III B. Sc - SEMESTER- V: BOTANY SYLLABUS
THEORY PAPER – V
Paper-V: Cell Biology, Genetics and Plant Breeding
Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I Cell Biology: (12hrs)

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

UNIT – II Genetic Material: (12hrs)

1. DNA as the genetic material: Griffith’s and Avery’s transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.

UNIT – III Mendelian Inheritance: (12 hrs)

1. Mendel’s laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.

UNIT – IV Plant Breeding: (12 hrs)

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

UNIT – V Breeding, Crop Improvement and Biotechnology: (12 hrs)

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).
Suggested activity: Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

Books for Reference:

III B. Sc - BOTANY SYLLABUS  SEMESTER- V
Practical Paper-V: CELL BIOLOGY, GENETICS AND PLANT BREEDING
Total hours of teaching 30hrs @ 2hrs per week

Suggested Laboratory Exercises:

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
4. Study of DNA packing by micrographs.
5. Study of effect of temperature & organic solvent on permeability of cell membrane.
7. Chromosome mapping using 3 point test cross data.
8. Hybridization techniques – emasculation, bagging (for demonstration only).
9. Field visit to a plant breeding research station.

III B. Sc – SEMESTER- V, BOTANY PRACTICAL MODEL PAPER
PAPER-V:  CELL BIOLOGY, GENETICS AND PLANT BREEDING

1. Perform the Experiment A .Perform squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage.  
   \[1 \times 15 = 15\text{marks}\]

2. Give the experimental protocol of the experiments  B  
   \[1 \times 10 = 10\text{ marks}\]

3. Solving numerical problems on Mendelian inheritance  C,D  
   \[2 \times 7 \frac{1}{2} = 15\text{marks}\]

4. Record & Viva  
   \[= 10\text{marks}\]

   \[\text{----------------------}\]
   \[50\text{marks}\]

A-Onion root squash technique 
B- Estimation of DNA by diphenylamine method 
C&D Numerical problems on Mendelian Inheritance.
III B. Sc - SEMESTER-V: BOTANY THEORY SYLLABUS
PAPER-VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I. Elements of Ecology (12 hrs)
2. Climatic Factors: Light, Temperature, precipitation.
4. Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology (12 hrs)
1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.

UNIT – II Population & Community Ecology (12 hrs)
1. Population - definition, characteristics and importance, outlines – ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.
3. Interaction between plants growing in a community.

UNIT – IV Phytogeography (12 hrs)
1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

UNIT- V: Plant Biodiversity and its importance (12 hrs)
1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots - Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (In-situ and ex-situ methods).
4. Seed banks - conservation of genetic resources and their importance

Suggested activity: Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man’s activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.
Books for Reference:

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauze, and lux meter.

2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.

3. Determination of soil pH

4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)

5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method

6. Study of Phytoplankton and macrophytes from water bodies.

7. Study of species diversity index of vegetation.

8. Estimation of Primary Productivity of an ecosystem

9. To study field vegetation with respect to stratification, canopy cover and composition.

10. Study of plants included in agro forestry and social forestry.

11. To locate the hotspots, phyto geographical regions and distribution of endemic plants in the map of India.

11. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.
III B. Sc - SEMESTER- V: BOTANY PRACTICAL MODEL PAPER
PAPER–VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

1. Study Project under supervision = 15 Marks
2. Record & Viva-Voce = 10 Marks
3. Experiment  A = 10 Marks
4. Anatomical adaptations of  B  (Section cutting) = 10 Marks
5. Spotters  C&D (2x2 1/2) = 5 Marks

Total = 50 Marks

1. Study Project of a surrounding Ecosystem (terrestrial or aquatic)(plant diversity, animal diversity, human activity, pollution levels, restoration efforts under supervision.
2. Presentation of the project work in Q & A session.
5. C & D-anemometer/rain gauze/lux meter.
BOTANY
Model Theory Question Paper

III B.Sc SEMESTER – V

Paper – V (Cell Biology, Genetics and Plant Breeding)

Time : 3 Hrs
Max. Marks : 75 Marks

Section- A

5x5 = 25 Marks

Answer any five of the following:

1. Enumerate Eukaryotic cell Components.

2. Write Short notes on types of Chromosomes.

3. Write about the structure and function of m-R.N.A.

4. Discuss about the Griffith and Avery Experiment.

5. Test cross : 

6. Complete Linkage : 

7. Plant Hybridization : 

8. Molecular Plant Breeding : 

Dr. K. Sujatha
Chairperson

1. G. V. GOUNADARASULU
   ROS Member

2. B. LAKSHMI
   B.O S. Member
Section-B

5x10=50 Marks

Answer all Questions:
Draw neat and labeled diagrams wherever necessary.

9.(a) Write an essay on structure and function of Plasma membrane.

(Or)

(b) Describe the Ultra structure of Chromosomes.

10.(a) Describe Hershey- Chase Bacteria Phage Experiment.

(Or)

(b) Write an essay on DNA replication.

11.(a) Discuss about Chromosomal theory of Inheritance.

(Or)

(b) Write about Crossing over Concept and its Significance.

1. Anuradha
   (M. Konukatamalla)
   Bos S. Member

2. B. Lakshmi
   Dr. B. Lakshmi
   Bos S. Member

K. Sujatha
   Dr. K. Sujatha
   Bos Chairperson
12. (a) Write an essay on objectives of Plant Breeding.

(b) Describe about advantages and limitations of Plant Selection.

13. (a) Explain the role of Mutations in Crop-Improvement.

(b) Describe the uses of DNA markers in Plant Breeding.

1. (D. HOUNDA & ATULU)
   BOS Member

2. (B. Loka)
   DR. B. (A. K. SHMI)
   BOS Member

K.Sujatha
Dr. K. Sujatha
BOS Chairperson
BOTANY
Model Theory Question Paper

III B.Sc SEMESTER –V
Paper –VI (Plant Ecology & Phyto Geography)

Time : 3 Hrs
Max.Marks : 75 Marks

Section- A

5x5=25 Marks

Answer any five of the following:
Draw neat and labeled diagrams wherever necessary.

1. Origin of soil

2. Food Chain

3. Significance of Ecology

4. Ecotype

5. Energy Flow

6. Plant Distribution

7. In-Situ Conservation

8. Net Productivity

(DHOUNIDANASULU)
BOS Member

(B. LAGHY)
DR. B. C. KESTHI
B.O.S. Member
Section-B

5x10=50 Marks

Answer all Questions:
Draw neat and labeled diagrams wherever necessary.

9. (a) Describe the role of Temperature and Light in Ecology.

Or

(b) Discuss about the interactions between Plants and Animals in Ecology.

10. (a) Explain the significance of Ecological Pyramids.

Or

(b) Write an essay on Nitrogen Cycle.

11. (a) Describe the role of Plant Communities in Ecology.

Or

(b) Write about the importance of Plant Population.

K. Sujatha
Chairperson

C.D. (Goudapala) Rama Rao

Dr. B. Lakshmi

B. O. S. Ramab

(D. Goudapala)
12. (a) Write an essay on Phyto geographic regions of India.
(Or)

(b) What is Endemism? Describe types and causes of Endemism.

13. (a) Describe the Bio-Diversity Hot-Spots of India.
(Or)

(b) Write about the role of Seed Banks, Conservation of genetic resources and their importance.

1. <signature>
   (Dr. Goudarfatulu)
   Bos member

2. <signature>
   Dr. B. Lokesh
   Bos member

Dr. K. Sujatha
Bos chairperson