

SKELETON OF S.Y.B.Sc. AND T.Y.B.Sc. SYLLABUS IN BOTANY.

S.Y.B.Sc. Syllabus to be implemented w.e.f. June, 1993)

S.Y.B.Sc.

<u>Paper Number / Course No.</u>	<u>Term-I</u>	<u>Term-II</u>
Paper-I Bot : 2.1	Angiosperm Taxonomy, Economic Botany.	Applied Botany
Paper-II Bot : 2.2	Cell Biology	Plant Physiology
Paper-III Bot : 2.3	Practical (on Bot : 2.1 & Bot : 2.3)	

BOTANY

SECOND YEAR B.Sc.

SYLLABUS (From June, 1993)

Paper - I Bot : 2.1

(Angiosperm Taxonomy and Economic Botany & Applied Botany)

First Term

(Total lectures = 44)

A. Angiosperms Taxonomy :

A-1 Introduction

- i) Distinguishing features.
- ii) Alternation of generation
- iii) Binomial nomenclature (3)

A-2 Systems of Classification

- i) Introduction
- ii) Criteria used for classification of Artificial, Natural and Phylogenetic systems of classification.
- iii) Outline of Bentham and Hooker's system of classification up to series and its merits and demerits (6)

A-3 Study of following plant families w.r.t.

- 1) Classification with reasons.
 - ii) General morphological characters.
 - iii) Distinguishing characters.
 - iv) Floral formula.
 - v) Floral diagram.

vi) Economic importance.

- | | | |
|------------------------|-----------------------------|--------------|
| 1) Family Papaveraceae | 2) Malvaceae | 3) Rutaceae |
| 4) Meliaceae | 5) Papilionaceae (Fabaceae) | |
| 6) Caesalpinaceae | 7) Mimosaceae | 8) Myrtaceae |
| 9) Rubiaceae | 10) Solanaceae | 11) Labiatae |
| 12) Euphorbiaceae | 13) Liliaceae | |
- (21)

A-4 Herbarium techniques and importance of herbaria.
(02)

B. Economic Botany :

General account with reference to Botanical source ,
plant parts, products & uses-

- | | |
|---------------------------|-------------------------|
| B-1 Cereals | - Bajara, Rice. |
| B-2 Pulses | - Gram, Tur. |
| B-3 Oils | - Groundnut, Castor, |
| B-4 Spices and condiments | - Clove, Cardamom. |
| B-5 Fibres | - Cotton, Coconut. |
| B-6 Timber | - Teak, Sisam. |
| B-7 Beverages | - Tea, Coffee |
| B-8 Fruits | - Banana, Grapes |
| B-9 Sugar | - Sugarcane, Beet. (12) |

LIST OF RECOMMENDED BOOKS

1. A Text Book of Systematic Botany - R.K. Gupta.
2. Systematic Botany - Mathur.
3. Taxonomy of Angiosperms - P.C. Vashista.
4. An introduction to Taxonomy of Angiosperms - Pritishukla & Shital Misra.
5. A hand Book of systematic Botany - S.C. Datta.
6. Taxonomy of vascular Plants - Lawrence.
7. Angiosperm Taxonomy, Anatomy, Embryology;
Economic Botany - Pandeya, B.P.
8. Economic Botany - Hill
9. Studies in Botany Vol-I - Mitra, Mitra & Chowdhuri.

SECOND TERMPAPER-I BOT : 2.1 APPLIED BOTANY

(Total lectures - 48)

- A. Introduction, Scope and importance (1)
- B. Biofertilizers :
- B:1 Definition and Types.
- B:2 Methods of culturing Rhizobium and Blue Green Algae
- B:3 Utilization of biofertilizers in agriculture (5)
- C. Fermentation Industry :
- C:1 Introduction, Definition, Microbes involved in fermentation.
- C:2 General process of fermentation :
Pure culture, substrate, sterilization, fermentation, recovery of end product.
- C:3 Production of 1) Ethyl Alcohol 2) Antibiotic Penicillin. (6)
- D. Mushroom Cultivation :
- D:1 Introduction - Edible and poisonous mushrooms
Nutritional value of Mushroom.
- D:2 Important edible species used for cultivation.
- D:3 Method of cultivation. of 1) Agaricus,
2) Pleurotus/Volvariella. (7)
- E. Waste-land Development :
- E:1 Introduction.
- E:2 Causes of Wasteland.
- E:3 Types of Wastelands.
- E:4 Methods of improvement.
- E:5 Plant species used in the reclamation of
i) Salin Soils ii) Acidic Soils. (6)

F. Social Forestry :

- F:1 Definition and scope
- F:2 Social forestry practices - farm forestry, Recreation forestry, Extension forestry.
- F:3 Choice of Species for social forestry.
- F:4 Tree crop husbandary of any one of the following with reference to - a) Method of propagation.
b) Planting and aftercare.
c) Harvesting and Uses - i) Eucalyptus/Teak/Neem/Subabul.

(6)

G. Medicinal Plants :

- G.1 Taxonomic position, distribution, morphology, drug product, active principle and uses of the following-
1) Hirda 2) Behda 3) Amla 4) Vasaka 5) Rauwolfia.

(6)

H. Adulteration in plant products :

- H.1 Introduction.
- H.2 Detection of probable adulterations in the following-
i) Oil-Groundnut.
ii) Spices - Caraway, Clove
iii) Cereals, pulses - Bajara and Tur.
iv) Beverages - Coffee.

(6)

I. Aerobiology :

- I.1 Introduction and scope
- I.2 Aerospora and its importance in-
i) Allergy ii) Apiculture iii) Pollination.

(5)

LIST OF BOOKS RECOMMENDED

1. Biofertilizers in Agriculture - N.S. Subbarao.
2. Role of blue-green algae in nitrogen Economy - R.N. Singh.
3. Economic Botany in tropics - S.L. Kochhar
4. Hand Book of Social forestry - S.S. Negi.
5. Social forestry - M. Sitaram Rao.
6. Food microbiology - Frazier & Westhoff.
7. Management of upland, wasteland (1983) - Bochet.

8. Wasteland development - Report on wasteland of India.
9. Aerobiology - S.T. Tilak.

-X-X-X-X-X-X-X-

PAPER - II BOT : 2.2

FIRST TERM CELL BIOLOGY

(Total lectures-46)

1. Scope and importance of cell biology (1)
2. Origin of Cell and concept of modern cell. (2)
3. General structure of cell.
 - (i) Cell as a structural unit, shape, size.
 - (ii) comparative account of Prokaryotic & Eukaryotic Cell (3)
4. Cell Wall :
 - 1) Middle lamella; primary, secondary and tertiary deposition.
 - 2) Chemical composition of cell wall
 - 3) Ultrastructure of primary cell wall.
 - 4) Functions of cell wall. (4)
5. Plasma Membrane :
 - i) Ultrastructure of plasma membrane and models. (Daniellis and Benson's model).
 - ii) Chemical composition.
 - iii) Concepts of unit membrane.
 - iv) Functions of plasma membrane. (4)
6. Cell Organelles :
 - a) Endoplasmic reticulum :
Organisation, types and functions. (3)
 - b) Golgi complex :
Organisation, Chemical composition & functions. (3)
 - c) Lysosomes :
Types, structure and functions. (1)

- d) Ribosomes :
Occurrence, types (70 S, 80 S), Chemical composition and functions. (1)
- e) Plastids :
i) Schimper's classification.
ii) Chloroplast, Ultrastructure, chemical composition and composition (1)
iii) Leucoplasts and chromoplasts, functions (3)
- f) Mitochondria :
i) Ultrastructure, chemical composition and functions
ii) Mitochondria as a symbionts (3)
- g) Nucleus :
i) General structure of interphase nucleus,
ii) Ultrastructure of nuclear membrane
Nucleolus :
Chemical composition and functions (3)
7. Chromosomes :
i) Number, Size, Shapes and structure, arm ratio, SAT chromosome.
ii) Chromonema, paranemic and plectonemic coiling.
iii) Euchromatin and Heterochromatin.
iv) Giant chromosomes, polytene chromosome, Lampbrush Chromosome.
v) Auto and Sex chromosomes. (6)
8. Nucleic acids :
i) Structure and functions of DNA
ii) Watson and Crick's model of DNA
iii) Structure and function of RNA, types of RNA (3)
9. Cell Division :
Amitotic, mitotic and meiotic cell division and their significance. (3)
10. Chromosomal aberrations and their significance :
i) Deletion ii) Duplication iii) Translocation
iv) Inversion . (3)

LIST OF BOOKS RECOMMENDED

1. Essentials of cell & molecular Biology - De Robertis.
2. Essentials of cytology - C.B. Powar.
3. Cell Biology - J.D.Burke.
4. Cell Biology - CCO C.J. Avers.
5. The Cell - Swanson.
6. Cell Biology - Verma & Agarwal.

-x-x-x-x-x-x-

PAPER + II BOT : 2.2 - Plant Physiology

SECOND TERM

(Total lectures - 44)

1. Definition, introduction, and scope in brief. (2)
2. Diffusion : i) Introduction, ii) Definition
iii) Law of diffusion iv) Mechanisam, (2)
3. Imbibition :
i) Introduction ii) definition iii) Phenomenon (2)
4. Osmosis :
i) Introduction ii) definition iii) pre-requisities
iv) separating membranes, v) solutions of different
concentrations vi) concentration gradience vii) Osmotic
pressure (OP) and DPD viii) Mechanisam.
ix) Equilibrium x) plasmolysis xi) Potato boat
experiment xii) Osmosis in living system (Cells)
(5)
5. Water Absorption :
i) Introduction ii) importance of water iii) Active
and passive absorption of water iv) Discussion of the
following theories : a) Osmotic theory b) Non-Osmotic
theory c) Kramer's theory v) Factors affecting on
water absorption.
(4)

6. Salt absorption :
- i) Introduction, importance of salts/nutrients.
 - ii) Active and passive absorption of salts.
 - iii) Discussion of the following theories :
 - a) Bennet, Clerk and Lundigardh.
 - b) Bonnan's equilibrium.
 - iv) Factors affecting on salt absorption, (5)
7. Transpiration :
- i) Introduction ii) definition iii) Types-Lenticular, cuticular and stomatal iv) Mechanism (Structure of stomata) opening and closing of stomata.
 - v) Theories : a) K- pump b) Stewards theory.
 - vi) Factor's affecting the process.
 - vii) Significance of the process.
 - viii) Cuttation. (5)
8. Ascent of sap :
- i) Introduction, definition.
 - ii) Pathway of solutes - xylem and phloem.
 - iii) Experiments : a) Ringing b) Balsam twig c) Parafin blocking.
 - iv) Theories : a) Vital b) Physical process c) Root pressure d) Cohesion Theory.
9. Enzymes : i) Introduction ii) definition iii) classifica-
tion and Key hypothesis. (5)
10. Photosynthesis : i) Introduction ii) definition
iii) Photosynthetic pigments and their role.
iv) Mechanism.
a) Cyclic photophosphorylation.
b) Non - cyclic photophosphorylation.
c) Calvin cycle.
v) factors affecting the process.
11. Respiration :
- i) Introduction ii) definition iii) Types - Acrobic & Anaerobic iv) Mechanism : a) Glycolysis b) Kreb's cycle
c) Basic knowledge on ETC.
 - v) Alcoholic fermentation.
 - vi) Factors affecting on the process (7)

LIST OF RECOMMENDED BOOKS

1. An Introduction to Plant Physiology - Kochhar.
2. Plant Physiology - Noggle & Friz.
3. Plant Physiology - Devlin.
4. Plant Physiology - Rao.
5. Plant Physiology - Salisbury & Ross
6. Plant Physiology - Sinha & Sinha.
7. Plant Physiology - Mallik.

-X-X-X-X-X-X-X-X-X-

PRACTICAL BOT : 2.3 (BASED ON PAPERS BOT : 2.1 & BOT 2.2)

- 1-5 : Study of any ten families as per theory syllabus with respect to :
- i) Morphological Characters.
 - ii) Systematic Position with reasons.
 - iii) Floral formula & floral diagram.
- 5-8 : Economic Botany :
- Study of diagnostic features of economically important Plants, Parts or products and uses as per theory Syllabus.
9. Cultivation of Agaricus/Pleurotus/Volvariella (any one).
- 10-11: Detection of adulteration in following plant products.
- 10) a) Mixture of Lakhidal in gram.
b) Argemone seeds in mustard Seeds.
c) Grass seeds in Caraway.
 - 11) a) Castor Oil in ground nut Oil.
b) Ergot in Bajara.
c) Adulterated Supari.
12. Demonstration practical.
- i) Culture of Rhizobium and Blue green algae.
 - ii) Sampling of aerospora.
13. Observation and description of following medicinal plants-
- i) Hirda ii) Behda. iii) Amla iv) Vasaka
 - v) Rauwolfia.
14. Study of stages during mitosis in onion root tips (squash Preparation).
15. Study of stages during meiosis (smear preparation)

16. Demonstration Polytene Chromosome (Permanent Slide).
17. Study the molar concentration of Isotonic solution at which incipient plasmolysis takes place.
18. Determine the rate of transpiration in following by varying conditions.
 - a) Intensity of Light.
 - b) Wind velocity.
19. Determine the rate of photosynthesis in aquatic plants. (Hydrilla verticillata) by varying.
 - a) Light intensity.
 - b) Light quality.
20. Effect of temperature on the activity of enzyme-amylase.
- 21-22. Demonstration :
 - a) Imbibition pressure.
 - b) Osmosis - thersel funnel experiment.
 - c) Osmosis - Curling experiment.
 - d) Ringing experiment.
 - e) Relative transpiration.
 - f) Ganong's potometer.
 - g) Kuhne's tube experiment.
 - h) CO_2 necessary for photosynthesis.

- N.B.
- 1) Botanical excursion should be arranged.
 - 2) Properly prepared minimum ten herbarium sheets from the area visited, should be submitted along with excursion report.
 - 3) Students activity-
Preparation of DNA (Paper model)

-x-x-x-x-x-x-