countries. Journal of Cleaner Production. Vol. 313, 127898 https://doi.org/10.1016/j.jclepro.2021.127898
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- Makino, Y., Hofer, T., Azdad, M., Bari, F. (2021). Resilient Watershed Management: Landscape Approach to Climate Change and Disaster Risk Reduction. In: Sassa, K., Mikoš, M., Sassa, S., Bobrowsky, P.T., Takara, K., Dang, K. (eds) Understanding and Reducing Landslide Disaster Risk. WLF 2020. ICL Contribution to Landslide Disaster Risk Reduction. Springer, Cham. https://doi.org/10.1007/978-3-030-60196-6_40
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- Reed, J., van Vianen, J., Deakin, E.L., Barlow, J., & Sutherland, T. (2016). Integrated landscape approaches to managing social and environmental issues in the tropics: learning from the past to guide the future. Global Change Biology, 22, 2540–2554, doi: 10.1111/gcb.13284
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- Renaud, F., Sudmeier, K. and Estrella, M. (eds) (2013). Role of ecosystems in disaster risk reduction, United Nations University Press, New York
- Sudmeier, K. et.al. (2006) Ecosystems, Livelihoods and Disasters. An Integrated Approach to Disaster Risk Management. Gland: IUCN
- Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J. L., Sheil, D., Meijaard, E., Venter, M., Boedhihartono, A.K., Day, M., Garcia, C., van Oosten, C., & Buck, L.E. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. Proceedings of the national academy of sciences 110(21), 8349-8356.