DEPARTMENT OF BOTANY – C.B.C.S. – 2015-2016 onwards

Semester	Part	Subject Code	Title of paper	Teaching		Marks Allotted		Duration of Exam
				Hour	Credit	Internal	External	
III			**Plant Diversity I** Algae, fungi, Bryophytes, Plant pathology and Agricultural microbiology **Lab**	4 2 2	3 - 2	25 - 25	75 - 75	3hrs - 3hrs
IV	III Allied II		**Plant Diversity II** Pteridophytes, Gymnosperms, Anatomy and Embryology **Lab: Practical I**	4 2 2	3 2 2	25 40 25	75 60 75	3hrs 3hrs 3hrs
V			**Paper III** Taxonomy of Angiosperm, Plant physiology, Forest Ecology **Lab**	4 2	3 -	25 -	75 -	3hrs -
VI			**<u>Applied Botany</u>** Plant breeding, Horticulture, Economic Botany, and Herbal medicine, **Lab : Practical II**	4 2	4 2	25 40	75 60	3hrs 3hrs
			Total Credits		21			

Allied Botany – Paper I

Algae, Fungi, Bryophytes, Plant Pathology and Agricultural Microbiology

Semester III **Duration**: 4hrs /Week

Objectives:

1. To have a comprehensive knowledge of algae, fungi and bryophytes
2. To gain the knowledge about the economic importance of algae and fungi
3. To understand the symptoms, dissemination and control measures of plant diseases
4. To appreciate the role of microbes in Agriculture

Unit I Algae:

- General Characters and classification according to Fritsch
- Structure and life history of the following (Need not study development of sex organ, gametophyte and sporophyte)

a. Cyanophyceae - Nostoc

b. Chlorophyceae – Oedogonium

c. Phaeophyceae – Laminaria

- Economic importance of Algae

Unit II Fungi:

- General Characters and classification according to Alexopoulos and Mims
- Structure and life history of the following (Need not study development of sex organ, gametophyte and sporophyte)

a. Ascomycetes – Saccharomyces

b. Basidiomycetes – Puccinia graminis

- Lichens – Structure and reproduction of Usnea
- Economic importance of Fungi

Unit III Bryophytes:

1. General characters of Bryophytes
2. Structure, Reproduction and life history of Moss with special reference to Funaria (Need not study development of sex organ, gametophyte and sporophyte)

Unit IV Plant Pathology:

1. Study of the following plant diseases with reference to causal organism, symptoms, Disease cycle, control and preventive measures of
   a. Bacterial disease – Citrus canker
   b. Fungal disease – Red rot of sugar cane
   c. Virus disease – Tobacco Mosaic Virus

Unit V Agricultural Microbiology:

1. Bio – fertilizers – Advantages of Bio-fertilizers
   a. Nitrogen Fixation
   b. production of Rhizobium and its application
   c. VAM

Text Books:

1. Vasishta, B.R., Botany for Degree Students, Algae, S. Chand and company New Delhi
2. Srivastava, H.N., Algae, Pradeep Publications, Jalandhar
3. Vasishta, B.R., Botany for Degree Students, Fungi, S, Chand and Company, New Delhi.
4. Sharma; P.D., The Fungai, Rastogi Publications, Meerut.
5. Srivastava, H.N., Bryophyta, Pradeep Publications, Jalandhar
6. Sharma, P.D., Microbiology and plant Pathology, Rastogi Publications, Meerut.
7. College Botany, Ganguly and Das

Reference Books:

1. Smith, G.M., Cryptogamic Botany, Tata Mc Graw Hill Publications New Delhi.
2. Alexopoulos, C.J., Introductory Mycology, Willey Eastern, New York
3. Srivastava, H.N., Fungi, Pradeep Publications, Jalandhar.
4. Pandey B.P., Text Book of Botany Vol I, S. Chand and Company, New Delhi
5. Singh, R.S., Plant Diseases, Oxford IBH publications, New Delhi
6. Rengaswami, G., Agricultural Microbiology, Prentice Hall of India, New Delhi.

Allied Botany – Paper II

Pteridophytes, Gymnosperms, Cell Biology, Anatomy and Embryology,

Semester IV **Duration:** 4hrs /Week

Objectives:

1. To gain knowledge about Pteridophytes and Gymnosperms
2. To understand the embryology of Angiosperms
3. To understand the interaction and functioning of various cell organelles and cell division
4. To know about the internal structure of various parts of the plant body

Unit I Pteridophytes:

1. General characters and classification of Pteridophytes according to Smith
2. Structure and life history of Lycopodium (Need not study development of sex organ, gametophyte and sporophyte.)

Unit II Gymnosperms:

1. General characters and classification of Gymnosperms according to Chamberlin
2. Structure and life history of Cycas (Need not study development of sex organ, gametophyte and sporophyte)

Unit III Cell Biology:

1. a) Structure of the Plant Cell wall, Plasma Membrane – (Fluid Mosaic Model)
   Ultra structure of Mitochondria, Chloroplast, and Golgi complex
2. Cell division – Mitosis and Meiosis – Significance of Meiosis

Unit IV Anatomy:

1. Primary Structure of Dicot Stem
2. Primary Structure of Dicot Root
3. Internal structure of Dicot Leaf

Unit V Embryology:

1. Structure of Anther
2. Structure and development of female gametophyte – Polygonum type
3. Endosperm- Types – Nuclear and Cellular (Dicotyledon)
4. Development of Dicot Embryo – Crucifer type

Text Books:

1. Srivastava, H.N., Pteridophytes, Pradeep Publications, Jalandha
2. Srivastava,H.N. Gymnosperms, Pradeep Publications, Jalandhar
3. Tayal, M.S., Plant Anatomy, Rastogi Publications. Meerut
4. Gupta and Varshneya, Embryology of Angiosperms, Tata Mc Graw Hill Publications, New Delhi

Reference Books:

1. Maheswari P., An Introduction to the Embryology of Angiosperms, Tata Mc Graw Hill Publications, New Delhi
2. Bhojwani, S.S., and Bhatnagar, S.P., Text Book of Embryology, Vikas Publishers, Sahibabad
3. Pandey, B.P., Text Book of Botany Vol II, S. Chand and company, New Delhi
4. Vasishta, P.C A text Bood of Plant Anatomy, Pradeep Publications, Jalandhar
5. Pandey, B.P.Plant Anatomy, S Chand and company, New Delhi
6. Sharma B.K. and Singh, S.P. Gymnosperms, Pradeep Publications, Jalandhar

Allied Botany – Paper III

Taxonomy of Angiosperms, Plant Physiology and Forest Ecology

Semester V **Duration**: 4 hrs / week

Objectives:

1. To know the salient features of different families of Angiosperms
2. To identify the plants
3. To understand the concept of metabolic activities of plants
4. To understand the importance of forest protection and to have a knowledge about the conservation and management of forests

Unit I: Taxonomy of Angiosperms

1. Out lines of Bentham and Hooker's systems of classification
2. Salient features of Poaceae- floral characters, floral diagram, floral formula and Economic importance

Unit II:

1. Salient features: Dicot Families
   Annonaceae- Caesalpinaceae- Rubiaceae - Apocynaceae –Euphorbiaceae

Unit III Plant Physiology:

1. Ascent of sap, Absorption of water: - Diffusion, Osmosis, Imbibition
2. Mechanism of water Absorption – Active absorption
3. Transpiration: Types & Mechanism of opening and closing of Stomata starch-sugar
4. Phytohormones- Auxin

Unit IV Plant Metabolism:

1. Photosynthesis –Light and Dark reaction, Factors affecting photosynthesis
2. Respiration : Mechanism of Respiration Glycolysis and Kreb's cycle

Unit V Ecology:

1. Deforestation, Land misuse, indiscriminate tree felling effect of deforestation On environment
1. Conservation of forests against external dangers- fire, diseases, insects, Crazing, by domestic animals, landslide, flood and shifting sands
2. Sylviculture, Social forestry and agro forestry

Text Books:

1. Narayanasamy, R.V. and Rao, K.N., Outlines of Botany, S. Viswanathan, & co, Madras.
2. Rao, K.N., Ancillary Botany, S. Viswanathan, & co, Madras.
3. Vasishta, P.C., Taxonomy of Angiosperms, S. Chand & Co, New Delhi
4. Srivastva, H.N., Plant Physiology, Pradeep Publications, Jalandhar
5. Srivastva, H.S, Plant Physiology, Rastogi Publications, Meerut
6. Sharma, P.D., Ecology and Environment, Rastogi Publications, Meerut

Reference Books:

1. Lawrence, H.M., Taxonomy of Vascular Plants, Oxford & IBH, Publication New Delhi
2. Chopra G.L., Angiosperms, Pradeep Publications, Jalandhar.
3. Singh, V & Jain, T.K., Taxonomy of Angiosperms, Rastogi Publications, Meerut.
4. Salisbury and Ross, Plant Physiology, Prentice and Hall of India , New Delhi.
5. Dwividi, A.P., Agroforestry – Principles & Practices, Oxford & IBH publications, New Delhi.
6. Wilkins, Physiology of Plant growth and development, Tata Mc Graw Hill, New Delhi

Allied Botany – Paper IV

Applied Botany -Horticulture, Plant Breeding, EconomicBotony & Herbal Medicine

Semester VI

Objectives: **Duration**: 4 hrs / week

1. Appreciate nutritive value and used of food products with relevant applied
2. Aspects suited to problems of regional and national needs.
3 To know about different types of plant yielding drugs.
3. To acquire knowledge about the various methods of propagation of plants.
4. To have a knowledge of commercial crop improvement methods.

Unit I Horticultural Methods:

1. Definition, scope and importance of Horticulture
2. Vegetative propagation – cutting., layering and grafting
3. Planning and layout of Kitchen Garden
4. Indoor gardening – Hanging pots, Miniature rockeries

Unit II Plant Breeding:

1. Objective of plant breeding and methods of crop improvement - Introduction, Accumulation - Selection (mass) and Hybridization-
2. Chemical and Polyploidy in Plant Breeding

Unit III Economic Botany

Economic important of the following Edible plants.

Brief study on Botanical name, family, morphology and use of commercial product

a. Cereal – Ragi

b. Pulse –Red Gram

c. Fruit – Grapes

d. Beverage – Coffee

e. Spice – Cardamomum

Unit IV Economic **importance of Non Edible plants**.

Brief study on Botanical name, family, morphology and use of commercial product

a. Narcotics- Tobacco

b. Dye – Indigo

c. Fibre – Jute

d. Latex – Rubber

e. Tannin – Wattle Bark

f. Wood- Rose wood

g. Resins and Gum – Turpentine

Unit IV Herbal medicines:

Botanical name, family of useful parts and medicinal Values:

a) Seed -castor oil

b) Roots – Asparagus

c) Rhizome – Curcuma

d) Bark – Cinchona officainalis

e) Leaves – Aloe vera

f) Flowers – Eugenia caryophyllum

Text Books:

1. Kumar, H.D., Text Book of Horticulture, Vikas Publishing Company, Sahibabad.
2. Sinha and Punitha, Cytogenetics, Plant Breeding and Evolution, Vikas publishing Company, Sahibabad.
3. BentHill, A.F., Economic Botony, Tata Mc Graw Hill Publishers, New Delhi.
4. Sambamoorthy, A.F., and Subramaniam, N.S., A Text Book of Economic Botany, Willey Eastern Limited, New Delhi.
5. Manibhushan Rao, K., Text Book of Horticulture Mac Millan India, Madras.
6. Burgen et al., Gaddam's Pharmacology, The English Language Book Society, London.

Reference Books:

1. Edmend et al., Fundamentals of Horticulture, Tata Mc Graw Hill Publishers, New Delhi.
2. Pandey, B.P., Economic Botany, S. Chand and company, New Delhi.
3. Sadhu, M.K.,Plant Propagation, Willey Eastern Publishers, New Delhi.
4. Sukla, R.S. and Chandel P.S., Cytogenetics, Evolution and Plant Breeding, S. Chand and company, New Delhi.

Allied Botany – Practical Paper I

Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms, Cell Biology, Anatomy, Embryology, Plant Pathology & Agricultural Microbiology.

Semester IV **Duration** : 2 hrs / week

1. Identification of permanent slides showing cell inclusions and Mitosis.
2. Cutting, mounting and identifying T.S. of stem and root of Dicots – Primary structure, secondary growth.
3. Cutting, mounting and identifying T.S. of leaf of Dicot
4. Micropreparation and identification of the algal and fungal forms prescribed in the syllabus.
5. Identification of vegetative parts of Funaria, Lycopodium and Cycas.
6. Cutting, mounting and identifying T.S. of Vegetative parts of Funaria. Lycopodium and Cycas.
7. Identification of permanent slides of capsule of Funaria and cones of Lycopodium and Cycas.
8. Identification of sections of anther and ovule
9. To observe and identify the diseases specified in the syllabus
10. To maintain an observation note and record note book. Submit the record for external valuation

Allied Botany – Practical Paper II

Angiosperm Taxonomy, Plant Physiology,

Horticulture, Plant Breeding

Economic Botany & Herbal Medicine,

Semester VI **Duration: 2hrs / week**

1. To dissect and mount the floral parts of the plants of the families prescribed in the syllabus.
2. To describe the plants in technical terms.
3. To assign the given plant to its family giving reasons.
4. To identify the economic products specified in the syllabus and point out the Botanical name, family, morphology of useful part and their users.
5. Propagation methods of horticulture – cutting, layering and grafting.
6. Lay out of kitchen garden.
7. To describe simple setups in plant physiology.
8. To observe and identify at sight and point out the Botanical name, family and morphology of useful part of the medicinal plants.
9. To maintain an observation note and record note book submit it for external valuation