Kuvempu University

STATE EDUCATION POLICY SYSTEM (SEP) & CONTINUOUS ASSESSMENT AND GRADING PATTERN (CGPA)

FOR UNDER GRADUATE PROGRAMS

B.Sc. BOTANY

III & IV SEMESTER

Syllabus and Scheme of Examination

2025 - 26

ALLOCATION OF CREDITS (SEP scheme-2024-25)

Sem	Course code	Practical/ Theory	TITLE OF THE COURSE DISCIPLINE CORE COURSE (COMPULSORY)	Hrs./ Week L:T:P	Credits	Max marks
I	DSCB* - 1.1	Theory	**Microbial Diversity & Thallophyta**	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
II	DSCB* - 1.2	Theory	**Bryophytes, Pteridophytes & Gymnosperms**	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
III	DSCB* – 1.3	Theory	**Plant Anatomy & Embryology**	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
	DSEB1.1	Elective	**Plant Propagation**	2 Hrs.	2	40+10
IV	DSCB* – 1.4	Theory	**Plant Ecology, Biodiversity & Conservation**	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
	DSEB - 1.2	Elective	**Seed health testing methods**	2 Hrs.	2	40+10
V	DSEB - 1.2	Theory	**Morphology, Taxonomy of Angiosperms & Economic Botany**	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
	DCB**- 1.2	Theory	**Cell Biology Genetics & Evolution**	3 Hrs.	3	
		Practical		4 Hrs.	2	40+ 10
VI	DSEB - 1.3	Theory	**Plant Physiology & Metabolism**	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
	DCB** - 1.4	Theory	**Plant breeding & Plant Biotechnology**	3Hrs	3	80+20
		Practical	”	4 Hrs.	2	40+10

DSCB* Discipline Core Course Botany**;** **DSEB*** Discipline Elective Botany;
DCB*Discipline Compulsory Course Botany

BOTANY – THIRD SEMESTER (SEP) **- DSCB 1.3**

Paper: Plant Anatomy & Embryology

Course No.	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures / Hours per Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSCB* 1.3	Theory	03	03 Hrs.	45 Hrs.	3 Hrs.	20	80	100

Course outcome

1. Skill development for the proper description of internal structure using botanical terms, their identification and further classification.
2. Understanding various levels of organization in a plant body with an outlook in the relationship between the structure and function through comparative studies.
3. Understanding the various reproductive methods sub-stages in the life cycle of plants.
4. Observation and classification of the embryological variations in angiosperms.
5. Enthusiasm to understand evolution based on the variations in reproduction among plants.

Unit I: PLANT TISSUE SYSTEM - 15 Hrs.

Study of meristematic and permanent tissues. Classification of meristems based on origin, function and position. Theories of histogen and *Tunica corpus*. Structure, types and functions of simple permanent tissues (parenchyma, collenchyma and sclerenchyma), complex permanent tissues (xylem and phloem).

a) Dermal: Structure and functions of epidermis, including cuticle, bulliform cell, trichomes, and stomata; their types and distribution.

b) Ground: Cortex, endodermis, pericycle, pith; their structure and function.

c) Vascular: Types of vascular bundle – radial, conjoint, collateral, bicollateral and concentric.

Unit II: ANATOMY - 15 Hrs.

Internal structure: Dicot root – *Cicer*; Monocot root – *Canna*; Dicot stem – *Tridax* and *Cucurbita*; Monocot stem – Grass; Dicot leaf – *Tridax*; Monocot leaf – Grass.

Normal secondary growth in a typical dicot stem (E.g.: *Morus alba*) – formation of cambial ring, storied and non-storied cambium, activity of the cambium – secondary xylem, secondary phloem, vascular rays, sap wood, heart wood, growth rings, tyloses; periderm.

Secondary growth in a typical dicot root (E.g.: *Cicer*).

Anomalous secondary growth in the stem of *Boerhavia* and *Dracaena*.

UNIT III: EMBRYOLOGY - 15 Hrs.

a) Historical Account and Contributions of P. Maheshwari and B. G. L. Swamy.

b) **Microsporogenesis:** Development of anther, development of male gametophyte, pollen grains.

c) **Megasporogenesis:** Types of ovules, differentiation of archesporial initials, formation of megaspores, types of embryo sacs (monosporic, bisporic, tetrasporic), development of monosporic type of embryo sac (*Polygonum* type).

d) **Fertilization:** Definition, syngamy (Double fertilization and triple fusion) and their significance.

e) **Endosperm:** Types – nuclear, cellular and helobial. Detailed study of cellular, haustorial type of endosperm and vermiform appendage.

Suggested readings

1. Bhojwani and Bhatnagar, Introduction to Embryology of Angiosperms –Oxford & IBH, Delhi.
2. Bhojwani, Sant, & Saran, 2014. Current Trends in the Embryology of Angiosperms, Woong-Young Soh, Springer Netherlands.
3. Coutler E. G., 1969. Plant Anatomy – Part I Cells and Tissues – Edward Arnold, London.
4. Dickison, W. C. 2000. Integrative Plant Anatomy, Harcourt Academic Press, USA
5. Esau, K. 1990. Plant Anatomy, Wiley Eastern Pvt. Ltd. New Delhi.
6. Evert, R.F. 2006. Esau's Plant Anatomy: Meristem, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc
7. Johri, B.M. l., 1984. Embryology of Angiosperms, Springer-Verlag, Netherlands.
8. Maheshwari, P. 1950. An introduction to the embryology of angiosperms. New York: McGraw-Hill.
9. Pandey, B. P., 1997. Plant Anatomy, S. Chand and Co. New Delhi
10. Pandey S.N. 1997. Plant Anatomy and Embryology. A. Chadha, Vikas Publication House Pvt. Ltd.
11. Vashishta. P.C., 1984. Plant Anatomy – Pradeep Publications – Jalandhar

SCHEME OF QUESTION PAPER (SEP) (THEORY)

III Semester B.Sc., Degree Examination

Plant Anatomy & Embryology

Code: DSCB* 1.3

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

2 from Unit II

3 from Unit III

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

1from Unit I

2 from Unit II

2 from Unit III

Unit	2 Mark	5 Marks	10 Marks	Total
I	4 X 2 = 8	3 X 5 =15	1 X10 = 10	**33**
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	**41**
			2 X 05 = 10	
Total	20	48	50	

Assessment method

Assessment		Marks
C_1	Test-1	10
C_2	Test-2	10
C_3	Semester end exam	80

Theory Model Question Paper (SEP Scheme)
III Semester – Paper III (DSCB 1.3)

Code: DSCB* 1.3 **Plant Anatomy & Embryology**
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**

1.
2.
3.
4.
5.
6.
7.
8.

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

1.
2.
3.
4.
5.

Practical Syllabus (SEP)
III Semester – Paper III (DSCB 1.3)
Plant Anatomy & Embryology

Code: **DSCB 1.3** **- 10 Practicals (1 practical of 4 Hrs./ week: 2 Credits)**

1. **Plant Tissue System:** Parenchyma, Collenchyma, Sclerenchyma (fibers and sclereids); Xylem (tracheids and trachea), Phloem (sieve tube and companion cells); Types and distribution of stomata.
2. **Anatomy:** Dicot root (*Cicer*), Monocot root (*Canna*); Dicot stem (*Tridax* and *Cucurbita*), Monocot stem (Grass).
3. Dicot leaf (*Tridax*), Monocot leaf (Grass);
4. Normal secondary growth in dicot root (*Cicer*); Normal secondary growth in dicot stem (*Morus alba*). Anomalous secondary growth in *Boerhavia* and *Dracaena* stem.
5. **Pollen Morphology:** Echinate, Scabrate, Psilate (*Datura*, *Ipomoea* and *Hibiscus*), mounting of pollinia (*Calotropis*), Pollen germination by hanging drop method in *Vinca*, *Datura* and *Ipomoea*.
6. **Microsporogenesis:** Development of microspore, T.S. of anther showing different developmental stages, types of tetrads.
7. **Megasporogenesis:** Development of megaspore, Types of ovules, *Polygonum* type of embryo sac development.
8. **Embryo Mounting** (Mustard)
9. **Endosperm mounting** (*Cucumis*)
10. **Demonstration –** Double Staining Technique.

Assessment method

Assessment		**Marks**
C_1	Continuous assessment (CA)	05
C_2	Assignment	05
C_3	Semester end exam	40

Practical Question Paper Scheme (SEP)

III Semester – Practical III (DSCB 1.3)

Plant Anatomy & Embryology

Max. Marks: 40

Code: DSCB 1.3

I. Mount and sketch the endosperm/ embryo of material **A** and leave for evaluation - 06

II. Prepare a temporary stained slide of the material **B** sketch, label and identify with reasons. Leave the preparation for evaluation - 08

III. Calculate the percentage of pollen germination **C.** - 06

IV. Identify the slides **D, E, F, G & H**, sketch and label with reason -15

V. Record - 05

Practical Question Paper Scheme (SEP)
III Semester – Practical III (DSCB 1.3)
Plant Anatomy & Embryology

Code: DSCB 1.3
Time: 3 Hrs. **Max. Marks: 40**

I. Mount and sketch the endosperm/ embryo of material A and leave for evaluation - 06
[*Cucumis* endosperm/ Embryo of mustard] (Principle- 1; Procedure- 2; Preparation- 3)

II. Prepare a temporary stained slide of the material B sketch, label and identify with reasons. Leave the preparation for evaluation - 08
[Dicot/Monocot – Root/Stem/Leaf] **(**Identification- 1; Preparation- 3; Reasons with labeled diagram- 4)

III. Calculate the percentage of pollen germination C. -06
(Procedure - 2, Preparation and results - 4)

IV. Identify the slide D, E, F, G & H sketch and label with reasons 5x3=15
[2 from tissue system; 2 from anatomy; 1 from embryology]
(Identification- 1; Reasons with labeled diagram- 2)

V. Record - 05

Note: Each student should bring the valued practical record to the practical examination for evaluation Without which he / she will not be allowed to appear for the examination.

BOTANY – THIRD SEMESTER (SEP)
Open Elective Course (DSEB1.1)
Paper: Plant Propagation

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures / Hours per Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSEB1.1	OEC	Theory	02	02 Hrs.	32 Hrs.	2 Hrs.	10	40	50

Course outcome

1. Explain various plant propagation structures and their utilization.
2. Understand advantages and disadvantages of vegetative, asexual and sexual plant propagation methods.
3. Assess the benefits of asexual propagation of certain economically valuable plants using apomictic and adventive polyembryony.
4. Demonstrate skills related to vegetative plant propagation techniques such as cuttings, layering, grafting and budding.
5. Apply a specific macro-propagation technique for a given plant species.

Unit 1: Basic concepts of propagation -08 Hrs.

Propagation: Definition, need and potentialities for plant multiplication; asexual and sexual methods of propagation – advantages and disadvantages.

Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery – tools and implements.

Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, solons, suckers and offsets.

Unit 2: Propagation by cuttings -08 Hrs.

Cuttings: Definition, different methods of cuttings; root, stem and leaf cuttings.

Stem cuttings: Definition of stem tip and section cuttings; plant propagation by herbaceous, soft wood, semi hard wood, hard wood and coniferous stem cuttings.

Physiological and biochemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings.

Unit 3: Propagation by layering -08 Hrs.

Layering: Definition, principle and factors influencing layering.

Plant propagation by layering: Ground layering – tip layering, simple layering, trench layering, mound (stool) layering and compound (serpentine layering).

Air layering technique – application in woody trees.

Unit 4: Propagation by grafting and budding -08 Hrs.

Grafting: Definition, principle, types, graft incompatibility, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification; micrografting. Propagation by veneer, whip, cleft, side and bark grafting techniques.

Budding: Definition; techniques of 'T', inverted 'T', patch and chip budding.

Suggested readings

1. Sharma RR and Manish Srivastav. 2004. *Plant Propagation and Nursery Management*, International Book Distributing Co. Lucknow.
2. Hartman, HT and Kester, D.E. 1976. *Plant Propagation: Principles and Practices*, Prentice Hall of India Pvt Ltd. Bombay.
3. Sadhu, M.K. 1996. *Plant Propagation*. New Age International Publishers, New Delhi.
4. Web resources suggested by the teacher concerned and college librarian including reading material.

SCHEME OF QUESTION PAPER (SEP) (THEORY)

III Semester Open Elective Examination

Plant Propagation

Code: DSEB1.1

Time: 2 Hrs. **Max Marks: 40**

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer all of the following **5 X 2 = 10**

1 from Unit I
1 from Unit II
1 from Unit III
2 from Unit IV

II. Answer any FOUR of the following **4 X 5 = 20**

1 from Unit I
2 from Unit II
2 from Unit III
1 from Unit IV

III. Describe any ONE of the following in detail **1 X 10 = 10**

1 from Unit I/ II
1 from Unit III/ IV

Unit	2 Mark	5 Marks	10 Marks	Total
I	1 X 2 = 2	1 X 5 = 5	1 X10 = 10	**17**
II	1 X 2 = 2	2 X 5 = 10		**22**
III	1 X 2 = 2	2 X 5 = 10	1 X 10 = 10	**22**
IV	2 X 2 = 4	1 X 5 = 5		**19**
Total	10	30	20	

Assessment method

Assessment		Marks
C_1	Test-1	10
C_2	Semester end exam	80

Theory Model Question Paper (SEP Scheme)
III Semester Open Elective Examination
Plant Propagation

Code: DSEB1.1
Time: 2 Hrs. **Max Marks: 40**
Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer all of the following **5 X 2 = 10**

1.
2.
3.
4.
5.

Section – B

II. Answer any FOUR of the following **4 X 5 = 20**

1.
2.
3.
4.
5.
6.

III. Describe any ONE of the following in detail 1 **X 10 = 10**

1.
2.

BOTANY – FOURTH SEMESTER (SEP) **- DSCB 1.4**
Plant Ecology, Biodiversity & Conservation

Course No.	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures / Hours per Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSCB* 1.4	Theory	03	03 Hrs.	45 Hrs.	3 Hrs.	20	80	100

Course outcome

1. Understanding different habit and their habitat of the organisms in the nature.
2. Know the biotic, abiotic factors and their importance in ecosystem.
3. Acquire knowledge about the various levels of biodiversity.
4. To create awareness about different pollutions and their effects on the environment.
5. Emphasize on the policies and actions regarding biodiversity conservation.

Unit I: ECOLOGY - 15 Hrs.

Aim and Scope, Factors affecting plant growth and their distribution - Edaphic, topographic, climatic and biotic factors, study of water cycle.

Ecosystem: Concept and structure of ecosystem - pond and forest ecosystem, ecological pyramids, ecological niche, food chain, trophic level, food web, energy flow and biogeochemical cycles - Nitrogen, Carbon and Phosphorous cycles.

Ecological Successions: Process of plant succession, hydrosere and xerosere, concept of climax vegetation.

Ecological Adaptations: Hydrophytes, Xerophytes, Epiphytes, Halophytes, Parasites and Psamophytes.

Community Ecology: Methods of studying natural vegetation by quadrats, bisects and transects.

Unit II: BIODIVERSITY AND CONSERVATION - 15 Hrs.

Biodiversity: Definition, Types and Importance of Biodiversity and its impact, endemism, hot spots and conservation strategies, management of wild life, National parks and game sanctuaries.

Forestry: Deforestation, Reforestation, Afforestation and Social forestry, importance of forestry.

Conservation Ecology: Definition and types of soil erosion, control, conservation and management of soil erosion.

Phytogeography: Phytogeographical regions of India, Types of forest in India and Karnataka, Study of endemic, endangered and rare species of Karnataka.

UNIT III: ENVIRONMENTAL BIOLOGY - 15 Hrs.

Environmental Pollution: A general account of air, water, land and noise pollution, their effects and management (case study with reference to India), bioremediation types and Significance.

Population Ecology: Population definition, density, natality, mortality, life table, age distribution; age pyramids, sex ratio, biotic potential and environmental resistance; population growth rate, dispersion-emigration, immigration, migration and regulation of population size.

Toxicology: Introduction, types of toxic agents on biological system, mode of action, Spectrum of toxic effects, Xenobiotics and Degradation of DDT

Suggested readings

1. Colinvaux, P. A. (1973). Introduction to Ecology. John Wiley.
2. Odum, E. P. (1983). Basic Ecology. Saunders
3. Chapman, J. L., & Reiss, M. J. (2010). Ecology: Principles and Applications (2nd ed.). Cambridge University Press.
4. Sharma, P.D. 2018. Fundamentals of Ecology. Rastogi Publications.
5. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
6. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
7. Kumar H.D. (2000): Biodiversity & Sustainable Conservation. Oxford & IBH Publishing Co Ltd. New Delhi.
8. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.
9. Newman, E.I. (2000): Applied Ecology, Blackwell Scientific Publisher, U.K.
10. Chapman, J.L&M.J. Reiss (1992): Ecology (Principles & Applications). Cambridge University Press, U.K.
11. Malcolm L. Hunter Jr., James P. Gibbs, Viorel D. Popescu, 2020. Fundamentals of Conservation Biology, 4th Edition. Wiley-Blackwel.
12. Saha T. K., 2017. Ecology and Environmental Biology. Books and Allied Publishers.
13.

Theory Question Paper Scheme (SEP scheme)

IV Semester – Paper IV (DSCB 1.4)

Plant Ecology, Biodiversity & Conservation

Code: DSCB 1.4

Time: 3 Hrs. **Max Marks: 80**

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer 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**

1from Unit I

2 from Unit II

2 from Unit III

Unit	2 Mark	5 Marks	10 Marks	Total
I	4 X 2 = 8	3 X 5 =15	1 X10 = 10	**33**
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**
			2 X 05 = 10	
Total	20	40	50	

Assessment method

Assessment		Marks
C_1	Test-1	10
C_2	Test-2	10
C_3	Semester end exam	80

Theory Model Question Paper (SEP Scheme)

IV Semester - Paper IV (DSCB 1.4)

Plant Ecology, Biodiversity & Conservation

Code: DSCB 1.4

Time: 3 Hrs. **Max Marks: 80**

Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer 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**

1.
2.
3.
4.
5.
6.
7.
8.

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

1.
2.
3.
4.
5.

Practical Syllabus (SEP scheme)

IV Semester - Practical IV (DSCB 1.4)

Plant Ecology, Biodiversity & Conservation

Code: **DSCB 1.4** **- 10 Practicals (1 practical of 4 Hrs./ week: 2 Credits)**

1. **Study of Ecological Groups:** Ecological Modifications
   Hydrophytes: *Hydrilla sp., Pistia sp., Jussiaea sp., Eichornia sp.* and *Trapa sp.*
   Xerophytes: *Casuarina sp., Euphorbia tirucalli* and *Opuntia sp., Nerium* leaf.
   Halophytes: *Avicennia sp.* – Pneumatophores, *Rhizophora sp.* – Vivipary

2. **Parasites**: *Cuscuta sp., Viscum sp.* and *Loranthus sp.*
   Psamophytes: *Spinifex sp., Ipomoea biloba* and *Salicornia*
   Epiphytes: *Vanda root, Bulbophyllum*.
   Ecological Anatomy: *Hydrilla spp., Jussiaea spp., Casuarina stem, Nerium leaf* and *Vanda root.*

3. **Ecological Instruments:** Rain gauge, Anemometer, Air hygrometer, wet and dry bulb thermometer.

4. **Study of soil pH** (pH paper method)

5. Water holding capacity of soil

6. Determination of dissolved oxygen in polluted and unpolluted water

7. Application of remote sensing to vegetation analysis using satellite imageries.

   Study of a pond/forest ecosystem and recording the different biotic and abiotic components.

8. Field visit to study the different types of vegetation.

9. Mapping of vegetation types of Karnataka

10. Study of plant community by quadrat method

Assessment method

Assessment		Marks
C_1	Continuous assessment (CA)	05
C_2	Assignment	05
C_3	Semester end exam	40

Practical Question Paper (SEP)

IV Semester - Practical IV (DSCB 1.4)

Plant Ecology, Biodiversity & Conservation

Code: **DSCB 1.4**

Time: 3 Hrs. **Max. Marks: 40**

I. Prepare a temporary stained mounting of '**A**' **-06**

II. Write critical notes on **B** and **C** **-08**

III. Comment on ecological instrument -04

IV. Estimation of P^H of soil/ Water holding capacity/ Dissolved oxygen in water **-04**

V. Identify the slides E**, F & G** with reasons -09

VI. Mapping of vegetation of Karnataka -04

VII. Record -05

Practical Question Paper Scheme (SEP)
IV Semester - Practical IV (DSCB 1.4)
Plant Ecology, Biodiversity & Conservation

Code: **DSCB 1.4**

Time: 3 Hrs. **Max. Marks: 40**

I. Prepare a temporary stained mounting of '**A**' -06
[Ecological anatomy – Hydrophytes/ Xerophytes/ Epiphytes]
(Preparation – 2, Identification – 01, Sketch & label – 01, Comment on ecological anatomy – 02)

II. Write critical notes on **B** and **C** -08
[Ecological modifications] (Identification – 01, Sketch & label – 01, Comment– 02)

III. Comment on ecological instrument -04
(Identification – 01, Sketch & label – 01, Comment – 02)

IV. Estimation of P^H of soil/ Water holding capacity/ Dissolved oxygen in water -04
(Procedure– 01, Performance– 02, Result– 01)

V. Identify the slides/ photograph E**, F & G** with reasons -09
(Identification – 01, Reasons– 02)

VI. Mapping of vegetation of Karnataka -04

VII. Record -05

Note: Each student should bring the valued practical record to the practical examination without which he or she will not be allowed to appear for the examination.

BOTANY – FOURTH SEMESTER (SEP)
Open Elective Course (DSEB1.2)
Paper: Seed Health Testing Methods

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures / Hours per Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
DSEB1.2	OEC	Theory	02	02 Hrs.	32 Hrs.	2 Hrs.	10	40	50

Course outcome

1. To understand the Features, Structure and Importance of Dicot and Monocot seeds.
2. To study various seed health testing methods.
3. To acquire the knowledge of seed quality for agriculture.

Unit 1: Introduction: -08 Hrs.

Structure of monocot and dicot seeds; seed quality: objectives, concept and components and their role in seed quality control; instruments, devices and tools used in seed testing. ISTA and its role in seed testing.

Seed Sampling: definition, objectives, seed-lot and its size; types of samples; sampling devices; procedure of seed sampling; sampling intensity; methods of preparing composite and submitted samples; sampling in the seed testing laboratory.

Unit 2: Physical Purity: -08 Hrs.

Definition, objective and procedure, weight of working samples for physical purity analysis; components of purity analysis and their definitions and criteria; pure seed definitions applicable to specific genera and families; multiple seed units; general procedure of purity analysis; calculation and reporting of results, prescribed seed purity standards; determination of husk less seeds; determination of weed seed and other seed by number per kilogram; determination of test weight and application of heterogeneity test.

Seed moisture content: importance of moisture content; equilibrium moisture content; principles and methods of moisture estimation - types, instruments and devices used; pre-drying and grinding requirements, procedural steps in moisture estimation; calculation and reporting of results.

Unit 3: Germination: -08 Hrs.

Importance; definitions; requirements for germination, instrument and substrata required; principle and methods of seed germination testing; working sample and choice of method; general procedure for each type of method; duration of test; seedling evaluation; calculation and reporting of results; dormancy: definition, importance, causal mechanisms, types and methods for breaking dormancy.

Viability and Vigour Testing: definition and importance of viability tests; different viability tests; quick viability test (TZ- test) - advantages, principle, preparation of seeds and solutions, procedure, evaluation and calculation of test results. Vigour testing: concept, historical development, definitions, principles and procedures of different methods used for testing vigour.

Unit 4: Seed health Testing: -08 Hrs.

Field and seed standards; designated diseases, objectionable weeds - significance of seed borne disease vis-a-vis seed quality - seed health testing and detection methods for seed borne fungi, bacteria, viruses and nematodes.

Preparation and dispatch of seed testing reports; storage of guard samples; application and use of seed standards and tolerances

Suggested readings

1. Basavaraju, G. V., Ravishankar, P. & Gowdiperu, S. 2014. *A textbook of seed science and technology*. Kalyani Publishers.
2. JHA, D. K. 1993. *A textbook of Seed Pathology*. Vikas Publishing House Pvt. Ltd.
3. Harpal Singh Tomar. *Seed Technology*. Rama Publishing House
4. Agarwal, R. L. (2018). *Seed technology*. Oxford and IBH Publishing.
5. Dahiya, B. S. & Rai, K. N. (1997). Seed technology. Kalyani Publishers.
6. Basra, A. (Ed.). (2024). *Handbook of seed science and technology*. CRC Press

SCHEME OF QUESTION PAPER (SEP) (THEORY)

IV Semester Open Elective Examination

Seed Health Testing Methods

Code: DSEB1.2

Time: 2 Hrs. **Max Marks: 40**

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer the following **05 X 2 = 10**

1 from Unit I
1 from Unit II
1 from Unit III
2 from Unit IV

II. Answer any FOUR of the following **4 X 5 = 20**

1 from Unit I
2 from Unit II
2 from Unit III
1 from Unit IV

III. Describe any ONE of the following in detail **1 X 10 = 10**

1 from Unit I/ II
1 from Unit III/ IV

Unit	1 Mark	6 Marks	10 Marks	Total
I	1 X 2 = 2	1 X 5 =10	1 X10 = 10	**22**
II	1 X 2 = 2	2 X 5 = 10		**22**
III	1 X 2 = 2	2 X 5 = 10	1 X 10 = 10	**22**
IV	2 X 2 = 4	1 X 5 = 5		**19**
Total	20	48	50	

Assessment method

Assessment		Marks
C_1	Test-1	10
C_2	Semester end exam	40

Theory Model Question Paper (SEP)
IV Semester Open Elective Examination
Seed Health Testing Methods

Code: DSEB1.2
Time: 2 Hrs. **Max Marks: 40**

Instruction: Draw neat labeled diagrams wherever necessary

Section – A

I. Answer the following **5 X 2 = 10**

1.
2.
3.
4.
5.

Section – B

II. Answer any FOUR of the following **4 X 5 = 20**

1.
2.
3.
4.
5.
6.

Section – C 1 **X 10 = 10**

III. Describe any ONE of the following in detail

1.
2.