**GOVERNMENT POSTGRADUATE COLLEGE, AMBALA CANTT.**

**SESSION : 2023-24**

**NAME OF FACULTY: DR ROHINI SINGH**

**Sub. Code : Bot 05, Name of course: Ecology**

**Syllabus**

Max. Marks – 40 External: 40

Min. marks : 16 Internal Assessment-10

Time – 3 Hrs.

**Note:** Five questions to be attempted in all, selecting two questions from each unit. Question No. 1 will be compulsory (short answer type). Nine questions are to be set spread over the entire syllabus. All questions carry equal marks.

**UNIT-I**

**Introduction to Ecology**: Definition; scope and importance; levels of organization.

**Environment**: Introduction; environmental factors- climatic (water, humidity, wind, light, temperature), edaphic (soil profile, physico-chemical properties), topographic and biotic factors (species interaction).

Adaptations of plants to water stress and salinity (morphological and anatomical features of hydrophytes, xerophytes and halophytes).

**Population Ecology**: Basic concept; characteristics; biotic potential, growth curves; ecotypes and ecads.

**UNIT-II**

**Community Ecology**: Concepts; characteristics (qualitative and quantitative-analytical and synthetic); methods of analysis; ecological succession.

**Ecosystem**: Structure (components) and functions (trophic levels, food chains, food webs, ecological pyramids and energy flow) Biogeochemical Cycles: carbon and nitrogen; hydrological (water) cycle.

**Phyto-geography**: Phyto-geographical regions of India; vegetation types of India (forests).

**Environmental Pollution**: Sources, types and control of air and water pollution.

**Global Change**: Greenhouse effect and greenhouse gases; impacts of global warming; carbon trading.

**Suggested Readings**:

1. Kocchar, S.L. 1998: Economic Botany in Tropics, 2nd edition, MacMillan India Ltd., New Delhi.

2. Sambammurthy, A.V.S.S. And Subramanyam, N.S. 1989: A Textbook of Economic Botany, Wiley Eastern Ltd., New Delhi.

3. Sharma, O.P. 1996: Hills Economic Botany (Late Dr. A.F. Hill adapted by O.P. Sharma), Tata McGraw Hill Co. Ltd., New Delhi.

4. Simpson, B.B. and Conner-Ogorzaly, M. 1986: Economic Botany- Plants in our World, McGraw Hill, New York.

**Course Objectives:** This course aims to critically engage students with the concepts of ecological principles, biodiversity, population, community, ecosystem structure and function.

The course objectives of course ‘Ecology’ are as below:

* **Understanding of concept of Ecology:** To understand the concept of ecology.
* **Environment:** To understand the environmental factors- climatic (water, humidity, wind, light, temperature), edaphic (soil profile, physico-chemical properties), topographic and biotic factors (species interaction).
* **Understanding of Adaptations:** To understand the adaptations of plants to water stress and salinity (morphological and anatomical features of hydrophytes, xerophytes and halophytes).
* **Population Ecology:** To understand the Basic concept and characteristics of population ecology, biotic potential, growth curves; ecotypes and ecads.
* **Community Ecology**: To understand the Concepts and characteristics of community(qualitative and quantitative-analytical and synthetic); methods of analysis; ecological succession.
* **Ecosystem**: To understand the structure (components) and functions of trophic levels, food chains, food webs, ecological pyramids and energy flow.
* **Biogeochemical Cycles:** To understand the Carbon and nitrogen; hydrological (water) cycle..
* **Phyto-geography**. To understand the Phyto-geographical regions of India; vegetation types of India (forests).
* **Environmental Pollution**: To understand the sources, types and control of air and water pollution.
* **Global Change:** Greenhouse effect and greenhouse gases; impacts of global warming; carbon trading.

**Course Outcomes:**

After the successful completion of the course, students will be able to:

* Students can explain the concept of environmental factors- climatic (water, humidity, wind, light, temperature), edaphic (soil profile, physico-chemical properties), topographic and biotic factors (species interaction).
* Students will be able to explain the concept of Adaptations of plants to water stress and salinity (morphological and anatomical features of hydrophytes, xerophytes and halophytes).
* Students will be able to describe the Basic concept of characteristics of population ecology, biotic potential, growth curves; ecotypes and ecads.
* They can explain the Concepts and characteristics (qualitative and quantitative-analytical and synthetic) of community ecology.
* They can explain the Concepts of ecological succession.
* Students can describe the structure(components) and functions (trophic levels, food chains, food webs, ecological pyramids and energy flow)
* Students can describe Carbon and nitrogen; hydrological (water) cycle.
* They can briefly explain the Phyto-geographical regions of India; vegetation types of India (forests).
* Students can briefly explain the sources, types and control of air and water pollution.
* They can describe the Greenhouse effect and greenhouse gases; impacts of global warming and carbon trading..

These objectives collectively aim to equip students with a comprehensive understanding of theoretical and practical knowledge of ecological concepts. By covering these topics, students will learn about the method of analysis of community. They will be thoroughly informed about the important phyto geographical regions, mega biodiversity centers of India. They will also get familiar with the global level changes in the environment and how to mitigate the environmental issues and carbon trading concepts. So after complete term they will know the environment in a better way and therefore will adopt the sustainable strategies for using natural resources.

# Lesson Plan

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| **Week**  **No** | **Scheduled Dates** | **Topics to be covered** |
| **1** | **1-5 August** | Origin, distribution, botanical description, brief idea of cultivation and uses of Rice. Class test |
| **2** | **7-12August** | Origin, distribution, botanical description, brief idea of cultivation and uses Wheat . Class test |
| **3** | **14-19 August** | Origin, distribution, botanical description, brief idea of cultivation and uses of Maize. Class test |
| **4** | **21-26 August** | Origin, distribution, botanical description, brief idea of cultivation and uses of Pulses- (Gram, Arhar and Pea).  Origin, distribution, botanical description, brief idea of cultivation and uses of Vegetables- (Potato, Tomato and Onion). |
| **5** | **28-31 August** | Origin, distribution, botanical description, brief idea of cultivation and uses of Fibers- Cotton, Jute and Flax. Class test |
| **6** | **1-2 September** | Origin, distribution, botanical description, brief idea of cultivation and uses of Oils- Groundnut, Mustard and Coconut. |
| **7** | **4-9 September** | Morphology of plant part used, brief idea of cultivation and uses of the following: Spices- Coriander, Ferula, Ginger, Turmeric, Cloves. |
| **8** | **11-16 September** | Morphology of plant part used, brief idea of cultivation and uses of the following Medicinal Plants- Cinchona, Rauwolfia, Atropa, Opium, Cannabis, Neem. Class test |
| **9** | **18-23 September** | Botanical description and processing of: Beverages- Tea , Class test |
| **10** | **25-30 September** | Botanical description and processing of Coffee, Class Test |
| **11** | **2-7 October** | Morphology of plant part used, brief idea of cultivation and uses of the Rubber- Hevea, Student seminar |
| **12** | **9-14 October** | Morphology of plant part used, brief idea of cultivation and uses of the Sugar- Sugarcane, Student seminar |
| **13** | **16-21 October** | General account and sources of timber; energy plantations and bio-fuels ,Student seminar |
| **14** | **23-28 October** | Final Test, Previous Year Question Papers Discussion , |
| **15** | **30-31 October** | Assignments, and REVISION of Contents |
| **16** | **1-4 Nov.** | Student seminar |
| **17** | **6- Nov12** | Student’s querries |