VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
Outline of S.Y.B.Sc. Syllabus
Effective from July 2012

Semester	Course	Title	Units	Title
III	301	Plant diversity of lower and higher cryptogams	I	Algae
			II	Fungi &Lichens
			III	Bryophyta
			IV	Pteridophyta
	302	Plant Physiology and Plant Ecology	I	Physiology-I
			II	Physiology-II
			III	Ecology-I
			IV	Ecology-II
	303	Morphology of Angiosperm and plant pathology	I	Root, Stem and Leaf
			II	Flowers and Fruits
			III	Defensive device
			IV	Plant pathology
ID		Biodiversity		
IV	401	Economic Botany, Plant Geography, Cytology, Genetics and Applied Botany	I	Economic Botany
			II	Plant Geography
			III	Cytology And Genetics
			IV	Applied Botany
	402	Structural Botany: Anatomy, Embryology And Biotechnology	I	Tissue System
			II	Anomalous Secondary Growth
			III	Embryology
			IV	Biotechnology
	403	Diversity of Gymnosperms and Angiosperms.	I	Gymnosperm-I
			II	Gymnosperm-II
			III	Angiosperm-I
			IV	Angiosperm-II
ID		Nutrition and Dietetics		

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

S.Y.B.Sc. : SEMESTER III

BOTANY - Syllabus

Effective from July 2012

BOT - 301: Plant Diversity of lower and higher cryptogams

BOT - 302: Plant Physiology & Plant Ecology

BOT- 303: Morphology of Angiosperms & Plant Pathology

Practical

Practical 301 (based on Theory paper 301)

Practical 302 (based on Theory paper 302)

Practical 303 (based on Theory paper 303)

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SYLLABUS FOR S.Y.B.Sc.
BOTANY PAPER-301
SEMESTER-III
Effective from July-2012

BOT - 301: Plant Diversity of lower and higher cryptogams

UNIT I

Algae:

Classification and life history of following types.

1. *Oscillatoria*
2. *Nostoc*
3. *Oedogonium*
4. *Ulothrix*
5. *Ectocarpus*
6. *Batrachospermum*

UNIT II

Fungi:

Classification and life history of following types.

1. *Pythium*
2. *Puccinia*
3. *Peziza*

Lichens:

Classification, types of thallus structure, reproduction and uses.

UNIT III

Bryophyte:

Classification and life history of following types.(except development)

1. *Anthoceros*
2. *Polytrichum*

UNIT IV

Pteridophytes:

Classification and life history of following types.(except development)

1. *Equisetum*
2. *Marsellia*

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BOT - 302: Plant Physiology & Plant Ecology

UNIT I

Plant Physiology I

1. Transpiration:
   Definition and introduction, and type of transpiration
2. Guttation:
   Definition and introduction
3. Respiration:
   Definition, types of respiration (Aerobic and anaerobic respiration), mechanism of respiration (Glycolysis and Kreb's cycle), factors affecting the rate of respiration in plants.
4. Photoperiodism:
   Definition, classification of plants based on photoperiodic response, photoperiodic induction, phytochrome, importance of photoperiodism.

UNIT II

Plant Physiology II

5. Vernalization:
   Vernalization and flowering, inductive type, stimulus f vernalization, mechanism of vernalization, technique of vernalization, application of vernalization.
6. Seed dormancy and germination:
   Seed dormancy, responsible factors for dormancy, methods for breaking seed dormancy.
   Germination of seed, types of germination, factors essential for germination.
7. Insectivorous plants:
   General introduction, study of following different insectivorous plants.
   i. Sarracennia
   ii. Darlingtonia
   iii. Nepenthes
   iv. Drosera
   v. Dionaea
   vi. Aldrovanda
   vii. Butterwort
   viii. Urticularia

UNIT III

Plant Ecology I

1. Vegetation: Origin, development & structure.
2. Plant communities: Halophytes Epiphytes & Lithophytes
3. Ecological Factors: Climatic and Edaphic factor.

UNIT IV

Plant Ecology II

4. Soil erosion and conservation:
   General introduction, types of soil erosion, factors responcible for soil erosion, control of soil erosion.
5. Ecosystems: Component parts of Environment, Concept of Ecosystem, Components of a Ecosystem, Energy flow in Ecosystem, Factors affecting the Ecosystem

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BOTANY PAPER-303
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BOT - 303: Morphology of Angiosperms & Plant Pathology

UNIT I

1. **Root:** Definition, parts of root, types of Root, functions and modification of root.

2. **Stem:** Definition, characters of stem, Shape and surface of stem. Types of stem, function & modification of stem, weak stem plants.

3. **Leaf:** Definition, characters & parts of leaf, types of stipules, Venation, types of leaf, function and Modification of leaf.

UNIT II

1. **Flower :** Definition, Structure of typical flower, Arrangement of floral leaf, Types of flower.

2. **Fruit:** Definition and their types.

UNIT III

Defensive Devices of Plants:

1. Thorns, Spines and Prickles
2. Stinging hairs
3. Sticky glandular hairs

UNIT IV

Plant Pathology: General information, Pathogen, Symptoms and Preventive measures of the following diseases.

1. Late blight of Potato
2. Tikka disease of ground nut
3. White rust of crucifer
4. Red strip of Sugarcane
5. Soft rot of Apple
6. Tobacco Mosaic Virus (TMV)

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BOTANY PRACTICAL-301
SEMESTER-III
Effective from July-2012

BOT-301: Plant diversity of lower and higher cryptogams

LOWER CRYPTOGAMS

(a) Algae

1. ***Oscillatoria***
   To study thallus structure and hormogonia
2. ***Nostoc***
   To study thallus structure and akinets
3. ***Oedogonium***
   To study thallus structure, oogonium and antheridium
4. ***Ulothrix***
   To study thallus structure
5. ***Ectocarpus***
   To study thallus structure, unilocular and plurilocular sporangium.
6. ***Batrachospermum***
   To study thallus structure and cystocarp.
   (To study the permanent slides of above types)

(b) FUNGI

1. ***Pythium***
   To study vegetative structure (permanent slide of Pythium W.M.)
2. ***Peziza***
   To study structure (permanent slide of Apothecia V.M.)
3. ***Puccinia***
   To study the stages on wheat leaf
   Uredospore and Teleuto spore (Permanent slide of Uredospore and Teleuto spore, Pycnidiospores, Aecidiospores)

(c) Lichens

1. To study external features and internal structures of Usnea
   (Permanent slides of Lichen thallus T.S., Lichen apothecium V.S., Lichen soridia)

HIGHER CRYPTOGAMS

(a) Bryophyta

1. *Anthoceros (Horn worts)*

To study external features of gametophytes, anatomy of thallus and sporophytes.
(Permanent slides of Anthoceros thallus T.S., Anthoceros antheredia, Anthoceros archegonia, Anthoceros sporophyte)

2. *Polytrichum*

To study external features of gametophytes, anatomy of thallus and sporophytes.
(Permanent slides of Polytrichum Leaf T.S., Polytrichum Stem T.S., Polytrichum antheredia, Polytrichum archegonia, Polytrichum capsule T.S.)

(b) Pteridophyta

1. *Equisetum*

To study external morphology, anatomy of internode of aerial stem, external morphology and anatomy of cone.
(Permanent slides of Equisetum stem T.S., Equisetum cone T.S. and L.S.)

2. *Marsellia*

To study external morphology of Marsellia plant with spore producing organs, anatomy of stem and sporocarp.
(Permanent slides of Marsellia stem T.S., petiole T.S., Sporocarp T.S. and L.S.)

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SEMESTER-III
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BOT-302: Plant Physiology and Plant Ecology

(a) Following physiological experiments are to be set up by the students. (Requirements to be submitted by the students)

1. To set up an experiment to determine the value of RQ of different respiratory substrate by using Ganong's respirometer.
2. To set up an experiment to demonstrate the process of fermentation by using Kohne's fermentation tube.
3. To set up an experiment to determine the rate of photosynthesis by using Whilmott's bubbler.
4. To set up an experiment to compare the process of photosynthesis and respiration.
5. To set up an experiment to demonstrate that ascent of sap takes place through the xylem by ringing method.

(b) Chemical analysis.

1. Detection of carbohydrates. (Molisch's test, Moore's test)
2. Detection of Proteins. (Biuret test and Xenthoprotein test)
3. Detection of oil (Solubility test, Sudan III test)

(c) Physiological experiments for demonstration only.

1. To demonstrate anaerobic respiration
2. Release of CO_2 during aerobic respiration. (Conical flask method).
3. To demonstrate that energy is released in the form of heat during respiration.
4. To demonstrate that oxygen is evolved during photosynthesis by inverted funnel method.
5. To demonstrate the phenomenon of transpiration. (Bell-jar method)
6. Demonstration of the stomatal transpiration by four leaves method.

(d) To study the specimen/ permanent slides of the following insectivorous plants.

1. *Urticularia*
2. *Drosera*
3. *Pitcher plant (Nepenthus, Saracenia)*
4. *Dionea*

ECOLOGY

(a) Study of ecological peculiarities (external morphology and anatomy) of the following plant communities.

1. Halophytes: *Avicennia*: root and leaf.
2. Epiphytes: *Vanda* : root and leaf.
3. Amphibious: *Typha:* root and leaf.

(b) Following ecological experiments are to be performed by students.

1. To determine water holding capacity of soil.
2. To determine soil pH.
3. To determine carbonate content from soil.
4. To determine Nitrate content from soil.

(c) Study of ecological instruments.

1. Thermograph
2. Hygrograph
3. Anemometer
4. Rainguage.
5. Sling Psychrometer.
6. Soil thermometer.

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BOT-303: Morphology of Angiosperm and Plant pathology

MORPHOLOGY

(1) Roots:

(a) To study different types of roots: Tap, fibrous and adventitious.
Tap root- *Vinca*,
Fibrous- Grass
Advantitious- Sugarcane
(b) To study modification of root:
Prop root- Banyan tree
Stilt root- Maize
Pneumatophores- *Avicennia*
Storage root- Carrot, sweet potato

(2) Stem:

(a) To study different types of stem

I. To study Aerial stem

Erect stem:
Cudex-Palms,
Clum-Bamboo,
Scape- Canna and Onion
Excurrent- *Polyalthia longifolia, Casurina*
Deliquescent- Mango
Weak stem:
Creepers: Cynodon, Centella
Trailers: Boerhaavia diffusa
Climbers:
Twiners: Ipomea carica (Ipomea palmeta), Dolichos lablab
Tendril climber: Passion flower, Vitis sp., Pisum Sp., Clemitis, Tropeolum, Gloriosa superb, Smilax, Antigonon.
Root climbers: Pothos
Scramblers and hook climbers: Rose, Cane, Artobotrys, Zizyphus
Adhesive climber: *Ficus repens*

II **To study underground stem**

Rhizome- Ginger, Turmeric
Tuber- Potato
Bulb- Onion
Corm- Amorphophollus

III To study Specialized stem

Phylloclade- *Opuntia*
Cladode- *Asparagus*

(3) Leaves

(a) To study different types of stipules
Free lateral- Hibiscus
Adnate- Rose
InterPetiolar- *Ixora*
Intra petiolar- *Tabernaemontana*
Ochreate- *Polygonum*
Spiny- *Zizyphus*
Tendrillar- *Smilax*
Bud Scales- *Ficus*

(4) Flower

(a) To study different types of bracts
Foliaceous bracts- Adhatoda
Petaliod- *Bougainvallia*
Spathy- *Colocasia*
Involucaral -Halianthus/Tridex
Scaly- Halianthus/Tridex (disk florets)
Cupule- Hibiscus
Glumes- Maize, grass

(5) Fruits

(a) To study different types of fruits
-Simple fruits.
Legume- Bean, groundnut
Follicle- Callotropis
Siliqua- Brassica
Capsule-Septifragal- Datura, Loculicidal- Lady's finger, Porous- Poppy
Caryopsis- Maize
Achene- Clematis
Drupe-Mango
Berry-Totamto, Brinjal, Hesperidium- Lemon, Pepo-Cucumber, Watermelon,
Pome-Apple
Etaerio of Barries- Custard apple
Etaerio of Drupes- Ochna
Etaerio of achene's-Clematis
Sorosis- Pineapple
Syconus- Fig

(6) To study defensive devices of plants

(a) Thorns- Carissa, Bougainvillea
(b) Spines – Zizyphus, Accacia, Opuntia
(c) Prickles- Rose, Smilax
(d) Stinging hair- Urtica

PLANT PATHOLOGY

(1) Pathogen (Scientific name) and symptoms of following diseases
   (a) Late blight of potato
   (b) Tikka disease of ground nut
   (c) White rust of Crucifer
   (d) Red stripe of Sugarcane
   (e) Soft rot of apple
   (f) Tobacco Mosaic Virus (TMV)

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S.Y.B.Sc. : SEMESTER III

Biodiversity (I.D.) - Syllabus

Effective from July 2012

Unit-1.

- Introduction and scope of biodiversity.
- Importance and values of biodiversity.

Unit-2

- General pattern of vegetation of Gujarat.
- Deciduous forest.
- Scrub forest
- Vegetation of ponds and ditches.
- Vegetation of river bank.
- Vegetation along Sea shore and saline ground.

Unit-3.

- Conservation of biodiversity.
- Endangered, endemic, threatened and rare species of Gujarat and efforts for its conservation.

Unit-4.

- Biodiversity of flora, fauna, mangroves and medicinal Plants of Gujarat.
- In-situ & Ex-situ conservation
- Biodiversity act.
- Biological hot-spots.

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S.Y.B.Sc. : SEMESTER-IV

BOTANY- Syllabus
Effective from July 2012

BOT- 401: Economic Botany, Plant Geography, Cytology, Genetics And Applied Botany

BOT- 402: Structural Botany: Anatomy, Embryology And Biotechnology

BOT- 403: Diversity Of Gymnosperrm And Angiosperms

Practical

Practical 4 (based on Theory paper 401)

Practical 5 (based on Theory paper 402)

Practical 6 (based on Theory paper 403)

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SYLLABUS FOR S.Y.B.Sc.
BOTANY PAPER-401
SEMESTER-IV
Effective from July-2012

BOT-401: Economic Botany, Plant Geography, Cytology, Genetics And Applied Botany

UNIT I: ECONOMIC BOTANY

1. Medicinal plants:
   Scientific name, family, parts used and medicinal uses of the following plants.
   i. *Tylophora indica* (Dam vel)
   ii. *Hemidesmus indicus* (Anant mool)
   iii. *Achyranthes aspera* (Aghedo)
   iv. *Mucuna pruriens* (Kavach)
   v. *Aloe barbedense* (Kuvarpathu)
   vi. *Terminalia belerica* (Behda)
   vii. *Embelica officinalis* (Ambla)
   viii. *Centella asiatica* (Bhrami)
   ix. *Helicteres isora* (Marda singh)
   x. *Santalum album* (Chandan)
2. Rubber and its products

Chemical properties, tapping, grading, packing, marketing and uses.

UNIT: II PLANT GEOGRAPHY

1. Minor forest products of gujarat
2. Cultivation of the following crops in relation to their origin, distribution, climate, soil, propagation, method of cultivation and uses.
   i. Sugarcane
   ii. Rice
   iii. Wheat

3. Fatty oils: drying, semidrying oils, non drying oils and vegetable fats

   i. Glycine max (Soyabean oil)
   ii. Papaver somniferum (Poppy oil)
   iii. Gossypium (Cotton seed oil)
   iv. Sesamum indicum (Sesame oil)
   v. Helianthus annus (Sunflower oil)
   vi. Arachis hypogea (Ground nut oil)
   vii. Ricinus communis (castor oil)
   viii. Cocus nucifera (Coconut oil)

UNIT:III CYTOLOGY AND GENETICS

1. Structure, shape, parts of cell and difference between plant cell and animal cell.
2. Fine structure and functions of Chloroplast and Mitochondria.
3. Lethal genes, Incomplete dominance, Linkage and Crossing over.

UNIT: IV APPLIED BOTANY

1. Plant Tissue Culture
   History, principle, laboratory facilities, culture medium, techniques and applications of plant tissue culture.
2. Ethno-botany
   Introduction, history and branches of ethnobotany
   Scientific name, family, morphology and ethno-botanical uses of following plants:

i. *Butea monosperma*
ii. *Typha angustifolia*
iii. *Tectona grandis*
iv. *Bambusa sp.*
v. *Adansonia digitata*

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BOTANY PAPER-402
SEMESTER-IV
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BOT-402: Structural Botany: Anatomy, Embryology And Biotechnology

UNIT: 1 TISSUE SYSTEM

1. Tissue
   Meristematic tissue: Apical, intercalary and lateral
   Permanent tissue : Simple and complex
2. Epidermal tissue: multiple epidermis, cuticle, Bulliform or motor cell, Stomata, epidermal outgrowth.
3. Glandular tissue: Glandular hair, Nectaries, Digestive gland, Hydathodes,

UNIT: 2 ANOMALOUS SECONDARY GROWTH

1. Definition and Study of anomalous secondary growth seen in the following plants.
   i. Bignonia
   ii. Nyctanthus
   iii. Boerhaavia
   iv. Salvadora
   v. Dracena.

UNIT: 3 EMBRYOLOGY

1. Ovule
   Definition, Structure and types of ovule
2. Pollination
   Definition, Self pollination and Cross pollination; Pollination in Salvia, Ficus, Orchids and Vallisneria
3. Structure of Microsporangium, microsporogenesis and male gametophyte.

UNIT: 4 BIOTECHNOLOGY

1. Introduction & History of Biotechnology
2. Cloning vectors
3. Recombinant DNA Technology
4. Applications of Biotechnology in different field.

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BOTANY PAPER-403
SEMESTER-IV
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BOT-403: Diversity of Gymnosperm and Angiosperms

UNIT: 1 GYMNOSPERM-I

Classification and life history of Pinus (Except development), Classification with reason, External Morphology, Internal Structure, Reproduction, Male gametophyte, Female gametophyte, Fertilization, Germination of seed.

UNIT: 2 GYMNOSPERM- II

Classification and life history of Gnetum (Except development), Classification with reason, External Morphology, Internal Structure, Reproduction- Male and female cone, Male gametophyte, Female gametophyte, Fertilization, formation of embryo

UNIT: 3 ANGIOSPERM-I

1. Plant taxonomy
Definition, Aims & Objective of Plant taxonomy
2. Natural system of Bentham & Hooker system
Introduction of Bentham & Hooker, Merits and Demerits of natural system of Bentham & Hooker system.

UNIT: 4 ANGIOSPERM-II

Classification with reasons (according to Bentham and Hooker system), general and distinguishing characters examples (scientific name) of important plants of the following families.

1. Brassicaceae (Crusiferae),
2. Rosaceae,
3. Papilionaceae,
4. Caesalpiniaceae,
5. Mimosaceae,
6. Combretaceae,
7. Myrtaceae,
8. Rubiaceae,
9. Asclepiadaceae,
10. Scrophulariaceae,
11. Bignoniaceae,
12. Verbenaceae,
13. Lamiaceae (Labiatae),
14. Euphorbiaceae,
15. Pontederiaceae,
16. Arecaceae (Palmae).

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SEMESTER-IV
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Nutrition and Dietetics

Unit: 1

- Definition of Food, Nutrition And Nutrients.
- Function of Food, Classifications Food Groups, Importance of Food Group and Nutritive Value of Food Groups.
  (i) Cereals, (ii) Pulses (iii) Fruits and Vegetables (iv) Milk (v) Sugar And Jaggery (vi) Fats and Oil.
- Concept of Balance Diet, use of food group in planning balance diet. Use of recommended dietary intake (RDIs) in planning balance diet, factors affecting RDIs.

Unit: 2

Macronutrients:

-Carbohydrate: Definition, sources, functions and deficiency symptoms.
-Protein: Definition, sources, functions and deficiency symptoms.
-Fat and lipids: Definition, sources, functions and deficiency symptoms.

Micronutrients:

-Vitamins: Definition, sources, functions and deficiency symptoms.
- Minerals: Definition, sources, functions and deficiency symptoms.
- Water: As a nutrient, requirements, and functions

Unit: 3

Food preservation

-Introduction and Definition

-Importance and Principles of food preservation

-Methods for food preservation

-Food spoilage.

Unit: 4

Meal planning

Definition and principles

Factors to be considered in meal planning, meal planning for School children, teen age and during travel,

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BOT-401: Economic Botany, Plant Geography, Cytology, Genetics And Applied Botany

(1) Scientific name, family, parts used and medicinal uses of the following plants.

(i) Tylophora indica (Dam vel)
(ii) Hemidesmus indicus (Anant mool)
(iii) Achyranthes aspera (Aghedo)
(iv) Mucuna pruriens (Kavach)
(v) Aloe barbedense (Kuvarpathu)
(vi) Terminalia belerica (Behda)
(vii) Embelica officinalis (Ambla)
(viii) Centella asiatica (Bhrami)
(ix) Helicteres isora (Marda singh)
(x) Santalum album (Chandan)

(2) To study following minor forest products:

i. Gum (*Acacia* gum)
ii. Bidee wrappers (*Diospyros sp.*)
iii. Latex (*Calotropis*)
iv. Fiber (Jute)
v. Match box
vi. Paper
vii. Dye (*Bixa orellana*)

(3) Botanical name, family, origin, distribution and uses of the following.

i. Sugarcane
ii. Rice
iii. Wheat
iv. Maize
v. Jowar
vi. Bajari

(4) To study following agriculture equipments and its uses

i. Plough
ii. Sickle
iii. Axe
iv. Cart
v. Khurpi
vi. Spade
vii. Hand sprayer

(5) Botanical name, family, origin and uses of following oil yielding plants

i. Glycine max (Soyabean oil)

ii. Papaver somniferum (Poppy oil)
iii. Gossypium (Cotton seed oil)
iv. Sesamum indicum (Sesame oil)
v. Helianthus annus (Sunflower oil)
vi. Arachis hypogea (Ground nut oil)
vii. Ricinus communis (castor oil)
viii. Cocus nucifera (Coconut oil).

(6) Scientific name, family, morphology and ethno botanical uses of following plants:
i. *Butea monosperma*
ii. *Typha angustifolia*
iii. *Tactona grandis*
iv. *Bambusa sp.*
v. *Adansonia digitata*

(7) To study local name, plant part used, chemical composition and uses of following plant drugs:
i. Drugs obtained from Underground parts- dry ginger (Sunth), Jethi madh, sarpgandha
ii. Drugs obtained from Bark: Taj, cherry, Arjun
iii. Drugs obtained from Leaf: Senna, Ankado, Neelgiri
iv. Drugs obtained from Flower: Clove (Laving), Kesar (saffron), Nagkesar
v. Drugs obtained from Fruit: Cardamom, Fannel, Beal
vi. Drugs obtained from Seeds: Jayphal, Kolchicum, Isabgol

(8) To solve the genetic problem related to Incomplete dominance.

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BOTANY PRACTICAL-402
SEMESTER-IV
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BOT-402: Structural Botany: Anatomy, Embryology and Biotechnology

(1) 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

(2) To study following permanent slides:
- i. Stinging hair
- ii. Stellate hair
- iii. Peltate hair
- iv. Glandular hair
- v. Multiple epidermis
- vi. Sunken stomata
- vii. Hydathode
- viii. Lenticel
- ix. Oil gland
- x. Nectaries
- xi. Digestive gland
- xii. Stone cell
- xiii. Cuticle

(3) To study T.S. of the following stem for abnormal secondary growth of following plants
- i. Bignonia
- ii. Nyctanthus
- iii. Boerhaavia
- iv. Salvadora
- v. Dracena.

(4) To study permanent slides of ovules
- i. Orthrotropous
- ii. Anatropous
- iii. Hemianatropous
- iv. Campylotropous
- v. Amphitropous
- vi. Circinotropous

(5) To study permanent slides of microsporangium
- i. T.S. of young anther
- ii. T.S. of anther showing four mature pollen sacs
- iii. T.S. of mature anther showing dihescence
- iv. Pollen tetrad
- v. Germination of pollen grain

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SYLLABUS FOR S.Y.B.Sc.
BOTANY PRACTICAL-403
SEMESTER-IV
Effective from July-2012
BOT-403: Diversity of Gymnosperm and Angiosperms

(1) To study external morphology, anatomy of pinus needle (leaf)
(permanent slides of Pinus young stem T.S., Pinus needle T.S., Pinus male cone T.S. and L.S., Pinus female cone T.S. and L.S.)

(2) To study external morphology, anatomy of *Gnetum* twig and male and female cones.
(Permanent slide of *Gnetum* young and old stem T.S., leaf T.S., male cone T.S. and L.S., Female cone T.S. and L.S., ovule L.S.)

(3) To study morphological characters, floral dissection, T.S. of Ovary and floral formula of following families.

(i) Brassicaceae (Crusiferae),
(ii) Rosaceae
(iii) Papilionaceae,
(iv) Caesalpiniaceae,
(v) Mimosaceae,
(vi) Combretaceae,
(vii) Myrtaceae,
(viii) Rubiaceae,
(ix) Asclepiadaceae,
(x) Scrophulariaceae,
(xi) Bignoniaceae,
(xii) Verbenaceae,
(xiii) Lamiaceae (Labiatae),
(xiv) Euphorbiaceae,
(xv) Pontidariaceae,
(xvi) Arecaceae (Palmae).