

9. 1.1.1. Records on curricula that meets Local, Regional, Global need.

PBYC11- Plant Diversity-I: Algae, Fungi and Lichens

Local: Contributions of Indian Phycologists: T.V. Desikachary, M.O.P.Iyengar, V.K. Krishnamurthy, M.S. Balakrishnan, V.S.S. Sundaralingam.

Algae as biofertilizer, food and feed; industrial (commercial) products from algae.

Fungi in industry, medicine and as food; fungal diseases in plants (*Magnaporthe oryzae* and *Puccinia* spp. In plants; Red rust of tea) mycorrhizae; as biocontrol agents. Contributions of Indian Mycologists

Regional & Global:

Lichens as indicators of Pollution; Economic importance of Lichens.

PBYEB - Plant Diseases and Insect Pest Control

PBYC12: Plant Diversity II (Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Major fossil sites of India: Thiruvakkarai, Sriperumbudhur, Rajmahal Hills. Paleobotany in phylogeny; Indian Paleobotanists: Birbal Sahni, D.D.Pant, M. Ramanujam.

PBYC32-Angiosperm Taxonomy: Preparation of herbarium specimen - methods and techniques, virtual herbarium; Icones, Monographs and Floras; BSI and NBRI

Economic botany

Perspectives in economic botany, Cereals, Millets, Pulses, Vegetables, Tubers, Fruits and nuts, Oil seeds, Plantation crops, Spices and condiments, Fumitories and masticatories, Fibers, Wood, Medicinal plants, Ornamental plants, Weeds, Resins and Gums, Beverages, Rubber, Forage crops, Plant insecticides, Dyes and tannins.

PBYC33 -Ecology and Conservation Biology: Major terrestrial biomes; theory of island biogeography; biogeographical zones of India; Indian forest and vegetation types.

Indian case studies on conservation/management strategy - Project Tiger, Biosphere reserves.

Major terrestrial biomes; theory of island biogeography; biogeographical zones of India; Indian forest and vegetation types. Endemism and endemic plant species of India.

PBYL33-Ecology and Conservation Biology – Practical :

To find relationship among important leaf and wood plant functional traits (plants from tropical dry forests)

To find reproductive allocation of selected herbs and trees

To record diversity of woody plants in tropical dry forest located in and around Tirunelveli.

Field visits/scientific tours

The students should be taken to one of the following:

- i. A protected area (biosphere reserve, national park, or a sanctuary), wet lands,

mangroves

- ii. Head Quarters of the Botanical Survey of India or one of its regional circles.
- iii. A CSIR laboratory doing research on plants and their utilization.
- iv. An ICAR Research Institute or a field station dealing with one major crop or crops (ICRISAT).
- v. A recognized botanical garden or museum (such as those at the Forest Research Institute, Dehra Dun; National Botanical Research Institute, Lucknow; Tropical Botanical Garden and Research Institute, Trivandrum), which has rich collection of plant products.

***Note:** the students are expected to prepare a brief illustrated narrative of the field survey and scientific visits. After evaluation, the marks/grades awarded to students by teachers will be added to the final assessment of credits for Field study/tour.

Local needs : **PBYED- Plants in Tamil Culture:**

Land, People and Literature

Antiquity of Tamil land – occurrence of Paleolithic, Mesolithic, Neolithic and megalithic sites of human settlement. Landscape and vegetation and rainfall patterns.

A Brief Introduction to Sangam Literature Plants in “Kurinjipattu”. Tinai as landscape and ecosystem concept. Importance of plants in five landscapes: Mullai, Marutham, Kurinji, Neythal and Palai.

Plants in Tholkkapiyam

Plants used in early Tamil culture as food and economy. Plants in love and war.

Sacred Plants

Sacred plants and *Venerated plants* Plants and poetic convention. Recent plant introductions and their adoption in Tamil culture.

Plants Relevant to Astrological Importance

Constellation (Rasi) and star plants. The continuing influence of plants, present-day Tamil culture.

PBYEE- Horticulture and Plant Breeding

The horticultural tools and structures for the development of agriculture

the various cultivation techniques influence in the production of horticultural plants

The Identification of barriers in self and cross pollination in plant breeding

The comparative statement of selection and failure of hybridization and their role in clonal

propagation

On transfer of various characters into breeds and their application in hybrid production

PBYC41 - Phytochemistry and Traditional Medicine : Ethnobotany: Concept, Scope and objectives; Ethnobotany as an interdisciplinary science, Tribals of India; Methodology of ethnobotanical studies; Medico-ethnobotanical sources in India; Benefit sharing with examples; Traditional Knowledge Digital Library (TKDL); Conservation practices of biodiversity - Sacred groves.

Traditional Systems of Medicine

Classical health traditions: Systems of medicine: origin and development of biomedicine; Indian Systems of Medicine (Ayurveda, Siddha, Unani, Tibetan, Yoga and Naturopathy) Ayurveda: Historical perspective, Fundamental principles of Ayurveda: Panchabhootha theory, Tridosha theory, Saptadhatu theory and *Mala* theory; Siddha: Origin and Concept of Siddha system of Medicine; Plants used in Siddha medicine, Siddha formulations; Unani: History, Concept: *Umoor-e-tabiya*, tumors treatment of therapy, polyherbal formulations.

PBYI41- Field Study: . Collection sites Kanyakumari, Rameswaram, Manapadu, Uvari Coastal areas. Western ghats – KMTR, Servalar, Tribal hamlets, Dam sites, Karaiyar, Kodaiyar, Kuthiraivetti, Winch point grasslands, Achenkoil forests, waterfalls and streams, Aryankavu, Kollam, Palode and Ponnudi.

Learning about plant morphological variations, forest and vegetation types, soil types, occurrence of plants at different altitudes and elevations, plant communities, associated organisms, plant animal interactions, dependency of tribal communities, and survival skills like mimicry. Conservation areas and Protected forests and sanctuaries. Nilgiri Biosphere reserve, Agastiyamalai biosphere reserve, Island vegetations, deserts etc.

Visit to Industries and Research institutions and Commercial organizations pertaining to courses mentioned in the Syllabus. State and central research laboratories, Herbaria, Museums, Wood research institutes, Live gene banks, Botanical gardens, Medicinal parks, paper or cotton mills, Floriculture, Horticultural, Pharmaceutical research stations or institutions.

Global needs

PBYC13 - Microbiology

PBYC14 -Cell and Molecular Biology

PBYEA - Evolutionary Biology

PBYEB - Plant Diseases and Insect Pest Control

PBYEC - Aquatic and Marine Plants :

Brief idea of Creek, Estuary, Lagoon and Delta. Definition -‘Mangrove’. Distribution – biogeography of Indian mangroves, East and West coast mangroves, Mangrove shores and

forests. Salient features of important mangrove families such as *Rhizophoraceae*, *Sonneratiaceae*, *Avicenniaceae*, *Myrsinaceae*, *Acanthaceae*. Methods of natural and artificial regeneration in mangroves. Carbon sequestration potential of mangrove ecosystem.

PBYC21- Anatomy and Embryology of Angiosperms

PBYC22- Instrumentation and Research Methodology

PBYC23 - Genetics, Genomics and Bioinformatics : Molecular modeling and visualization tools; docking and drug designing. Phylogenetics: phylogenetic trees and clades, software and online tools; inference methods (UPGMA). Biodiversity informatics: world flora online, plants of the world online.

PBYEF - Plants for Bio Energy and Space Research

PBYL31-Plant Physiology and Biochemistry

PBYC32-Angiosperm Taxonomy: Economic botany

Perspectives in economic botany, Cereals, Millets, Pulses, Vegetables, Tubers, Fruits and nuts, Oil seeds, Plantation crops, Spices and condiments, Fumitories and masticatories, Fibers, Wood, Medicinal plants, Ornamental plants, Weeds, Resins and Gums, Beverages, Rubber, Forage crops, Plant insecticides, Dyes and tannins.

PBYC33 -Ecology and Conservation Biology: Major terrestrial biomes; theory of island biogeography; biogeographical zones of India; Indian forest and vegetation types.

Applied Ecology and Conservation Biology

Biodiversity: alpha, beta and gamma diversity, inventory, documentation, status, monitoring; major drivers of biodiversity change or loss; Environmental pollution; global environmental change. IUCN and threat categories; Biodiversity conservation and climate change; *in situ* and *ex situ* conservation; indicators of biodiversity conservation, management approaches - reserve selection and reserve size.

PBYC42- Plant Biotechnology: Hybrid seeds and Terminator gene technology and molecular farming for production of pharmaceutical products.