



Code	Subject Title	Cr. Hrs	Semester
BOT-204	Botany Lab-IV (Plant Physiology and Ecology)	1	IV
Year	Discipline		
2	Botany, Zoology, Chemistry-I		

Syllabus Outline: Water uptake by swelling seeds, loss of permeability by beet root cells, Rate of transpiration by means of photometer, Cobalt Chloride Paper Method, Extraction of Chlorophyll and Separation of Component Pigments, Studies of Absorption Spectra, Winkler's Method to Determine Oxygen Utilization by a Respiring Plant, Amylase from Germinating Seeds and its Effect on Starch Breakdown, Carbon Dioxide Evolution during Respiration by Titration Method, Seed Germination.

Course Outline:

a) Plant Physiology:

1. Determination of Uptake of Water by Swelling Seeds when placed in Sodium Chloride Solution of Different Concentrations.
2. Determination of the Temperature at which Beet Root Cells lose their permeability.
3. Determination of the effects of environmental factors on the rate of transpiration of a leafy shoot by means of a photometer by Cobalt Chloride Paper Method.
4. Extraction of Chlorophyll from the leaves and Separation of Component Pigments on a Paper Chromatogram.
5. Study of Absorption Spectra using Spectrophotometer.
6. Estimation of Oxygen utilized by a Respiring Plant by Winkler's method.
7. Extraction of Amylase from Germinating Wheat Seeds and study of its effect on Starch Break Down.
8. Measurement of Carbon Dioxide Evolution during Respiration of Germinating Seeds by the Titration Method.
9. Effect of Light and Temperature on Seed Germination.

b) Ecology:

1. Determination of Physical and Chemical Characteristics of Soil.
2. Measurement of Light and Temperature.
3. Measurement of Vegetation by Quadrat and Line Intercept Methods.
4. Measurements of Wind Velocity.
5. Field Trips to Ecologically Diverse Habitats.

Module Aims: Specific objectives of this course will be to understand the Soil Plant Relationship with reference to Environmental Factors and Plant Physiology.

Learning Strategies:

1. Lectures
2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop



Learning Outcome: The aim is to give the students increased knowledge of metabolism, physiology and structure of plants together with a better understanding of regulation of growth and development and influence of environment.

Assessment Strategies:

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Books Recommended:

1. **Taiz, L. and Zeiger, E. (2010).** *Plant Physiology*. (5th Ed.), Sinauers Publishing, Co. Inc. California.
2. **Illahi, I. (2009).** *Plant Physiology. Biochemical Processes in Plants*. UGC Press.
3. **Witham, F.W., Devlin, A., Blaydes, D.F. and Devline, R.M. (1986)** *Exercises in Plant Physiology*. Prindle, Weber and Schmidt, Boston.
4. **Schultz, E. (2005).** *Plant Ecology*. (2nd Ed.) Springer-Verlag, Berlin.
5. **Smith, R. L. (2002).** *Ecology and Field Biology*. Harper and Row Publishers, New York.
6. **Salisbury, F.B. and Ross, C.B. (2002).** *Plant Physiology*. (7th Ed.), Wordsworth Publishing Co. Belmont CA.
7. **Ricklefs, R.E. (2001).** *The Economy of Nature* W.H. Freeman and Company. UK.
8. **Hopkins, W.B. (2000).** *Introduction to Plant Physiology*. (2nd Ed.) John Wiley and Sons. New York.
9. **Rick, R.E. (2000).** *Ecology*. (1st Ed.) W.H. Freeman and Company, UK.
10. **Smith, R. L. (2000).** *Elements of Ecology*. Harper and Row Publishers, New York.
11. **Subrahmanyam, N.S. and Sambamurthy, A.V.S.S. (2000).** *Ecology*. Narosa Publishing House, New Delhi.
12. **Townsend, C.R., Harper, J.L. and Begon, M.E. (2000).** *Essentials of Ecology*. Blackwell Scientific Publications, UK.
13. **Barbour, M.O., Burke, H.J. and Pitts, D.W. (1999).** *Terrestrial Plant Ecology*. The Benjamin, Cumming Publishing Company California, USA.
14. **Hussain, F. (1999).** *Field and Laboratory Manual of Plant Ecology*. National Academy of Higher Education, Islamabad.



15. **Krebs, C.J. (1997).** *Ecology and Field Biology*. Addison Wesley Longman Inc, New York.
 16. **Chapman, J.L. and Reiss, M.J. (1995).** *Ecology. Principles and Applications*. Cambridge University Press. U.K.
 17. **Odum, E.P. (1970).** *Basic Ecology*. V/B. Saunders. Philadelphia.
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