Institute of Botany
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline
Semester – IV

Programme	BS Botany	Course Code	Bot-209	Credit Hours	2
Course Title	**Principles of Plant Ecology (Theory)**				

Introduction

The course is organized to provide information about main concept of ecology and its major divisions. It focuses on study of different ecological factors. Macroclimatic and microclimatic factors, dynamic and complex nature of plant and environment are also discussed.

Learning Outcomes

After completing the course, the students will be able to:

- describe and debate various global and regional ecological concerns that affect various forms of life.
- They will be able to determine impact of human activities on the life forms and the plant ecology.
- The students will acquire knowledge about the hazardous effects of different ecological factors and relative measures for their control/prevention.

Course Contents

- **Introduction:** The seven major autecological factors and their detail. Adaptations in plants in response to ecological factors.
- **The Soil Factor:** Definition and importance of soil: Concept of texture and structure; Physical and chemical properties of soil; Soil formation and parent materials; Soil porosity; Organic and inorganic components; Living inhabitants of soil.
- **The Water Factor:** Importance of water to plants; Forms of atmospheric moisture; Forms of precipitation and their ecological effects. Soil moisture constants.
- **Light and Temperature Factors:** Introduction; Comparison of tropical, temperate and polar regions; Temporal and spatial variations in light and temperature; Role of light and temperature in plant distribution and diversity; Responses and adaptations of plants to light and temperature; Differences in Heliophytes and Sciophytes; Ecological response of plants to warm, chilling and freezing temperatures. Hardening; Ecophysiological responses in plants: Photoperiodism; Thermoperiodism; Cardinal temperatures; Light compensation point; Dormancy; Stratification; Vernalization.
- **The Wind Factor:** Formation of wind; Influences of wind on plants; Cushion plants; Shelterbelts.
- **The Fire Factor:** Kinds of fire; Plant adaptations related to fire. Fire climax; Practical value of vegetation burning.
- **The Biotic Factor:** Biotic influences; Local vegetation; Vegetation of Pakistan; Major Biomes of the world

Programme	BS Botany	Course Code	Bot-210	Credit Hours	1
Course Title	**Principles of Plant Ecology (Lab)**				

Lab Course Contents

- Determination of Soil Texture of given soil sample by Hydrometer method
- Find out the percentage and types of Water Stable Aggregates in a given soil sample by
- Wet Sieving Technique
- Determination of Capillary Rise of water in soil of different textures
- Study the Infiltration and Permeability in soils of different textures

- Determination of soil moisture constants of given soil sample
- Determination of Oxidizable Organic Matter Content of soil by Wet Digestion Method
- Determination of soil water holding capacity of given soil sample
- Determination of Air Temperature and Relative Humidity in open sunlight/shade at
- ground level and different heights with a Whirling Psychrometer
- Determination of Light Intensity in various habitats by using a Lux-Meter
- Study the different adaptations in Hydrophytes, Xerophytes and Cacti.
- Study of Heliophytes and Sciophytes
- Study of Impact of Wind on plants- Cushion plants
- Preliminary survey to gain information about different local Plant Communities

Textbooks and Reading Material

1. Begon, M., Howarth, R. W. and Townsend C .R .(2014) .Essentials of Ecology.4th Edition Wiley 480 .pp.
2. Chapman, J. L. and Reiss, M.J. (1999). *Ecology: Principles & Applications.* Cambridge University Press. London. 330 pp.
3. Hussain, F. (1989). *Field and Laboratory Manual of Plant Ecology*. National Academy of Higher Education, Islamabad.
4. Lambers, H., Chapin III, F. S. and Pons, T. L. (2008). *Physiological Plant Ecology*. Second Edition. Springer. 545 pp.
5. Schulze, E. D., Beck, E. and Müller-Hohenstein, K. (2005). *Ecology.* Springer. 207 pp.
6. Smith, T. M. and Smith, R. L. (2006). *Elements of Ecology.* Pearson Canada. 645 pp.

Teaching Learning Strategies

- Lectures
- Group Discussion
- Laboratory work
- Seminar/ Workshop

Assignments: Types and Number with Calendar

- Lecture Based Examination (Objective and Subjective)
- Assignments
- Class discussion
- Quiz
- Tests

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