

Kuvempu



University

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

FOR UNDER GRADUATE PROGRAMS

B.Sc. BOTANY

Syllabus and Scheme of Examination

2024 - 25

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	
IV	DSCB* - 1.4	Theory	Plant Ecology, Biodiversity & Conservation	3 Hrs.	3	80+20
		Practical	”	4 Hrs.	2	40+10
	DCB**-1.1	Compulsory	Floriculture	2 Hrs	2	
	DSEB - 1.2	Elective	Seed health testing methods	2 Hrs.	2	
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 – FIRST SEMESTER (SEP) - DSCB 1.1

Microbial Diversity & Thallophyta

Code: DSCB* 1.1

- 48 Hrs (3 Hrs of instruction/ week: 3 Credits)

Course outcome

1. To understand the General characters, Classification and Economic importance of Viruses, Bacteria, Cyanobacteria, Algae, Fungi and Lichens
2. To Learn the Structure and Reproduction of various forms included in the syllabus
3. To acquire the basic knowledge of various plant diseases mentioned in the syllabus and their management

Unit I: Microbial diversity

- 16 Hrs.

A brief account of microbes in soil, air, food and water. Brief account of five kingdom (Whittaker) and three domain (Carl Woese) system of classification.

Virology: History, General characters, Classification, Ultra structure and Multiplication of TMV and Bacteriophage (T4), Transmission of Viruses.

Phytoplasma: Introduction, Classification and disease (Sandal spike disease).

Bacteriology: Introduction, Classification (based on nutrition); Ultra structure and Reproduction (Budding, fission and endospore formation); Genetic recombination (Conjugation, Transduction and Transformation) and Economic importance.

Unit II: Cyanobacteria and Algae

- 14 Hrs.

Cyanobacteria: General characters and Economic importance. Type study: *Nostoc*

Algae: General Characters, Classification and Economic importance.

Type study: *Chara*, *Spirogyra*, *Oedogonium*, *Sargassum* and *Batrachospermum*

Unit III: Fungi and Lichens

- 18Hrs

Fungi: General characters, Classification (Alexopolous) and Economic importance.

Type study: *Albugo*, *Rhizopus*, *Penicillium*, *Puccinia* and *Cercospora*.

Lichens: General characters, Classification (based on morphology and fungal component) Reproduction and Economic importance.

Plant diseases: Host, causal organism, symptoms and management of Sandal spike disease, Tobacco Mosaic Disease, Citrus canker, Tikka disease of Groundnut and Kole roga of Areca nut

Suggested readings

1. Alexopoulos, J. and Charles, W. M. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.
2. Chopra, G. L. 1973. Text Book of Algae. S. Nagin and Co. Jalandhar.
3. Dube, H. C. 1983. An Introduction of Fungi. Vikas Publication House, New Delhi.
4. Dutta, A. C. 1998. Botany for Degree Students. Oxford University Press.
5. Ganguli, H. C., Das, K. S. and Datta C. 1935. College Botany. (Vol. II). New Central Book Agency (P) Ltd.
6. Mehrotra, R. S. and Aneja, K. R. 1990. An Introduction of Mycology. Wiley Eastern Ltd.
7. Pandey, B. P. 2001. College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand and Company Ltd, New Delhi.
8. Pandey, B. P. 2007. Botany for Degree students: Diversity of Microbes, Cryptograms, Cell Biology and Genetics. S. Chand and Company Ltd, New Delhi.
9. Pelczar, M. J. 2001. Microbiology. 5th edition, Tata Mc Graw-Hill Co, New Delhi.
10. Presscott, L., Harley, J. and Klein, D. 2005. Microbiology. 6th edition, Tata McGraw- Hill Co. New Delhi.
11. Sambamurthy, A. V. S. S. 2006. A text book of Plant Pathology. I. K. International Pvt. Ltd., New Delhi.
12. Sambamurthy, A.V.S. S. 2006. A Textbook of Algae. I.K. International Pvt. Ltd., New Delhi.
13. Sharma, O. P. 2006. A Text Book of Thallophyta. McGraw Hill Publishing. Co. New Delhi.
14. Singh, R. S. 1984. Introduction to Principles of Plant Pathology. Oxford and IBH Publication Co. Pvt. Ltd, New Delhi.
15. Singh, V., Pande, P. C. and Jain, D. K. 2006. A Textbook of Botany. Rastogi Publications, Meerut.
16. Smith G. M., 1955. Cryptogamic Botany- Algae, Fungi and Lichens. Vol. I. McGraw-Hill Book Co., New York.
17. Srivastava, H. N. 1998. Algae. Pradeep Publications, Jalandar.
18. Srivastava, H. N. 1993. Fungi. Pradeep Publications, Allahabad.
19. Sundarajan, S. 1998. College Microbiology. Vol 1. Vardhana Publications, Bangalore.
20. Sundararajan, S. 1993. College Botany. Vol I and II. Himalaya Publishing Company, Bangalore.
21. Vashishta, B. R., Sinha A. K. and Singh, V. P. 2008. Botany for Degree Students: Algae. S. Chand and Company Ltd, New Delhi.

**SCHEME OF QUESTION PAPER (SEP)
(THEORY)**

**B.Sc., Degree I Semester Examination
Microbial Diversity & Thallophyta**

Code:

Time: 3 Hrs

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer the following **10 X 2 = 20**

3 from Unit I

3 from Unit II

4 from Unit III

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

2 from Unit I

3 from Unit II

3 from Unit III

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

2 from Unit I

1 from Unit II

2 from Unit III

Unit	1 Mark	6 Marks	10 Marks	Total
I	4 X 2 = 8	2 X 6 = 12	2 X 10 = 20	40
II	2 X 2 = 4	3 X 6 = 18	1 X 10 = 10	37
			1 X 05 = 05	
III	4 X 2 = 8	3 X 6 = 18	1 X 10 = 10	41
			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

Theory Model Question Paper (SEP Scheme)
I Semester – Paper I (DSCB 1.1)

Code: Microbial Diversity & Thallophyta

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 (SEB)
I Semester – Paper I (DSCB 1.1)
Microbial Diversity & Thallophyta

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

1. **Staining of bacteria:** Simple (positive and negative) and Gram staining.
2. **Cyanobacteria:** *Nostoc*
3. **Algae:** *Chara & Spirogyra*
4. *Oedogonium & Sargassum*
5. *Batrachospermum*
6. **Fungi:** *Albugo & Rhizopus*
7. *Penicillium & Puccinia*
8. *Cercospora & Lichens*
9. **Pathology:** Sandal spike, TMV, Citrus canker, Tikka disease of Groundnut & Kole roga of Areca nut
10. Algal Biofertilizer / Assignment

Assessment method

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

Practical Question Paper Scheme (SEB)
I Semester – Practical I (DSCB 1.1)

Microbial Diversity & Thallophyta

Code:

Time: 3 Hrs

Max. Marks: 40

- | | |
|---|------|
| I. Perform the experiment A and leave for evaluation | - 07 |
| II. Prepare a temporary stained slide of the material B & C sketch, label and identify with reasons. Leave the preparation for evaluation | - 10 |
| III. Write critical comment on D, E & F | - 12 |
| IV. Identify the slide G, H & I with reason | -06 |
| V. Record | - 05 |

Practical Question Paper Scheme (SEB)
I Semester – Practical I (DSCB 1.1)

Microbial Diversity & Thallophyta

Code:

Time: 3 Hrs

Max. Marks: 40

- I. Perform the experiment A and leave for evaluation** **- 07**
[Simple (positive and negative) and Gram staining]
(Principle- 1; Procedure- 2; Performance with result- 4)
- II. Prepare a temporary stained slide of the material B & C** **2x5= 10**
sketch, label, and identify with reasons. Leave the preparation for evaluation
(1 from Cyanobacteria/ Algae, and Fungi)
(Identification- 1; Preparation- 2; Reasons with labeled diagram- 2)
- III. Write critical comment on D, E & F** **3x4= 12**
(Virus / Bacteria/ Phytoplasma/ Fungi)
(Identification- 1, Causal organism- 1, Symptoms and Management- 2)
- IV. Identify the slide G, H & I with reason** **3x2=06**
(Algae/ Cyanobacteria / Fungi / Lichen)
(Identification- 1; Reasons with labeled diagram- 1)
- 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.

Theory Syllabus (SEP)
II Semester – Paper II (DSCB 1.2)

Bryophytes, Pteridophytes & Gymnosperms

Code: - 48 Hrs (3 Hrs of instruction/ week: 3 Credits)

Course outcome

1. To understand the Salient features, Classification and Economic importance of Bryophytes, Pteridophytes and Gymnosperms
2. To study the Morphology, Anatomy and Reproduction of Bryophytes, Pteridophytes, Gymnosperms and fossil plants included in the syllabus
3. To acquire the knowledge of Geological time scale, Fossils and Fossilization

Unit I - 16 Hrs

Bryophytes: General characters, classification (Fritch) & Economic importance. Structure, Reproduction and life cycle of the following form study *Porella*, *Riccia*, *Anthoceros* and *Polytrichum*.

Paleobotany: Geological time scale, Fossils and fossilization, Types of Fossils.

Type study: *Rhynia* & *Lepidodendron*

Unit II - 16 Hrs

Pteridophytes: General characters and classification. Stelar Evolution, Heterospory and Seed habit.

Type study: *Psilotum*, *Lycopodium*, *Selaginella*, *Equisetum* and *Marsilea*

Unit III - 16 Hrs

Gymnosperms: General characters, classification and Economic importance of Gymnosperms. Structure, Reproduction and life cycle of the following form study: *Cycas*, *Pinus* and *Gnetum*.

Suggested readings

1. Andrews, H. N. 1961. *Studies in Paleobotany*. John Wiley, New York.
2. Bhatnagar, S. P. and Mitra, A. 1966 *Gymnosperms*. New age International (P) Ltd. Publishers.
3. Bierhorst, D. W. 1971. *Morphology of Vascular Plants*. The MacMillan Co., N.Y. and Collier- MacMillan Ltd., London.
4. Chamberlain, C. J. 1935. *Gymnosperms- Structure and Evolution*. Chicago Press.
5. Chestor, A. A. 1947. *Introduction to Palaeobotany*. McGraw Hill, London.
6. Coulter, J. M. and Chamberlain, C. J. 1964. *Morphology of Gymnosperms*. Central Book Depot, Allahabad.
7. Dutta, A. C. 1998. *Botany for Degree Students*. Oxford University Press.
8. Dutta, S. C. 1966. *An Introduction to Gymnosperms*. Asia Publications House, Mumbai.
9. Eames, A. J. 1936. *Morphology of Vascular Plants (Lower Groups)*. McGraw Hill, N.Y.
10. Easu, K. 1979. *Anatomy of seed plants*. Wiley Eastern Ltd. New Delhi
11. Fahn, A. 1969. *Plant Anatomy*. 2nd Edition, Wiley, New York.
12. Frank, C. 1990. *The inter-relationships of the Bryophytes*. New Phytologist. Today and Tomorrow's Printers and Publishers.
13. Gangulee, H. C., Kar and Kumar, A. 1982. *College Botany- Vol. II*. Central Book Agency, Calcutta.
14. Pandey, S. N. and Chadha, A. 2009. *Plant Anatomy and Embryology*. Vikas Publishing House Pvt Limited.
15. Pandey, S. N., Mishra, S. P. and Trivedi, P. S. 2007. *A Textbook of Botany- Vol. II*. Rastogi Publications, Meerut.
16. Rashid, A. 1999. *An Introduction to Pteridophyta*. MKM Publisher Pvt Ltd.
17. Shripad, N. A. 1995. *Paleobotany*. Oxford and I.B.H. New Delhi.
18. Singh, V., Pande, P. C. and Jain, D. K. 2005. *Diversity and Systematics of Seed plants*. Rastogi Publications, Meerut.
19. Singh, V., Pande, P. C. and Jain, D. K. 2006. *A Textbook of Botany*. Rastogi Publications, Meerut.
20. Sporne, K. R. 1971. *The Morphology of Gymnosperms: The Structure and Evolution of Primitive seed Plants*. Hutchinson University Library, London.
21. Sporne, K. R. 1974. *Morphology of Pteridophytes*. Hutchinson and Co., London.
22. Tayal M. S. 2004. *Plant Anatomy*. Rastogi Publications.
23. Vashishta, P. C. 1982. *Peridophyta*. S. Chand and Co. Ltd., New Delhi.

Theory Question Paper Scheme (SEP scheme)
II Semester – Paper II (DSCB 1.2)
Bryophytes, Pteridophytes & Gymnosperms

Code:

Time: 3 Hrs

Max Marks: 80

Instruction: Draw neat labeled diagrams wherever necessary

I. Answer 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**

- 2 from Unit I
- 3 from Unit II
- 3 from Unit III

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

- 2 from Unit I
- 1 from Unit II
- 2 from Unit III

Unit	1 Mark	6 Marks	10 Marks	Total
I	4 X 2 = 8	2 X 6 = 12	2 X 10 = 20	40
II	3 X 2 = 6	3 X 6 = 18	1 X 10 = 10	39
			1 X 05 = 05	
III	3 X 2 = 6	3 X 6 = 18	1 X 10 = 10	39
			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

Theory Model Question Paper (SEP Scheme)
II Semester - Paper I (DSCB 1.2)

Bryophytes, Pteridophytes & Gymnosperms

Code:

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)
II Semester - Practical II (DSCB 1.2)
Bryophytes, Pteridophytes & Gymnosperms

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

1. **Bryophytes:** *Porella & Riccia*
2. *Anthoceros* and *Polytrichum*
3. **Pteridophytes:** *Psilotum & Lycopodium*
4. *Selaginella & Equisetum*
5. *Marselia*
6. **Gymnosperms:** *Cycas*
7. *Pinus*
8. *Gnetum*
9. **Paleobotany:** *Rhynia & Lepidodendron*
10. Field Visit / Fernarium / Assignment

Assessment method

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

Practical Question Paper (SEP scheme)
II Semester - Practical II (DSCB 1.2)
Bryophytes, Pteridophytes & Gymnosperms

Code:

Time: 3 Hrs

Max. Marks: 40

- | | |
|---|------|
| I. Identify A, B and C with reasons | -9 |
| II. Prepare a temporary stained slide of the material D sketch, label and identify with reasons. Leave the preparation for evaluation. | - 5 |
| III. Comment on E, F and G | -9 |
| IV. Identify the slide / Chart H, I, J and K with reasons | - 12 |
| V. Record | - 5 |

Practical Question Paper Scheme (SEP scheme)
II Semester - Practical II (DSCB 1.2)
Bryophytes, Pteridophytes & Gymnosperms

Code:

Time: 3 Hrs

Max. Marks: 40

I. Identify A, B and C with reasons

3x3= 9

(1each from Bryophytes, Pteridophytes and Gymnosperms)

(Identification -1; Reasons with labeled diagram- 2)

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

5

(Pteridophytes / Gymnosperms)

(Mounting- 3; Identification- 1; Reasons with labeled diagram- 1)

III. Comment on E, F and G

3x3= 9

(Bryophytes/ Pteridophytes/ Gymnosperms/Paleobotany)

(Identification- 1; Reasons with labeled diagram- 2)

IV. Identify the slide / Photographs H, I, J and K with reasons

3x4= 12

(1each from Bryophytes, Pteridophytes, Gymnosperms & Paleobotany)

(Identification- 1; Reasons with labeled diagram- 2)

V. 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.