



# Man and Tropical Forest Ecosystem Function

## Semester -I: July – December

Coordinator	Prof S C Garkoti
Credits	2 Credits
Lecturers	Prof S C Garkoti
Level	M.Phil. (Pre-Ph.D.)
Host institution	School of Environmental Sciences (SES), Jawaharlal Nehru University, New Delhi
Course duration	One Semester [January - June] Started in January 2021

### Summary

This one full semester compulsory course provides the Pre-Ph.D. level students of Environmental Sciences the basic understanding of interactions between man and tropical forest ecosystem and its functions.

### Target Student Audiences

Semester - I Students of M.Phil. (Pre-Ph.D.)

### Prerequisites

- Nil

### Aims and Objectives

This course has been designed with a view to help students in developing a comprehensive understanding and knowledge on concepts man and forest interaction with greater degree of emphasis on forest ecosystem functions. The course work touches upon fundamental concepts of forest ecosystem function at stand level to global perspectives. The course provides a strong ecological perspective and understanding of forest, its structure and functions. The main objectives of the course are: (i) to help students in understanding forest ecosystem functions; and (ii) to comprehend this knowledge to understand its linkages with human beings.

### General Learning Outcomes:

By the end of the course, students will successfully:

- Understand the tropical forest functions,
- Learn and appreciate importance of forest ecosystem structure and functions and their interlinkages with human presence.

### 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 Ecosystem and related concepts. Subsequently it will build the science of ecosystem succession, structure and functional aspects. The sessions will be 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)
<b>In-class activities</b>			
Lectures and Presentations	Ecosystem concept-Temporal and spatial dimensions; Sustainable. Development concept-Spatial and temporal dimensions.	Mid Semester Examination	05
Lectures and Presentations	Carbon fluxes: Carbon pools and fluxes, Decomposition and stabilization of organic matter, Net ecosystem production, Phenology as strategy to optimize carbon gains, Nutrient partitioning, Nutrient resorption. Forest hydrological processes, Perturbations and forest ecosystem properties. Water fluxes: Water uptake by trees, Tree water relations: Water transport from soil to plants, Xylem water transport, Phloem water transport, Transpiration, Responses of plants to drought.	Mid Semester Examination	05
Lectures and Presentations	Forest ecosystem function: General characteristics; Primary productivity of forest ecosystems, litter production and decomposition, nutrient cycling and nutrient conservation strategies, plant water relations.	Mid Semester Examination	05
Lectures and Presentations	Forest ecosystem function: Global change and forest ecosystem, Climate change, - Biodiversity depletion, Biological invasion.	End Semester Examination	05
Lectures and Presentations	Various facets of biodiversity, Biodiversity assembly rules and environment filters, Species identity and dominance effects on ecosystem processes, Biodiversity effect on biomass production, Biodiversity effects on ecosystem multifunctionality, Mechanisms underlying biodiversity-ecosystem functioning relationships, value of biodiversity-ecosystem functioning.	End Semester Examination	05
Lectures and Presentations	Natural versus Human managed ecosystems; Complex agroecosystems of traditional societies. Structure and organization, stability and resilience; forest ecosystem function as related to social economic and cultural perceptions of traditional societies; Indicators of sustainable development; Rural ecosystem rehabilitation; Value of traditional science and technology for sustainable management of natural resources; People's	End Semester Examination	05



	perception of environment and development and community participation; Why people's participation? Conceptual issues of Humans as part of ecosystem function.		
<b>Total</b>			<b>30</b>

## Grading

The students' performance will be based on the following:

- Quizzes/Surprise Test – 20%
- Mid Semester Examination – 30%
- End Semester Examination – 50%

Course Schedule: **Semester-I: January - June 2021**

## Course Assignments

The Structure of Individual Assignments will be as follows:

- Reading of research articles and working paper with given objectives.
- Participation in ground discussion and classroom interactions

## Literature

- Leith, H., and Werger, M.J.A. (1989). Tropical Rain Forest Ecosystem. Biographical and Ecology Studies, A volume in Ecosystems of the World. Elsevier B.V., pp 713.
- Odum, E.P., and Barrett, G.W. (2004). Fundamentals of Ecology. Brooks/Cole; 5th Revised edition, pp 624.
- Singh, J.S, Singh, S.P., and Gupta, S.A. (2017). Ecology Environmental Science and Conservation. S. Chand (G/L) & Company Ltd, pp 944.
- Grey, Z. (2020). The Man of the Forest: Original Text. Independently Published, pp 302.
- Sinch, V.P. (2004). Tropical Forest Ecosystems Structure and Function. Scientific Publishers, pp 305.
- Garkoti, S.C., Van Bloem, S.J., Fule, P.Z., and Semwal R.L. (2019). Tropical Ecosystems: Structure, Functions and Challenges in the Face of Global Change. Springer; 1st ed. 2019 edition, pp 320.
- Ghazoul, J., and Sheil, D. (2010). Tropical Rain Forest Ecology, Diversity, and Conservation. OUP Oxford, pp 536.
- Montagnini, F., and Jordan, C.F. (2005). Tropical Forest Ecology: The Basis for Conservation and Management (Tropical Forestry). Springer-Verlag Berlin Heidelberg, pp 306.
- Kricher, J. (2011). Tropical Ecology. Princeton University Press, pp 704.