UNIVERSITY OF PUNE

F. Y. B. Sc. Botany Syllabus

Botany Paper – I (Plant Diversity)

First Term : Plant Diversity Part – I (36 Lectures)

1. **Introduction to plant diversity: (4L)**

   Plant diversity – concept, Plant kingdom- Cryptogams and Phanerogams**,** diversity in plant kingdom – habit, habitat, duration of life**,** Position of plants in five kingdom system.

2. **Algal diversity: (10L)**

   Occurrence, habitat, thallus, cell structure, pigment and food reserve material, reproduction

   Life cycle of *Ulothrix*

3. **Fungal diversity: (10L)**

   Occurrence, cell structure (Myxomycetes – *Stemonites* and Eumycetes – *Aspergillus*), thallus, nutrition and reproduction

   Life cycle of *Cystopus*

4. **Lichen diversity: (3L)**

   Thallus, reproduction and association

5. **Bryophyte diversity: (9L)**

   Occurrence, thallus, reproduction and sporophyte diversity

   Life cycle of *Riccia*

Second Term : Plant Diversity Part – II (36 Lectures)

1. **Pteridophyte diversity: (8L)**

   Sporophyte, gametophyte and reproduction

   Life cycle of *Selaginella*

2. Gymnosperm diversity : (8L)

Sporophyte, gametophyte, reproduction

Life cycle pattern in Gymnosperms

3. Angiosperm diversity: (14L)

Study of inflorescence –definition,

Types- a) Racemose - Raceme, spike,Spadix, Umbel, Capitulum.

b) Cymose- Solitary cyme, Uniparous, Biparous and Multiparous Cyme.

c) Special type of inflorescence- Hypanthodium, Cyathium and Verticillaster

Study of flower- Terminology, Parts of typical flower, floral whorls –

a) Calyx with their modifications and types of aestivations
b) Corolla- Forms – Cruciform, Papilionaceous, Infundibuliform and bilabiate
c) Androecium- Parts of stamen, cohesion and adhesion
d) Gynoecium- Parts of carpel, Apocarpous and Syncarpous, types of placentation.

Study of fruit- Classification, types

a) Simple- Achene, Cypsela, Legume, Follicle, Capsule, Drupe, Berry, Hespiridium,
b) Aggregate- Etario of Berries and follicles
c) Multiple- Sorosis and syconus

Morphology and anatomy of root, stem and leaf with reference to primary structure of dicot and monocot

4. Conservation of plant diversity: (6L)

Concept, types and Need

Methods –*In-situ* and *Ex-situ* enlisting

Detail study of National Parks, Biosphere Reserve Programmes; Tissue culture and Botanical gardens

Importance

Botany Paper –II (Plant Resources - Management and Utilization)

First Term : Plant Resources - Management and Utilization Part – I

(36 Lectures)

1. Introduction : (6L)

a) Concept, natural resources, biological resources, plants as natural resources

b) Management practices - need and methods

c) Utilization - Bioenergy, food, fodder, fibre, medicine and essences.

d) Plant Resources

Processed – Jam, jelly, squash, ketchup, raisin, pickle and rubber

Unprocessed – Honey, timber, wood, tannins and latex

2. Nursery management : (6L)

Introduction, types of nurseries and cultural practices

Seed (propagule) collection, selection of propagule materials, storage and treatment

Manures, fertilizers and pesticides

Methods of irrigation – Drip, sprinkler and flood

3. Horticultural practices : (6L)

Introduction, branches and importance

Methods of propagation:

Vegetative –i) Natural - Rhizome, bulb, corm and sucker

ii) Artificial –Cuttings- stem cutting, layering, grafting- Whip, tongue Side, approach and stone, budding- T and patch budding

4) Greenhouse technology : **(6L)**

Introduction, advantages and limitations

Types of greenhouses

Greenhouse structure, principle – i) Site selection and orientation, ii) Temperature and humidity control

5. Harvest Technology (8L)

Harvest technology management for fruits, flowers and medicinal plants

Artificial ripening, maturity indices, methods of picking

Post-harvest technology and management for fruits, flowers and medicinal plants – Grading, processing, storage and packing

6. Weed management : (4L)

Introduction and need

Invasive weeds - concept and causes of their dominance

Weed control – Physical, chemical and biological methods

Sustainable use of weeds

Second Term : Plant Resources - Management and Utilization Part –II (36 Lectures)

1. Flower arrangement : (5L)

Introduction, principles, types – social, formal and non-formal, materials used, vase life improvement. Flower arrangement as a business

2. Biocontrol : (6L)

Introduction, sources and advantages

Important commercial products – Source, preparation and uses of Pyrethins, Azadiractin, *Trichoderma*, Indiara,

Biocontrol as a agrobusiness

3. Phytoremediation : (6L)

Introduction, concept and principles

Plant population for phytoremediation processes, strategies and

applications

4. Bioprospecting : (6L)

Introduction, concept and scope

Untapped plant resources as potential resources

Sea weeds as a potential resource – Food, fodder and fertilizer

Applications

5. Forest as potential resource : (6L)

Introduction and scope

Major forest produce and their uses - Timber, fuel, paper (two examples of each)

Minor forest produce and their uses – Gum, resin, tannin, dyes and pigments (two examples of each)

6. Plant resources used in cosmetics, aromatics and pharmaceutics (7L)

Introduction and scope

Herbal preparations

Methods of extraction – Maceration, digestion, decoction, aromatic waste, extracts and tinctures

1) Cosmetics- Aloe, Henna,
2) Aromatics Lemon grass and Rose
3) Pharmaceuticals- Turmeric and Amla

with reference to Botanical name, family, part used, products and uses

PAPER III (Practical Course based on Paper I & Paper II)

F. Y. B. Sc. Botany Syllabus (Practicals)

(1) Study of thallus diversity in algae. (*Nostoc,* and *Scytonema, Chlorella Hydrodictyon, , Batrchospermum, Ulva and* Diatoms). 1 P

(2) Study of life cycle of Ulothrix 1P

(3) Study of thallus diversity in fungi : *Stemonites, Phyllachora, Puccinia, Agaricus, Aspergillus ,* and *Rhizophus* 1P

(4) Study of life cycle of *Cystopus*

(5) Study of Lichen diversity : Crustose, Foliose, Fruticose. 1 P

(6) Study of Bryophyte diversity : *Riccia, Anthoceros, Funaria* with comparative account. 1 P

(7) Study of methods of propagation with the help of suitable materials – tubers, bulbs, rhizomes, corms, suckers and runners. 1 P

(8) Propagation of horticultural plants by stem cuttings and air layering. 1 P

(9) Propagation of horticultural plants by grafting (Approach and stone) and 'T' budding. 1 P

(10) Visit to nursery and polyhouse/greenhouse. 1 P

(11) Preparation of jam and squash 1 P

(12) Extraction of essential oil from lemon grass / rose petals and collection and preparation of Henna powder / Aloe gel. 1 P

(13) Study of Pteridophyte diversity (Sporophytes) : *Psilotum, Selaginella, Equisetum, Nephrolepis* with comparative account. 1 P

(14) Study of Gymnosperm diversity (Sporophyte) : *Cycas, Pinus, Gnetum*.

(comparative account of vegetative and reproductive diversity) 1 P

(15) Study of flower with reference to Calyx and Corolla 1 P

(16) Study of flower with reference to Androecium and Gynoecium 1 P

(17) Study of internal structure of dicot: stem, root and leaf. 1 P

(18) Study of internal structure of monocot : stem, root and leaf 1 P

(19) Study of *In-situ* conservation : Visit to Botanical Garden/Reserve forest/National park/Herbal Garden (Visit report expected). 1 P

(20) Flower arrangements : Formal, non-formal and social. 1 P

(21) Commercial products and their applications in biocontrol : Pyrethrin, Azadiractin and *Trichoderma* 1 P

(22) Observation of plants used in phytoremediation :*Echhornia, Azolla, Pistia, Lemna*, Algal blooms 1 P

(23) Study of plant resources and products : Yeast – Yeast tablets, *Penicillium* – Penicillin, *Spirulina* – *Spirulina* tablets, Algal products – agar, liquid biofertilizer, Bamboo – paper, Teak – timber, *Acacia arabica* - gum, Asafoetida - resin, *Acacia catechu* – kath. 1 P

(24) Study of any two resources of fodder (Alfalfa, *Sesbania*), fibre (Cotton, Coconut), medicinal (Amla, *Aloe*), biofertilizers (BGA, *Azolla*), honey, timber (Teak, Sisso) and tannins (*Acacia* pod/bark, Tea). 1 P

(25) Observation of weeds with reference to Botanical Name, Family, Morphological and Ecological peculiarities:

Native – *Cynadon, Euphorbia, Amaranthus*.

Exotic/Invasive – *Parthenium, Xanthium, Alternanthera, Argemone* 1 P

*Students of F. Y. B. Sc. must submit a visit report at the time of practical examination with reference to Sacred Groves / National Park / Reserve Forest / Botanical Garden and Nursery / Greenhouse.

* **Study tour for observation of plant diversity in nature is compulsory.** Report on excursion is to be submitted at the time of examination. Submission of herbarium is not expected but photographs **may be submitted** along with report.