




हिमाचल प्रदेश केंद्रीय विश्वविद्यालय
Central University of Himachal Pradesh
(Established under Central Universities Act 2009)
Academic Block, Shahpur, Dist. Kangra (HP) - 176206
Website: www.cuhimachal.ac.in

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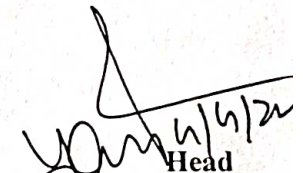
List of the Interdisciplinary courses offered for 2nd Semester in the Department of Plant Science.

Sr. No.	Course Name	Course Code	Credit	Name of Faculty Member
Interdisciplinary Courses offered by Department of Plant Science				
1	Bio-analytical Techniques in Plant Science	PLS 468	2	Dr. Munish Sharma
2	Plant Systematics	PLS 469	2	Dr. Divya V. Nair
3	Principles of Ecology and Environment	PLS 470	2	Dr. Ashun Chaudhary / Dr. Himadri


Head
Department of Plant Science

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Head
Department of Plant Science

Course Name: Bk-analytical Techniques In Plant Science

Course Code: PLS 468

Credits = 02

Learning outcomes:

On the completion of the course, the students will be able:

- To apply the concepts of bioanalytical techniques in plant research
- To operate and optimize the experimental conditions of different analytical techniques
- To implement knowledge for the separation of bioentities

UNIT-1

Centrifugation: Principles of centrifugation, concepts of RCF, different types of instruments and rotors, preparative, differential and density gradient centrifugation, analytical ultra-centrifugation, determination of molecular weights and other applications

UNIT-2

Microscopy: Light microscopy, phase contrast microscopy, fluorescent microscopy, Flow-cytometer, scanning electron microscopy (SEM/FBSEM), transmission electron microscopy (TEM)

UNIT-3

Chromatography: Principle, procedure and applications of Paper, Column, Thin layer chromatography and Gas chromatography, Ion exchange chromatography, High Performance Liquid Chromatography (HPLC) and Fast Protein Liquid Chromatography (FPLC)

UNIT-4

Electrophoresis: Principle of gel electrophoresis, polyacrylamide gel electrophoresis (PAGE and SDS-PAGE), agarose gel electrophoresis, pulse field gel electrophoresis (PFGE) and 2-Dimensional gel electrophoresis.

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UNIT-5

Spectroscopy: Concepts of spectroscopy, Laws of photometry, Beer-Lamberts law, Visible and UV spectroscopy, Nuclear Magnetic Resonance, atomic absorption and MS spectrophotometry,

Reference Books:

1. Spectrometric identification of Organic Compounds, Robert M. Silverstein, Basseler, Morrill (John Wiley and Sons, N.Y).
2. Principles of Instrumental Analysis by Douglas A. Skoog, James, J. Leary, 4th Edition.
3. Chromatographic Analysis of Pharmaceuticals, John A. Adamovics, 2nd Edition.
4. Instrumental Methods of Chemical Analysis - B. K. Sharma - 9th Edition.
5. Techniques and Practice of Chromatography - Raymond P. W. Scott, Vol. 70.
6. Instrumental Methods of Chemical Analysis - B. K. Sharma - 9th Edition.

Course Name: Plant Systematics

Course Code: PLS 469

Credits = 02

Objectives:

- To understand the concepts and principles related to plant systematics
- To acquire the skill in plant identification and herbaria preparation
- To create an attitude in conserving plants for sustainable development
- To get the skill in phylogenetic tree construction

UNIT-1

Classification - brief study of Artificial (Linnaeus), Natural (Bentham and Hooker) and Phylogenetic (Bessey and Takhtajan) systems, Detailed study on modern system of classification, Angiosperm Phylogeny Group (APG) SYSTEM - Principles of the APG System - APG I, APG II, APG III and APG IV

UNIT-2

Classification of taxonomical literature, general indices, floras, icons, monographs, reviews and journals; Molecular Plant identification, Herbarium - definition, steps involved in the development of herbarium, utility of herbarium and their maintenance, general account of National and regional herbaria with special reference to Central National Herbaria

UNIT-3

Phylogenetic systematics; Taxa and characters; Features of cladogram, Cladogram construction, Cladogram analysis, brief description about major angiosperm clades; Evolution of flowering plants; Angiosperm apomorphies, origin of angiosperms; molecular phylogeny, Gene and Species tree. Molecular evolution and Kimuras theory, Phylogenetic Trees, Terminology in Phylogenetic tree. Phylogram, Significance of Molecular Phylogeny.

UNIT-4

Plant Systematics an over view; Modern concepts and trends in plant systematics. Elementary treatment of i. Cytotaxonomy, ii. Chemotaxonomy, iii. Numerical taxonomy (taxinetrics), iv. Molecular taxonomy vs. Biosystematics.

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UNIT-5

Study of the following angiosperm families giving importance to morphological peculiarities if any (Special emphasis should be given on morphological and phylogenetic interrelationships, recent revisions and rearrangements between and within the families, and its critical analysis if any): i. Ranunculaceae ii. Brassicaceae iii. Malvaceae iv. Asteraceae v. Fabaceae vi. Rosaceae vii. Apiaceae viii. Apocynaceae ix. Solanaceae x. Lamiaceae xi. Liliaceae xii. Poaceae

REFERENCES:

1. Arora PK and Nayar EK. Wild relatives of Crops plants in India, NBPGR Sci. Monograph No. 7.
2. Simpson MG. Plant Systematics, Elsevier publications.
3. Judd WS, Campbell CS, Kellog EA & Stevens PF (1999), Plant Systematics. Sinauer Associates, Inc., Massachusetts, USA.
4. Kochar LS (1981) Economic Botany in the Tropics, Macmillan.
5. Lawrence GHM (1964), Taxonomy of Vascular Plants, Mac Millon Co., New York.
6. Rendle AB (1967), Classification of flowering plants, Cambridge University Press.
7. Sharma OP (1990) Plant Taxonomy, Oxford Publishers, New Delhi.
8. Singh G (1999), Plant systematics: Theory and Practice, Oxford IBH.
9. Sivarajan, V. V. 1999. Principles of Plant Taxonomy, Oxford and IBH Publishing Co
10. Sivarajan, V. V. 1991. An introduction to Principles of Taxonomy, London
11. Stace, C. 1985. Plant Taxonomy and Biosystematics, London.
12. Hutchinson, J. 1959. Families of Flowering Plants, Cambridge University Press.

Course Name: Principles of Ecology and Environment

Course Code: PLS 470

Credits = 02

Learning outcomes:

On the completion of the course, the students will be able:

- To understand characteristics of plants at community, population and ecosystem levels.
- To have sound background of ecosystem structure and function.
- To use various tools and techniques for ecological studies
- To understand the source of the environmental pollution and how to control the pollution in a sustainable way

UNIT-1

Basic concept of Ecology, Environment interaction with ecological factors, Approaches to Ecology, Biological Clocks, Ecological niche, and type of niche, Ecological Equivalents and Character Displacement, Basic Concepts of Population, Population Characteristics and Population Dynamics.

UNIT-2

Methods of study of communities, Individualistic concept and vegetational continuum concept of communities, Interspecific associations and ordination, Community Dynamics, Types of Succession, General process of succession, Hydrosere, Lithosere and Heterotrophic Succession.

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UNIT-3

Ecosystem Development, Climax concept and Biome, Structure of Ecosystem, Function of an ecosystem, Ecological Energetic, Nutrients cycles in ecosystem, Basic concept of system ecology, Freshwater Ecology, Marine Ecology, Estuarine ecology, terrestrial ecology and desert ecology

UNIT-4

Forest resources, forest cover, Forest survey of India, Deforestation, Desertification, Afforestation, Energy plantations for ethanol and biodiesel, Conventional and non conventional sources of energy

UNIT-5

Environmental pollution, Kinds, sources, Climate change, Basic concepts of sustainable development, Industrial ecology and recycling industry, role of natural products and biodiversity in international trade.

Reference Books:

1. Ambasht, R. S. and Ambasht, A. K. 2002. A textbook of Plant Ecology. C.B.S. Publishers and Distributors.
2. Kumar, H. D. 2000. Modern Concepts of Ecology. Prentice Hall India, New Delhi.
3. E. P. Odum, 2005, Fundamentals of Ecology, Cengage Publisher, 5 edition
4. P. D. Sharma, 2011, Ecology and Environment, Rastogi Publication
5. Chapman, J.L. and Reiss, M.J. 1988. Ecology – Principles and Applications, Cambridge University Press, U.K.
6. Tiwari, S.C. 1993. Concept of Modern Ecology, Bishan Singh Mahendra Pal Singh, Dehra Dun.
7. Kormondy, E.J. 1996. Concepts of Ecology, Prentice-Hall of Indian Ltd., New Delhi