

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B.Sc. SEMESTER - I
BOTANY PAPER - 101
(Effective from June 2018)

BOT – 101 : PLANT DIVERSITY

Unit - I Introduction to Plant Diversity

- Concept, Plant Kingdom (Eichler system)- cryptogams and phanerogams, diversity in plant kingdom, position of plants in five kingdom system.
- Prokaryotic and Eukaryotic cell structure

Unit - II Microbes

- Bacteria : Discovery, general character, structure and importance
- Virus: Discovery, general character, structure and importance

Unit - III Algal diversity

- Occurrence, classification, thallus, cell structure, pigments, reserve food material and reproduction of *Nostoc* and *Spirogyra*

Unit - IV Fungal diversity

- Occurrence, classification, thallus, cell structure, nutrition and reproduction of *Mucor* and *Agaricus*

Unit - V Lichen

- Classification, general characters, external and internal characters, reproduction and economic importance of *Lichen*

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B.Sc. SEMESTER - I
BOTANY PAPER - 102
(Effective from June 2018)

BOT - 102 : PLANT DIVERSITY, NURSERY MANAGEMENT AND UTILIZATION

Unit - I **Bryophytes**

- Study of life history, occurrence, thallus structure, reproduction and sporophyte diversity (external and internal) of *Funaria*.

Unit - II **Pteridophytes**

- Study of life history, sporophyte, gametophyte (external and internal) and reproduction of *Nephrolepis*.

Unit - III **Nursery Management**

- Introduction, types of nurseries
- Plant propagation- cutting, budding, grafting and layering
- Fertilizer and pesticides
- Methods of irrigation: drip and sprinkler,

Unit - IV **Plant Morphology**

- **Root:** Definition, parts of root, types of root, functions and modification of root.
- **Stem:** Definition, characters of stem, shape and surface of stem, types of stem, functions & modification of stem,
- **Leaf:** Definition, characters & parts of leaf, types of stipules, venation, types of leaf, functions and modification of leaf.
- **Flower:** Definition, structure of typical flower, arrangement of floral leaf, types of flower.

Unit - V **Food plants**

- Cultivation of the following crops in relation to their origin, distribution, climate, soil, propagation, method of cultivation and uses.
- Sugar cane, Paddy, Mango, Brinjal

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. SEMESTER - I

BOTANY PRACTICAL - 103

(Effective from June 2018)

BOT - 103 : PLANT DIVERSITY, NURSERY MANAGEMENT AND UTILIZATION

- The candidates should study the typical vegetation in natural condition and should record their observation in journals. Excursion should be arranged during the year to local places.
- Every candidate shall complete laboratory course in accordance with the regulations issued from time to time by Academic Council on the recommendation of the Board of Studies.
- Every candidate shall record observation directly in the laboratory journal. Every journal shall be signed periodically. At the end of the semester candidate shall produce certified journal during the practical examination.

Practical :1 To study microscopic examination of curd.

Permanent slides of Bacteria

Chart/Specimen of different types of Virus.

Practical :2 **Nostoc:**

To study thallus structure and akinets in Nostoc.

Practical :3 **Spirogyra:**

To study the thallus structure, Scalariform conjugation and Lateral conjugation in Spirogyra.

(Permanent slides of thallus W.M, Scalariform conjugation, Lateral Conjugation.)

Practical :4 **Mucor :**

To study the thallus structure and reproductive structure.

Permanent slides of Mucor vegetative W.M., Mucor sporangia, Mucor Zygosporangium.

Practical :5 **Agaricus:**

To study the vegetative structure, basidiocarp, gills, basidia and basidiospores.

Permanent slides : Stipe T.S.; Pileus T.S.

Practical :6 **Lichen:**

To study external features and internal structures of Usnea

(Permanent slides of Lichen thallus T.S., Lichen apothecium V.S., Lichen soredia)

Practical :7 **Moss (Funaria):**

To study the external features of gametophyte and sporophyte.

(Permanent slides of Funaria antheridia W.M.; Funaria archegonia W.M.)

Practical :8 **Nephrolepis :**

Preparation of slides from the fresh material of T.S of Stolon & T.S. of Rachis by the students.

(Permanent slides: T.S. of Stolon, T.S. of Rachis, T.S. of leaflet passing through sori, Nephrolepis prothallus, Fern sori W.M., prothallus with antheridia, prothallus with archegonia, prothallus with sporophyte.)

Practical :9 **Nursery Management**

- i) Study of methods of propagation with the help of suitable materials - tubers, bulbs, rhizomes, corms, suckers and runners.
- ii) Propagation of horticultural plants by stem cuttings, air layering, grafting and 'T' budding.

Practical :10 **Roots:**

- To study different types of roots:
 - ❖ Tap root- *Vinca*
 - ❖ Fibrous- *Grass*
 - ❖ Adventitious- *Sugarcane*
- To study modification of root:
 - ❖ Prop root- *Banyan tree*
 - ❖ Stilt root- *Maize*
 - ❖ Pneumatophores- *Avicennia*
 - ❖ Storage root- *Carrot, sweet potato*

Practical :11 To study different types of stem

- To study Aerial stem
 - ❖ Cudex- *Palms*,
 - ❖ Clum- *Bamboo*,
 - ❖ Scape- *Canna and Onion*
 - ❖ Excurrent- *Polyalthialongifolia, Casurina*
 - ❖ Deliquescent- *Mango*
 - ❖ Weak stem: *Ipomoea*
- To study underground stem
 - ❖ Rhizome- *Ginger, Turmeric*
 - ❖ Tuber- *Potato*
 - ❖ Bulb- *Onion*
 - ❖ Corm- *Amorphophollus*
- To study Specialized stem
 - ❖ Phylloclade- *Opuntia*
 - ❖ Cladode- *Asparagus*

Practical :12 Leaf:

- To study different types of leaf:
 - ❖ Simple leaf: *Banyan, Mango*
 - ❖ Pinnate Compound Leaf:
 - ✓ Unipinnate: *Cassia, Rose*
 - ✓ Bipinnate: *Mimosa, Caesalpinia*
 - ✓ Tripinnate: *Moringa*
 - ✓ Decompound: *Coriander*
 - ❖ Palmately Compound Leaf
 - ✓ Unifoliote: *Citrus*
 - ✓ Bifoliolate: *Balanites, Bauhinia*
 - ✓ Trifoliolate: *Crotalaria, Oxalis*
 - ✓ Quadrifoliolate: *Marsilea*
 - ✓ Multifoliolate: *Bombax*

Practical :13 Flower:

- To study different types of flower:
 - ❖ Regular flower: *Ipomoea*
 - ❖ Irregular flower: *Clitoria, Caesalpinia*
 - ❖ Unisexual flower: *Coccinia*
 - ❖ Bisexual flower: *Hibiscus*

Practical :14 Botanical name, family, origin, distribution and uses of the following crops.

- *Sugarcane*
 - *Paddy*
 - *Mango*
 - *Sapota(Chikoo)*
 - *Brinjal*
 - *Tomato*
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References:

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4. Cryptogamic Botany Vol. I - II G.M.Smith 2nd Edi. 1955 Tata MCGrow Hill Bombay
5. Vansptishaastra paper 1 (Semester I) Dr. T.G.Gohil and Dr. Alpesh B. Thakor 1st Edi. 2011 Popular prakashan, Surat
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7. A text book of Botany vol. I (Algae, Fungi, Bacteria, Viruses, Lichen & Plant pathology) Pandey etal. - Vikash publishing House pvt. Ltd., New Delhi
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11. Introduction to Fungi S.Sundara Rajan 1st Edi. 2001 Anmol Publication, New Delhi
12. Botany for Degree Student- P.C. Vashishta 1st Edi.
13. Modern Practical Botany Vol. II B.P. Pandey 1995 S. Chand & Company, New delhi.
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20. Fungi, Bacteria and Viruses by H.C. Dube; Vikas publishing house
21. The fungi, bacteria and viruses by Lokendra Singh; Rastogi Publications

22. Botany [for degree students] Bryophyta by B.R. vashishta; S.Chand and Co.

23. Botany for degree students: Pteridophyta by P. C. Vasishta; S. Chand and Co (Pvt.) Ltd.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. SEMESTER - II

BOTANY PAPER - 201

(Effective from June 2018)

BOT - 201 :PLANT PHYSIOLOGY, PLANT ECOLOGY, PLANT ANATOMY,
MEDICINAL PLANTS AND PLANT PATHOLOGY

Unit - I **Plant Physiology**

- Imbibition and Osmosis
- Plant Movement: Definition and types of movements
- Photosynthesis: Definition, pigments, light and dark reaction, C₃ and C₄ cycle, factors affecting photosynthesis

Unit - II **Plant Ecology**

- Ecological adaptations, morphological and anatomical characters of Hydrophytes, Mesophytes and Xerophytes with appropriate examples

Unit - III **Plant Anatomy**

- Tissue system: Meristematic and Permanent tissue
- Vascular Bundle: Definition and types
- Stele: Definition and types
- Ergastic matters: starch grain, raphides, sphaerephides, aleurone grain and cystolith

Unit - IV **Medicinal Plants**

- Scientific name, family, part use and medicinal uses of following:
 - ❖ *Ocimum sanctum*
 - ❖ *Adhatodavasica*
 - ❖ *Aloe barbedense*
 - ❖ *Azadirachta indica*
 - ❖ *Abrus precatorius*
 - ❖ *Zingiber officinale*

Unit - V **Plant Pathology**

- Causal organisms, symptoms and control measures of the following plant diseases:
 - ❖ Leaf spot of Mango
 - ❖ Red rot of Sugarcane
 - ❖ Bacterial blight of Paddy
 - ❖ Little leaf of Brinjal
 - ❖ Citrus canker

BOT - 202 :PLANT DIVERSITY AND WEED MANAGEMENT

Unit - I Weed management

- Introduction
- Invasive weeds: concept and causes of their dominance
- Weed control: Physical, chemical and biological methods
- Sustainable use of weeds

Unit - II Gymnosperm

- Classification, external morphology, internal structure, reproduction and alternation of generation in Cycas.

Unit - III Morphology

- Phyllotaxy: Definition and Types with examples.
- Aestivation: Definition and types with examples
- Inflorescence: Definition and Types: Racemose and Cymose
- Placentation: Definition and Types with examples.

Unit - IV ANGIOSPERMS

- Classification as per Bentham & Hooker's system of Classification, general characters, economic and medicinal importance, Botanical name of common important plants of the following families.

- ❖ Malvaceae
- ❖ Apocynaceae
- ❖ Convolvulaceae
- ❖ Nyctaginaceae
- ❖ Amarillidaceae

Unit - V Conservation of plant diversity

- Concept and need, Methods of in-situ and Ex-situ conservation
- Botanical garden
- Forests: Importance of forests and their conservation.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. SEMESTER - II

BOTANY PRACTICAL - 203

(Effective from June 2018)

BOT - 203 :PLANT PHYSIOLOGY, PLANT ECOLOGY, PLANT ANATOMY,
MEDICINAL PLANTS AND PLANT PATHOLOGY, PLANT
DIVERSITY AND WEED MANAGEMENT

- The candidates should study the typical vegetation in natural condition and should record their observation in journals. Excursion should be arranged during the year to local places.
- Every candidate shall complete laboratory course in accordance with the regulations issued from time to time by Academic Council on the recommendation of the Board of Studies.
- Every candidate shall record observation directly in the laboratory journal. Every journal shall be signed periodically. At the end of the semester candidate shall produce certified journal during the practical examination.

Practical :1 **Plant physiology** (Experiment to be demonstrated)

- (i) Imbibition and Imbibition force
 - ❖ Test tube experiment.
 - ❖ Indicator experiment
- (ii) Plant movements
 - ❖ Geotropism
 - ❖ Phototropism
 - ❖ Hydrotropism
- (iii) Photosynthesis
 - ❖ Mohl's half leaf experiment
 - ❖ Light is necessary for photosynthesis

Practical :2 **Plant ecology** (Fresh specimens to be shown to the students):

- Hydrophytes:
 - ❖ Hydrilla, Vallisneria, Eichhornia, Pistia, Nymphaea, Marsilea.
- Mesophytes:
 - ❖ Coriander, Trigonella, Garlic (Entire plants)
- Xerophytes:
 - ❖ Solanumxanthocarpum, Casuarina, Aloe vera, Opuntia, Euphorbia tiruculli

Practical :3 **Tissue:**To study following permanent slides:

- i Root apex
- ii Shoot apex
- iii Parenchyma
- iv Aerenchyma
- v Chlorenchyma
- vi Collenchyma
- vii Sclerenchyma
- viii Xylem- Spiral vessels, Pitted vessels
- ix Phloem elements

Practical :4 **Stele:** Study of stele from permanent slides:

- Actinostele
- Plectostele
- Amphiphloic siphonostele
- Eustele
- Atactostele

Practical :5 **Vascular Bundles:** Study of various types of Vascular bundles from Permanent slides.

- Radial
- Amphicribal (Hadrocentric)
- Collateral and open
- Collateral and closed
- Bicollateral

Practical :6 **Non living cell contents:** Slides are to be prepared by the students from given materials.

- Starch grains: Potato tuber, Wheat or Rice, Euphorbia tiruculli.
- Mineral Crystals:
 - (a) Raphides: Pothos, Colocasia petiole
 - (b) Sphaeraphides: Opuntia, Nerium leaf

Practical :7 **Medicinal plants:** Scientific name, family, part use and medicinal uses of following:

- Ocimum sanctum
- Adhatodavasica
- Aloe barbedense
- Azadirachtaindica
- Abrusprecatorius
- Zingiberofficinale

Practical :8 **Plant pathology:** Causal organisms, symptoms and control measures of the following plant diseases

- Leaf spot of Mango
- Red rot of Sugarcane
- Bacterial blight of Paddy
- Little leaf of Brinjal
- Citrus Canker

Practical :9 **Weed Management:** Observation of weeds with reference to Botanical Name, Family, Morphological peculiarities:

- Native – Cynodon, Cyprus, Amaranthus, Panicum
- Exotic/Invasive – Alternanthera, Desmostachya, Euphorbia, Malachra

Practical :10 Gymnosperms (Cycas)

- Preparation of slides from the fresh material by the students -:
 - ❖ T.S. of Rachis
 - ❖ T.S. of Leaflet
- Permanent Slides: T.S. of Leaflet, T.S. of Rachis, T.S. of Coralloid root, T.S. of Microsporophyll, T.S. of Megasporophyll, L.S. of Ovule
- Preserve Specimen: Coralloid root, Microsporophyll and Megasporophyll

Practical :11 **Phyllotaxy:**

- (i) Distichous phyllotaxy
- (ii) Tristichous
- (iii) Pentastichous
- (iv) Opposite superpose
- (v) Opposite decussate
- (vi) Verticillate or Whorled
- (vii) Leaf mosaic
- (viii) Heterophylly

Practical :12 **Aestivation**

- Valvate: Calyx of *Hibiscus rosasinensis*
- Twisted: Corolla of *Hibiscus rosasinensis*
- Imbricate: Corolla of *Caesalpinia pulcherrima*
- Quincuncial : Corolla of *Antigonon leptopus*
- Vexillary : Corolla of *Clitoria ternatea*

Practical :13 **Inflorescence:**

- RACEMOSE
 - (a) Raceme: *Caesalpinia pulcherrima*, *Brassica juncea*
 - (b) Spike: *Achyranthus aspera*, *Polianthes tuberosa*
 - (c) Spadix: *Colocasia*

- (d) Catkin: Acalyphahispida
- (e) Spikelets: Poaceae (any plant)
- (f) Corymb: Cassia, Ixora
- (g) Umbel: Coriandrum
- (h) Capitata: Acacia, Albizzia
- (i) Capitulum: Helianthus, Tridax

➤ **CYMOSE**

Unbranched:

- (a) Solitary Terminal: Datura
- (b) Solitary Axillary: Hibiscus

Branched:

- (c) Helicoid: Hamelia
- (d) Scorpioid: Heliotropium
- (e) Dichasial or Biparous: Clerodendrum, Nyctanthus, Jasminum
- (f) Polychasial or Multiparous: Nerium, Calotropis

Practical :14 **Placentation:** Study of Placentation to be demonstrated by permanent slides.

- (i) Marginal
- (ii) Axile
- (iii) Free central
- (iv) Parietal
- (v) Superficial
- (vi) Basal

Practical :15 **Angiosperm: (Families)**

- Study of Morphological characters, floral dissection, T.S. of Ovary and floral formulae of following families.
 - (i) Malvaceae : *Hibiscus rosasinensis*, *Thespesia*, *Gossypium*
 - (ii) Convolvulaceae: *Ipomeapalmeta*
 - (iii) Apocynaceae : *Nerium*, *Allamanda*, *Catharanthusroseus*
 - (iv) Nyctaginaceae : *Bougainvillia*, *Mirabilis*
 - (v) Amaryllidaceae : *Crinum*, *Polianthes*

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