Ecosystem Processes

Semester -I: July – December

Coordinator	Prof P K Joshi
Credits	2 Credits
Lecturers	Prof P K Joshi
Level	M.Phil. (Pre-Ph.D.)
Host institution	School of Environmental Sciences (SES), Jawaharlal Nehru University, New Delhi
Course duration	One Semester [July - December] Started in July 2020

Summary

This one full semester compulsory course provides the Pre-Ph.D. level students of Environmental Sciences the basic understanding of concepts and applications of ecosystem processes through interdisciplinary approach.

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 and applications of ecosystem processed. In the recent years it has become increasingly evident that human activities and practices produce significant changes in the status of the environment and global climate. The course provides an ecosystem perspective to look at these changes and advocates for ecosystem/landscape approach to understand them and find solutions. The main objectives of the course are: (i) to help students in understanding ecosystem processed; and (ii) to comprehend approaches and measured for ecosystem/landscape assessment.

General Learning Outcomes:

By the end of the course, students will successfully:

- Understand the Ecosystem components,
- Learn and appreciate importance of ecosystem processes and their interlinkages with human environment,

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)
In-class activities			
Lectures and Presentations	**Introduction to Ecosystem** *Introduction to the term* Levels of Organization Trophic Dynamics Ecosystem Model Ecological Pyramids Ecosystem Processes *Concept of Planetary Boundary* Ecosystem Organization, Design *Homeostasis* Gaia Hypothesis CLAW Hypothesis *Succession/Ecological Succession* Primary and Secondary Succession Theories of Ecological Succession *Ecological Stability and Diversity* Theories of ecological stability Resistances, Resilience	Mid Semester Examination	10
Lectures and Presentations	**Primary Production** Processes and Factors Ecosystem Production Whole Lake Experiments Trophic Cascade hypothesis Disturbances including Climate Change Measuring Primary Production	Mid Semester Examination	08
Lectures and Presentations	**Trophic Dynamics - I** Trophic Level Autotrophic vs. heterotrophic systems Ecological Pyramids Food Chain/Web – Energy Transfer Niche Models and Ecological efficiencies	End Semester Examination	05
Lectures and Presentations	**Trophic Dynamics – II** Global Biogeochemical Cycles (Carbon, Hydrogen, Oxygen, Nitrogen, Sulphur, Phosphorus) Disruption of Biogeochemical Cycles and its consequences International Programs on Ecosystem Processes Ecological Restoration to Ecosystem Management Recovery (Ecosystem and Landscape approaches)	End Semester Examination	07
Total			***30***

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: July - December 2020

Course Assignments

The Structure of Individual Assignments will be as follows:

- Review of research articles and working paper with given objectives.

Literature

- Molles, M.C. (2015). Ecology: Concepts and Applications. McGraw-Hill Education; 7th edition, pp 592.
- Singh, J.S, Singh, S.P., and Gupta, S.A. (2017). Ecology Environmental Science and Conservation. S.Chand (G/L) & Company Ltd, pp 944.
- Singh, J.S, Singh, S.P., and Gupta, S.A. (2006). Ecology, Environment and Resource Conservation. Anamaya Publishers, pp 688.
- Begon, M., Townsend, C.R., Harper, J.L. (2005). Ecology from Individuals to Ecosystems. Wiley-Blackwell; 4th edition, pp 750.
- Cain, M.L., Bowman, W.D., and Hacket, S.D. (2014). Ecology. Sinauer; 3rd ed. 2014 edition, pp 648.
- Odum, E.P., and Barrett, G.W. (2004). Fundamentals of Ecology. Brooks/Cole; 5th Revised edition, pp 624.