

BOTANY – FIFTH SEMESTER (SEP) – PAPER-5**MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY**

Course No.	Theory/ Practical	Credits	Instruction Hrs. per week	Total No. of lectures/ hours per semester	Duration of Exam	Formative assessment Marks	Summative assessment Marks	Total Marks
	Theory	03	04 Hrs.	64 Hrs.	3 Hrs.	20	80	100

Course Outcome:

1. Understanding the main features of Angiosperms.
2. Ability to identify, classify and describe a plant in scientific terms.
3. Interpret the rules of ICN in botanical nomenclature.
4. Recognition of locally available angiosperm families.
5. Classify Plant Systematic and recognize the importance of herbarium.
6. Study the economic importance of plant species.

Unit-1: Morphology**-20 Hrs.**

Root: Introduction, classification, Modification for storage (fusiform, conical, napiform, nodulated, moniliform, tuberous and fasciculated), support (epiphytic and aerial) and respiration (respiratory/pneumatophores) floating and sucking (haustoria).

Stem: Introduction, branching type. Modifications: -Rhizome, stem tuber, bulb, corm, Runner, stolon, sucker, off-set, phylloclade, cladode, thorn and tendril.

Leaf: Introduction, Types (simple and compound), Phyllotaxy (alternate, opposite and whorled) stipules. Modifications: - phyllode, spines, tendril, hooks, Insectivorous plant-pitcher plant and sundew plant.

Inflorescence- General account of racemose and cymose including special types.

Flower: Complete account of floral morphology – Cohesion of calyx and corolla, aestivation, attachment and dehiscence and cohesion and adhesion of anthers, apocarpous and syncarpous, placentation, style and stigma, floral formula and floral diagram.

Fruit: General account including classification and types of fruits.

Unit-2: Taxonomy of Angiosperms**-28 Hrs.**

Principles of classification, Binomial nomenclature, Principles and rules of ICN, species concept, systems of classification, Bentham and Hooker's system of classification – its merits and demerits, Herbarium techniques and importance of herbaria of India, Brief account of APG system.

Study of following families with plants of economic importance (Bentham and Hooker's system to be followed).

Dicotyledonae: Annonaceae, Brassicaceae, Malvaceae, Fabaceae (Papilionoideae Caesalpinoideae and Mimosoideae), Cucurbitaceae, Apiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Solanaceae, Acanthaceae, Lamiaceae, Amaranthaceae, and Euphorbiaceae.

Monocotyledonae: Orchidaceae, Liliaceae, Arecaceae and Poaceae.

Unit-3: Economic Botany**- 16 Hrs.**

Food: Cereals, Millets and Pulses: Jowar, Ragi, Wheat, Rice; Pulses- Red Gram, Black gram and Bengal gram.

Oils and Fats: Groundnut, Coconut and Sunflower.

Beverages: Tea and Coffee.

Textile Fibres: Cotton and Coir.

Spices: Cardamom, Clove, and Cinnamon.

Timber: Teak and Rosewood.

Narcotic: Tobacco, Opium and *Cannabis*.

Medicinal plants: *Rauwolfia serpentina*, *Catharanthus roseus*, *Tylophora asthmatica*, *Cinchona officinalis*, *Withania somnifera*, *Tinospora cordifolia*, *Ocimum tenuifolium*, *Phyllanthus emblica*, *Hemidesmus indicus*, *Marsdenia sylvestre*, *Allium sativum*, *Aloe vera*, *Curcuma longa* and *Zingiber officinale*.

References:

1. **B.P. Pandey** – *A Textbook of Botany: Angiosperms* – S. Chand & Company Ltd., New Delhi.
2. **B.P. Pandey** – *Plant Taxonomy* – S. Chand & Company Ltd., New Delhi.
3. **V. Singh, D.K. Jain & P.C. Pande** – *Taxonomy of Angiosperms* – Rastogi Publications, Meerut.
4. **T. Pullaiah & S. Karuppusamy** – *Taxonomy of Angiosperms* – Regency Publications, New Delhi.
5. **B.K. Verma** – *Introduction to Taxonomy of Angiosperms* – PHI Learning Pvt. Ltd., New Delhi.
6. **Gurcharan Singh** – *Plant Systematics: Theory and Practice* – Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
7. **Simpson, M.G.** – *Plant Systematics* – Academic Press, USA.
8. **Judd, W.S. et al.** – *Plant Systematics: A Phylogenetic Approach* – Sinauer Associates, USA.
9. **P.C. Trivedi** – *Economic Botany* – Pointer Publishers, Jaipur.
10. **S.L. Kochhar** – *Economic Botany in the Tropics* – Macmillan India Ltd., New Delhi.
11. **Hill, A.F.** – *Economic Botany* – McGraw-Hill Book Company, New York.
12. **Annie Ragland & V. Kumaresan** – *Morphology of Angiosperms, Taxonomy and Economic Botany* – Saras Publication, Nagercoil.
13. **Anand Pandey** – *Angiosperm Taxonomy: A Comprehensive Guide* – Oxford Book Company, New Delhi.

KUVEMPU UNIVERSITY
SCHEME OF QUESTION PAPER (SEP) (THEORY)
V Semester, Paper-5, B.Sc., Degree Examination
MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer all of the following

10 X 2 = 20

3 from Unit I

4 from Unit II

3 from Unit III

II. Answer any SIX of the following

6 X 5 = 30

3 from Unit I

3 from Unit II

2 from Unit III

III. Describe any THREE of the following in detail

3 X 10 = 30

1 from Unit I

2 from Unit II

1 from Unit III (5M X 2 Questions)

1 from Unit I & II (5M X 2 Questions)

Unit	2 Mark	5 Marks	10 Marks	Total
I	3 X 2 = 6	3 X 5 = 15	1 X 10 = 10	36
			1 X 05 = 05	
II	4 X 2 = 8	3 X 5 = 15	2 X 10 = 20	48
			1 X 05 = 05	
III	3 X 2 = 6	2 X 5 = 10	2 X 05 = 10	26
Total	20	40	50	

Assessment method

Assessment		Marks
C ₁	Test-1	10
C ₂	Test-2	10
C ₃	Semester end exam	80

KUVEMPU UNIVERSITY
SCHEME OF QUESTION PAPER (SEP) (THEORY)
V Semester, Paper-5, B.Sc., Degree Examination
MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer all of the following

10 X 2 = 20

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Section – B

II. Answer any SIX of the following

6 X 5 = 30

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

III. Describe any THREE of the following in detail

3 X 10 = 30

- 19.
- 20.
- 21.
22.
 - a.
 - b.
23.
 - a.
 - b.

KUVEMPU UNIVERSITY

BOTANY – FIFTH SEMESTER (SEP) – PAPER-6

CYTOLOGY, GENETICS AND MOLECULAR BIOLOGY

Course No.	Theory/ Practical	Credits	Instruction Hrs. per week	Total No. of lectures/ hours per semester	Duration of Exam	Formative assessment Marks	Summative assessment Marks	Total Marks
	Theory	03	04 Hrs.	64 Hrs.	3 Hrs.	20	80	100

Course Outcome:

1. Understand Cell Structure and Function.
2. Explain Cellular Processes.
3. Comprehend Principles of Genetics.
4. Analyse Molecular Basis of Inheritance.
5. Understand Mendelian and non- Mendelian inheritance.

Unit-1: Cellular organization and cytogenetics

-22 Hrs.

The Cell: Ultrastructure of a plant cell, organization and functions - cell wall, membranes (fluid mosaic model) Endoplasmic reticulum, Golgi apparatus, Peroxisomes, Ribosomes, Mitochondria, Plastids, Cytoplasm, Vacuole, Cell sap, Non-living, inclusions, Nucleus, Nucleoplasm, Nuclear membrane, Pores and Nucleolus.

Chromosomes: Size, number, structure, Types of chromosomes (based on position of centromere), Karyotype, heterochromatin (facultative and constitutive heterochromatin). Euchromatin, Chromosomal Model; nucleosome model; Chromosomal aberrations – Structural and numerical (deletion, duplication, inversion, translocations).

Variation in chromosome number: Haploidy and Polyploidy (Aneuploidy, euploidy, autopolyploidy, allopolyploids-with reference to *Raphanobrassica*), Character of Polyploidy and its significance of Polyploidy.

Cell Division: Introduction, Cell Cycle-Regulation of cell cycle (positive and negative)- checkpoints. – Mitosis, Meiosis and their significance.

Unit-2: Molecular Biology

-22 Hrs.

Nucleic acids: Occurrence, types, structure, chemical composition and functions of RNA and DNA

DNA - Double helix model and mechanism of DNA replication (semi conservative method).

Concept of Gene: Fine structure of Gene, expression and regulation- exons, introns, inducible and repressible genes: the operon concept; lac operon(inducible)and repression operon(tryptophan).

Gene Mutation: Mutation and Mutagens (spontaneous, induced: point mutation).

Genetic Code: Code dictionary and properties of genetic code.

Protein synthesis: Central dogma: mechanism of protein synthesis transcription and translation.

Unit-3: Genetics

- 20 Hrs.

Mendelian Genetics: Introduction, a brief history of Mendel, Principles of Mendel, Monohybrid cross. Monohybrid Test cross, Dihybrid cross, DihybridTest cross.

Incomplete dominance (*Mirabilis jalapa*).

Extension of Mendelian Principles: (With reference to plant examples) Interaction of genes – Epistasis (dominant and recessive); supplementary factors, complementary factors: multiple alleles (self-sterility in *Nicotiana*), Linkage and crossing over (Maize).

Sex determination in *Melandirum*. Cytoplasmic inheritance (*Mirabilis jalapa*).

References:

1. **P.S. Verma & V.K. Agarwal** – *Cytology* – S. Chand & Company Ltd., New Delhi.
2. **Bruce Alberts et al.** – *Molecular Biology of the Cell* – Garland Science, New York. (*A globally recognized standard text for cell biology*)
3. **Gerald Karp** – *Cell and Molecular Biology: Concepts and Experiments* – John Wiley & Sons, New York.
4. **De Robertis, E.D.P. & De Robertis, E.M.F.** – *Cell and Molecular Biology* – Lippincott Williams & Wilkins, Philadelphia.
5. **James D. Watson et al.** – *Molecular Biology of the Gene* – Pearson/Benjamin Cummings, San Francisco.
6. **Geoffrey M. Cooper & Robert E. Hausman** – *The Cell: A Molecular Approach* – Sinauer Associates, Sunderland.
7. **S.B. Primrose & R.M. Twyman** – *Principles of Gene Manipulation and Genomics* – Blackwell Publishing, Oxford.
8. **H.D. Kumar** – *Molecular Biology and Biotechnology* – Vikas Publishing House, New Delhi.
9. **P.K. Gupta** – *Genetics* – Rastogi Publications, Meerut.
10. **Gardner, Simmons & Snustad** – *Principles of Genetics* – John Wiley & Sons, New York.
11. **Klug, Cummings & Spencer** – *Concepts of Genetics* – Pearson Education, San Francisco.
12. **Griffiths et al.** – *Introduction to Genetic Analysis* – W.H. Freeman & Company, New York.
13. **P.J. Russell** – *Genetics: A Molecular Approach* – Pearson Education, San Francisco.
14. **P.S. Verma, V.K. Agarwal & S. Chandra** – *Genetics* – S. Chand & Company Ltd., New Delhi.
15. **C.B. Powar** – *Cell Biology* – Himalaya Publishing House, Mumbai.
16. **Veer Bala Rastogi** – *Cell Biology* – Medtech Publishers, New Delhi.

KUVEMPU UNIVERSITY
SCHEME OF QUESTION PAPER (SEP) (THEORY)
V Semester, Paper-6, B.Sc., Degree Examination
CYTOLOGY, GENETICS AND MOLECULAR BIOLOGY

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer all of the following

10 X 2 = 20

4 from Unit I

3 from Unit II

3 from Unit III

II. Answer any SIX of the following

6 X 5 = 30

3 from Unit I

3 from Unit II

2 from Unit III

III. Describe any THREE of the following in detail

3 X 10 = 30

1 from Unit I

2 from Unit II

1 from Unit III

1 from Unit I & III (5M X 02 Questions)

Unit	2 Mark	5 Marks	10 Marks	Total
I	4 X 2 = 8	3 X 5 = 15	1 X 10 = 10	33
			1 X 05 = 05	
II	3 X 2 = 6	3 X 5 = 15	2 X 10 = 20	41
III	3 X 2 = 6	2 X 5 = 10	1 X 10 = 10	36
			1 X 05 = 05	
Total	20	48	50	

Assessment method

Assessment		Marks
C ₁	Test-1	10
C ₂	Test-2	10
C ₃	Semester end exam	80

KUVEMPU UNIVERSITY
SCHEME OF QUESTION PAPER (SEP) (THEORY)
V Semester, Paper-6, B.Sc., Degree Examination
CYTOLOGY, GENETICS AND MOLECULAR BIOLOGY

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer all of the following

10 X 2 = 20

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Section – B

II. Answer any SIX of the following

6 X 5 = 30

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

III. Describe any THREE of the following in detail

3 X 10 = 30

- 19.
- 20.
- 21.
- 22.
23.
 - a.
 - b.

KUVEMPU UNIVERSITY**BOTANY – FIFTH SEMESTER (SEP) – PAPER-5 & 6****PRACTICAL SYLLABUS****MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY****&****CYTOLOGY, GENETICS AND MOLECULAR BIOLOGY**

Course No.	Theory/ Practical	Credits	Instruction Hrs. per week	Total No. of lectures/ hours per semester	Duration of Exam	Formative assessment Marks	Summative assessment Marks	Total Marks
	Practical	02	04 Hrs.	48 Hrs.	3 Hrs.	10	40	50

1. Morphology and modifications of root and stem.
2. Morphology and modifications of leaves and inflorescence types.
3. Structure of flower and Types of fruits
4. Malvaceae and Annonaceae,
5. Brassicaceae and Fabaceae (Caesalpinioideae, Papilionoideae)
6. Fabaceae (Mimosoideae), Apiaceae and Apocynaceae.
7. Asteraceae, Asclepiadaceae and Solanaceae.
8. Lamiaceae, Euphorbiaceae and Amaranthaceae
9. Poaceae Arecaceae and Economic Botany
10. Preparation and study of different stages of mitosis.
11. Preparation and study of different stages of Meiosis.
12. Genetic problems from the given list.
13. Field visit/ trip

Assessment method

Assessment		Marks
C ₁	Continuous assessment (CA)	05
C ₂	Assignment	05
C ₃	Semester end exam	40

KUVEMPU UNIVERSITY
V SEMESTER – PAPER - 5 & 6
Practical Question Paper (SEP)

MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY
&
CYTOLOGY, GENETICS AND MOLECULAR BIOLOGY

Max. Marks: 40

Code: DSCB 1.3

- | | | |
|------|--|-------------|
| I. | Identify the families A, B & C | - 09 |
| II. | Draw floral diagram with floral formula of D | - 03 |
| III. | Write the morphological and biological importance of E & F . | - 04 |
| IV. | Write the economic importance of G & H | -04 |
| V. | Prepare squash/smear of material I , identify, sketch and label the stages with reasons | -06 |
| VI. | Identify the slide J with reasons | -04 |
| VII. | Genetic problem | -05 |
| V. | Record submission | - 05 |

**MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY
&
CYTOLOGY, GENETICS AND MOLECULAR BIOLOGY**

Max. Marks: 40

Code: DSCB 1.3

- I. Identify the families **A, B & C** - **09**
(one from Polypetalae; one from Gamopetalae; one from Monochlamydae or Monocotyledonae) (Identification – 01; Family characters – 02)
- II. Draw floral diagram with floral formula of **D** - **03**
(Floral diagram – 02; Floral formula-01)
- III. Write the morphological and biological importance of **E & F**. - **04**
(Identification – 01; Reasons – 01)
- IV. Write the economic importance of **G & H** - **04**
(Identification-01; economic importance-01)
- V. Prepare squash/smear of material **I**, identify, sketch and label the stages with reasons - **06**
(Mitosis/Meiosis) (Preparation – 03; Identification with reasons -02; Sketch & label – 01)
- VI. Identify the slide **J** with reasons - **04**
(Mitosis/Meiosis) (Preparation – 03; identification with reasons – 01)
- VII. Genetic problem - **05**
(Monohybrid/dihybrid/Test cross/incomplete dominance/epistasis/linkage/crossing over)
- V. Record submission - **05**

KUVEMPU UNIVERSITY

BOTANY – SIXTH SEMESTER (SEP) – PAPER - 7

PLANT PHYSIOLOGY

Course No.	Theory/ Practical	Credits	Instruction Hrs. per week	Total No. of lectures/ hours per semester	Duration of Exam	Formative assessment Marks	Summative assessment Marks	Total Marks
	Theory	03	04 Hrs.	64 Hrs.	3 Hrs.	20	80	100

Course Outcome:

1. Importance of water and the mechanism of transport.
2. Understand biosynthesis and breakdown of biomolecules.
3. Role of plant hormones in plant development.
4. Preliminary understanding of the basic functions and metabolism in a plant body.
5. Understand the importance of nutrients in plant metabolism and crop yield.

Unit-1:

-22 Hrs.

Plant Water Relation: Significance of water for plants. Solutions (Molar and Mole), colloidal systems (hydrophilic and hydrophobic). Osmosis (O.P, T.P, D.P.D, and water potential. Plasmolysis, exosmosis, de-plasmolysis and endosmosis)

Absorption of water: Mechanism active osmotic and active non osmotic absorption and passive absorption. Ascent of sap-path (only Balsam experiment) mechanism, Root pressure and T.C.T theory.

Absorption of Mineral Salts: Mechanism of absorption passive absorption (diffusion, mass flow, -exchange, Donnan equilibrium), active absorption, Cytochrome pump theory, carrier concept.

Transpiration: Types, structure of stomata, mechanism of stomatal transpiration and movement. Starch-sugar hypothesis, Significance of transpiration, Guttation and brief account on antitranspirants.

Translocation of Solutes: Types (upward, radial and downward), path (phloem ringing experiment, protoplasmic streaming theory, vein loading and unloading and Munch mass flow theory.

Unit-2:

-22 Hrs.

Enzymes: Introduction, nomenclature, classification, properties and Mechanism of enzyme action.

Photosynthesis: Introduction, structure and function of chloroplast, photosynthesis pigment, Photosystem I and Photosystem II, light and dark reaction, C₃ and C₄ pathway. The law of limiting factor, factors affecting photosynthesis. CAM photosynthesis.

An account of photorespiration and its significance.

Respiration: Introduction, types, Biochemical pathways of respiration –glycolysis. TCA cycle, oxidative phosphorylation. An account of anaerobic respiration and fermentation and its Significance.

Unit-3:

-20 Hrs.

Mineral Nutrition: A brief account on Micro and Macro nutrients. Role and deficiency symptoms of N.P.K and Mg, Fe, Cu.

Phytohormones: Definition, natural and synthetic hormones, physiological and practical application of auxins, gibberellins, cytokinins, ethylene and ABA.

Plant Growth and movement: Introduction, definition, phases of growth, growth curve, factors affecting growth. Plant Movement: Introduction and classification.

Physiology of flowering: Photoperiodism, types, role of phytochrome and vernalisation. Ageing and senescence.

References:

1. **Taiz, L., Zeiger, E., Møller, I.M. & Murphy, A.** – *Plant Physiology and Development* – Sinauer Associates, Sunderland (USA).
2. **Salisbury, F.B. & Ross, C.W.** – *Plant Physiology* – CBS Publishers & Distributors, New Delhi.
3. **Lincoln Taiz & Eduardo Zeiger** – *Plant Physiology* – Sinauer Associates, Sunderland (USA).
4. **Hans Mohr & Peter Schopfer** – *Plant Physiology* – Springer-Verlag, Berlin.
5. **V.K. Jain** – *Fundamentals of Plant Physiology* – S. Chand & Company Ltd., New Delhi.
6. **S.N. Pandey & B.K. Sinha** – *Plant Physiology* – Vikas Publishing House Pvt. Ltd., New Delhi.
7. **H.S. Srivastava** – *Plant Physiology* – Rastogi Publications, Meerut.
8. **P.S. Verma & V.K. Agarwal** – *Plant Physiology* – S. Chand & Company Ltd., New Delhi.
9. **Hopkins, W.G. & Hüner, N.P.A.** – *Introduction to Plant Physiology* – John Wiley & Sons, New York.
10. **Goodwin, T.W. & Mercer, E.I.** – *Introduction to Plant Biochemistry* – Pergamon Press, Oxford.
11. **Devlin, R.M. & Witham, F.H.** – *Plant Physiology* – CBS Publishers & Distributors, New Delhi.

KUVEMPU UNIVERSITY

VI Semester, Paper-7, B.Sc., Degree Examination
SCHEME OF QUESTION PAPER (SEP) (THEORY)
PLANT PHYSIOLOGY

Code: DSCB***Time: 3 Hrs.****Max Marks: 80****Instruction: Draw neat labeled diagrams wherever necessary****I. Answer all of the following****10 X 2 = 20**

4 from Unit I

3 from Unit II

3 from Unit III

II. Answer any SIX of the following**6 X 5 = 30**

3 from Unit I

3 from Unit II

2 from Unit III

III. Describe any THREE of the following in detail**3 X 10 = 30**

1 from Unit I

2 from Unit II

1 from Unit III

1 from Unit I & III

Unit	2 Mark	5 Marks	10 Marks	Total
I	4 X 2 = 8	3 X 5 = 15	1 X 10 = 10	38
			1 X 05 = 05	
II	3 X 2 = 6	3 X 5 = 15	2 X 10 = 20	41
III	3 X 2 = 6	2 X 5 = 10	1 X 10 = 10	31
			1 X 05 = 05	
Total	20	40	50	

Assessment method

Assessment		Marks
C ₁	Test-1	10
C ₂	Test-2	10
C ₃	Semester end exam	80

KUVEMPU UNIVERSITY

**VI Semester, Paper-7, B.Sc., Degree Examination
QUESTION PAPER MODEL (SEP) (THEORY)
PLANT PHYSIOLOGY**

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer all of the following

10 X 2 = 20

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Section – B

II. Answer any SIX of the following

6 X 5 = 30

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

III. Describe any THREE of the following in detail

3 X 10 = 30

- 19.
- 20.
- 21.
- 22.
- a.
- b.
- 23.
- a.
- b.

KUVEMPU UNIVERSITY

BOTANY – SIXTH SEMESTER (SEP) – PAPER - 8

PLANT BREEDING AND PLANT BIOTECHNOLOGY

Course No.	Theory/ Practical	Credits	Instruction Hrs. per week	Total No. of lectures/ hours per semester	Duration of Exam	Formative assessment Marks	Summative assessment Marks	Total Marks
	Theory	03	04 Hrs.	64 Hrs.	3 Hrs.	20	80	100

Course Outcome:

1. Understand Principles of Plant Breeding.
2. Explain Breeding Techniques.
3. Understand Plant Biotechnology Tools.
4. Apply Biotechnological Approaches for Crop Improvement.
5. Evaluate Ethical and Biosafety Aspects.

Unit-1: Plant Breeding

-22 Hrs.

Introduction, principles, objectives and significance of plant breeding.

Methods of selection: Mass selection, single plant or pure line selection, clonal selection, progeny selection and recurrent selection.

Plant breeding in producing new and improved varieties of medicinal plants.

Hybridization: Objectives, steps in hybridization, classification- intraspecific, interspecific and intergeneric crosses with suitable examples, Heterosis and its applications.

Propagation: Cutting-root and stem, layering- simple, compound and gootee. Grafting,- wedge grafting, approach grafting, Bud grafting.

Plant breeding centres of India.

Unit-2: Plant Biotechnology

-22 Hrs.

Introduction, tools used in genetic engineering – vectors - PUC₁₈, cosmid, plasmids, YAC and enzymes, General procedure and scope of genetic engineering (r-DNA technology), PCR techniques, production of polyclonal and monoclonal antibodies. Gene mapping. Application of biotechnology in pharmaceutical, agriculture, Industrial, Environmental field and oil spill (Waste management and sewage treatment). DNA finger printing and its application.

Transgenic plants: General account on BT cotton and Tomato.

Unit-3: Plant Tissue Culture

-20 Hrs.

Aim and scope, culture media, micropropagation, tissue culture techniques. Totipotency, callus culture, organogenesis through callus culture, somatic embryogenesis, haploid culture (example anther culture), Protoplast fusion and culture. Application of tissue culture in agriculture and human welfare.

References:

1. **B.D. Singh** – *Plant Breeding: Principles and Methods* – Kalyani Publishers, New Delhi.
2. **P.K. Gupta** – *Plant Breeding* – Rastogi Publications, Meerut.
3. **R.L. Chaudhary** – *Introduction to Plant Breeding* – Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
4. **Allard, R.W.** – *Principles of Plant Breeding* – John Wiley & Sons, New York.
5. **H.S. Chawla** – *Introduction to Plant Biotechnology* – Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
6. **B.D. Singh** – *Biotechnology: Expanding Horizons* – Kalyani Publishers, New Delhi.
7. **P.K. Gupta** – *Elements of Biotechnology* – Rastogi Publications, Meerut.
8. **Slater, A., Scott, N.W. & Fowler, M.R.** – *Plant Biotechnology: The Genetic Manipulation of Plants* – Oxford University Press, Oxford.
9. **S.S. Bhojwani & M.K. Razdan** – *Plant Tissue Culture: Theory and Practice* – Elsevier, Amsterdam.
10. **Kalyan Kumar De** – *Plant Tissue Culture: New Techniques and Applications* – New Central Book Agency, Kolkata.
11. **I.K. Vasil (Ed.)** – *Cell Culture and Somatic Cell Genetics of Plants* – Academic Press, Orlando.
12. **Primrose, S.B. & Twyman, R.M.** – *Principles of Gene Manipulation and Genomics* – Blackwell Publishing, Oxford.
13. **Watson, J.D. et al.** – *Recombinant DNA: Genes and Genomes* – W.H. Freeman & Company, New York.
14. **Brown, T.A.** – *Gene Cloning and DNA Analysis* – Wiley-Blackwell, Oxford.

**VI Semester, Paper-8, B.Sc., Degree Examination
SCHEME OF QUESTION PAPER (SEP) (THEORY)
PLANT BREEDING AND PLANT BIOTECHNOLOGY**

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

- 2 Answer all of the following** **10 X 2 = 20**
 4 from Unit I
 3 from Unit II
 3 from Unit III
- 3 Answer any SIX of the following** **6 X 5 = 30**
 3 from Unit I
 2 from Unit II
 3 from Unit III
- 4 Describe any THREE of the following in detail** **3 X 10 = 30**
 1 from Unit I
 a. from Unit II
 1 from Unit III
 1 from Unit I & III

Unit	2 Mark	5 Marks	10 Marks	Total
I	4 X 2 = 8	3 X 5 = 15	1 X 10 = 10	38
			1 X 05 = 05	
II	3 X 2 = 6	2 X 5 = 10	2 X 10 = 20	36
III	3 X 2 = 6	3 X 5 = 15	1 X 10 = 10	36
			1 X 05 = 05	
Total	20	40	50	

Assessment method

Assessment		Marks
C ₁	Test-1	10
C ₂	Test-2	10
C ₃	Semester end exam	80

VI Semester, Paper-8, B.Sc., Degree Examination
QUESTION PAPER MODEL(SEP) (THEORY)
PLANT BREEDING AND PLANT BIOTECHNOLOGY

Code: DSCB*

Time: 3 Hrs.

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer all of the following

10 X 2 = 20

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Section – B

II. Answer any SIX of the following

6 X 5 = 30

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

III. Describe any THREE of the following in detail

3 X 10 = 30

- 19.
- 20.
- 21.
- 22.
23.
 - a.
 - b.

BOTANY – SIXTH SEMESTER (SEP) – PRACTICAL SYLLABUS**PLANT PHYSIOLOGY****&****PLANT BREEDING AND PLANT BIOTECHNOLOGY**

Course No.	Theory/ Practical	Credits	Instruction Hrs. per week	Total No. of lectures/ hours per semester	Duration of Exam	Formative assessment Marks	Summative assessment Marks	Total Marks
	Practical	02	04 Hrs.	44 Hrs.	3 Hrs.	10	40	50

- Determination of DPD in plants (Potato) by gravimetric method.
- Determination of rate of transpiration under different conditions of light and wind by Ganong's photometer.
- Relation between absorption and transpiration.
- Suction force due to transpiration
- Determination of rate of photosynthesis at different wavelength of light (Normal, Red, blue, yellow or green) by bubble counting method.
- Separation of chlorophyll pigments by vertical paper chromatographic method.
- Minor Experiments**
 - Potato osmoscope to demonstrate endosmosis and ex-osmosis;
 - Bell jar experiment
 - Mohl's half leaf experiment.
 - Dewar's flask experiment.
- Minor Experiments**
 - Kuhne's fermentation vessel
 - Plant movements: Phototropism, Hydrotropism, Geotropism and Arc Auxanometer.
- Biochemical tests – Starch, Protein, Sucrose and Glucose.
- Vegetative propagation; Hybridization techniques
- Biotechnology – instruments; Callus culture

Assessment method

Assessment		Marks
C ₁	Continuous assessment (CA)	05
C ₂	Assignment	05
C ₃	Semester end exam	40

KUVEMPU UNIVERSITY

Practical Question Paper (SEP)

VI Semester – Practical V (DSCB)

PLANT PHYSIOLOGY

&

PLANT BREEDING AND PLANT BIOTECHNOLOGY

Max. Marks: 40

Code: DSCB 1.3

- | | | |
|------|---|------------|
| I. | Conduct major experiment A . Write Requirement, Procedure, Record the Results with conclusions | -10 Marks |
| II. | Comment on experiment B and C . | -10 Marks |
| III. | Investigate the chemical nature of D . | -5 Marks |
| IV. | Identify and comment on specimens/ photographs E & F . | -10 Marks |
| V. | Record submission | - 05 Marks |

Code: DSCB 1.3

- I. Conduct major experiment **A**. Write Requirement, Procedure, Record the Results with conclusions -10 Marks
(Major experiment: Requirement-01, Procedure-03, Experiment settings-02, Record the Results with conclusions -02. Diagram-02)
- II. Comment on experiment **B** and **C**. -10 Marks
(Minor Experiments) (Identification – 01; Principle – 02; Results and conclusion – 02)
- III. Investigate the chemical nature of **D**. -5 Marks
(Positive results – 2.5; Negative results – 2.5)
- IV. Identify and comment on specimens/ photographs **E** & **F**. -10 Marks
(One from – Emasculation/Bagging & Tagging/Vegetative propagation; one from biotechnology instruments/ callus culture) (Identification-01; Comments – 03; Diagram-01)
- V. Record submission - 05 Marks