



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



Programme	BS Botany	Course Code	Bot-301	Credit Hours	2
Course Title	Advanced Plant Ecology (Theory)				
Introduction					
This course introduces the concepts of the population and community ecology along with the understanding of the plant ecosystems. This course will also emphasis on current ecological events and global issues.					
Learning Outcomes					
The course is designed to:					
<ul style="list-style-type: none"> • To provide an adequate knowledge about concepts of population and community ecology • To give an insight about ecosystems and emergent properties associated with ecosystems • Describe different aspects of current ecological events and global issues in order to understand its nature and impact on plants • Analyze current ecological issues and evaluate potential solutions 					
Course Contents					
<ul style="list-style-type: none"> • Concepts of species • Population Ecology: Plant population structure; Plant population dynamics; Density dependent and density independent growth, Life Tables and Plant demography • Community Ecology: Community concepts and attributes; Analytic & synthetic characteristics; Plant community structure; Plant community dynamics; Types of changes, succession, its types and climax concept. • Ecosystem and Biogeochemical cycles: Concept, components, type's structure and function of ecosystem, Biogeochemical cycles; Hydrologic cycle and P cycles. • Air Pollution: Sources, Nature and impact of primary and secondary air pollution, Effect of major and minor phytotoxic air pollutions on plants • Water Pollution: Introduction, sources of water pollution, nature of water pollution and their impacts and control measures • Current Ecological Issues: Nature, origin and impacts of <ul style="list-style-type: none"> i) Ozone Hole ii) Smog iii) Green House effects iv) Acid rain v) Global Warming vi) Climate Change vii) Noise Pollution viii) Radiation Pollution ix) Particulate Matter 					

Programme	BS Botany	Course Code	Bot-302	Credit Hours	1
Course Title	Advanced Plant Ecology (Lab)				
Lab Course Contents					
<ul style="list-style-type: none"> • Determination of frequency of occurrence of various plant species in a grass land community by Quadrature Method • Determination of vegetation cover (Percentage cover area) by Line Transect Method • Determination the Line Cover of the species in a plant community by Transect Method • Examination of industrial waste water/ municipal sewage water for some physical characteristic; <ul style="list-style-type: none"> • Total Dissolved Solids (TDS) • pH and EC • BOD and COD, DO 					

- Chlorides, Carbonates, Bicarbonates and Nitrates
- Field observation on the Sources and Impacts of various Air Pollutants.
- Examination of the Effects of Automobile Exhaust on the Adjacent Vegetation.
 - Symptoms on plant leaves
 - Chlorophyll Content of plant leaves
 - Particulate matter on plant leaves
- Effects of seed irradiation on seed germination and plant seedling
- A visit to EPA to study the Instruments used for Monitoring Pollution.

Textbooks and Reading Material

1. Begon, M. Howarth R. W., 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. Schulze, E. D., Beck, E. K. and Müller-Hohenstein (2005). *Ecology*. Springer. 207 pp.
5. Smith, T. M. and Smith R. L. (2006). *Elements of Ecology*. Pearson Canada. 645 pp.
6. Berry, W.K. (2017). *Water Pollution* CBS Publisher and Distributer Pvt. Ltd.
7. Goel, P. K. (2016). *Water Pollution: Causes, Effects and Control* (Revised 2nd edition) new AGE International Ltd Publisher.
8. Ghafoor, A., Murtaza, G. M., Rehman, Z., Sabir, M. Ahmad, H. R. and Saifullah. (2012). *Environmental Pollution: Types, Sources & Management*. Allied Book Centre, Urdu Bazar, Lahore.
9. Treshow, M. (Latest Edition) *Environment and Plant Response*. Mcgraw-Hill NY.
10. Koziol, M.J., Whatley, F. R. (Latest Edition) *Gaseous Air Pollution and Plant Metabolism*. Butterworths.
11. Agrawal, K. C. (Latest Edition) *Environmental Biology* Agro Botanical Publishers, India.
12. Johnson, C. E. (Latest Edition) *Eco-crisis* John Wiley & Sons. Inc., New York, London. Toronto.
13. Mansfield, T. A. (Latest Edition) *Effects of Air Pollutants on Plants* Cambridge University Press, London, New York, Melbourne.

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
