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 patterns in *Ulothrix* and *Ulva*

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

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

   Life cycle patterns in *Cystopus* and *Agaricus*

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

   Thallus, reproduction and association

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

   Occurrence, thallus, reproduction and sporophyte diversity

   Life cycle pattern in Bryophytes

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

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

   Sporophyte, gametophyte and reproduction

   Life cycle pattern in Pteridophytes

   Diversity in stelar type

2. Gymnosperm diversity : (8L)

Sporophyte, gametophyte, reproduction and wood

Life cycle pattern in Gymnosperms

Affinities with pteridophytes and angiosperms

3. Angiosperm diversity: (14L)

Sporophyte diversity in habit, habitat, organization of body and nutrition

Mode of reproduction and dispersal

Gametophyte

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

Diversity of angiosperms as a basis for evolutionary success and dominance

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, layering, grafting and budding

Landscaping as a means of plant resources conservation

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

Introduction, advantages and limitations

Types of greenhouses

Greenhouse structure, principle – i) Site selection and orientation, ii) Structure materials, iii) Covering materials, iv) Temperature and humidity control

Greenhouse technology as applied to ornamentals, vegetables, fruit plants and medicinal plants

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, *Trichogramma*

Biocontrol as a agrobusiness

3. Phytoremediation : (6L)

Introduction, concept and principles

Plant population for phytoremediation processes

Phytoremediation strategies

Applications

4. Bioprospecting : (6L)

Introduction, concept and scope

Biochemical resources from plants and fungi

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

i) Aloe, ii) Henna, iii) Lemon grass, iv) Rose, v) Jasmine vi) Turmeric, vii) Ginger, viii) Neem, ix) Holy basil, x) Kuda, xi) Amala with reference to 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 prokaryotic organisms. (*Nostoc, Oscillatoria, Croococcus, Microcystis* and *Scytonema*). 1 P

(2) Study of thallus diversity in Algae : *Chlorella, Volvox, Hydrodictyon, Batrchospermum, Caulerpa, Ulva, Padina* and Diatoms 1P

(3) a) Study of thallus diversity in fungi : *Stemonites, Synchytrium, Plasmopara / Phytopthora* and *Mucor* 1P

b) Study of thallus diversity in fungi : *Phyllachora*, *Yeast*, *Puccinia*, *Ustilago, Agaricus, Polyporus / Ganoderma*, *Aspergillus / Penicillium* and *Fusarium*. 1 P

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

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

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

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

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

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

(10) a) Preparation of jam and jelly 1 P

b) Preparation of squash and pickle 1 P

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

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

(13) Stelar diversity in Pteridophytes. 1 P

(14) Study of Gymnosperm diversity (Sporophyte) : *Cycas, Pinus, Gnetum*. (comparative account of vegetative and reproductive diversity) 1 P

(15) Study of Angiosperm diversity with reference to habit – herbs, shrubs, trees, climbers, epiphytes and parasites. (with one example of each) 1 P

(16) Study of Angiosperm diversity with reference to external adaptations : hydrophytes, mesophytes, xerophytes and halophytes.(one example of each with comparative account) 1 P

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

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

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

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

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

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

(22) 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

(23) 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

(24) 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.