



GOVERNMENT OF KARNATAKA
DEPARTMENT OF COLLEGIATE EDUCATION
MAHARANIS SCIENCE COLLEGE FOR WOMEN (AUTONOMOUS)
JLB ROAD MYSURU-570005
(RE-ACCREDITED BY NAAC WITH 'A' GRADE)
DEPARTMENT OF BOTANY

**CHOICE BASED CREDIT SYSTEM (CBCS) & CONTINUOUS ASSESSMENT
AND
GRADING PATTERN (CGPA)
FOR UNDER GRADUATE PROGRAMS**

B.Sc., BOTANY

**Syllabus and Scheme of Examination
2019-20**

BOTANY - FIRST SEMESTER -DSCB- 1.1
DIVERSITY OF MICROBES, ALGAE, FUNGI & PLANT PATHOLOGY
(Course duration: 16 weeks with 4 hours of instruction per week)

Theory-64 Hrs

Unit-1: Diversity of Microbes: Microbial diversity and its significance; Microbes of soil, air, food and water; **Virology** - History and discovery, structure and multiplication of TMV and Bacteriophage (T4); **Viroids**-general characters and fine structure of Potato Spindle Tuber Viroid (PSTVd); **Prions**- general characters and Prion diseases (BSE, CJD); **Mycoplasma** - History and general characteristics;

Unit-2: Bacteria: Introduction and classification of Bacteria based on morphology, nutrition and flagellation; ultra structure and reproduction of bacteria; Archaeobacteria. **Cyanobacteria**-occurrence, structure, reproduction and economic importance; Type study- *Nostoc* and *Scytonema*; **Algae**-Introduction, general characteristics, Fischer's classification, thallus organization, reproduction and economic importance; Type study- *Oedogonium*, *Vaucheria*, *Diatoms*, *Sargassum* and *Polysiphonia*.

Unit-3: Fungi- General characteristics and Ainsworth's classification; Thallus organization, nutrition in fungi, asexual and sexual reproduction and economic importance, Type study- *Rhizopus*, *Penicillium*, *Lycoperdon*, *Puccinia*, **Lichens**- Distribution, types, classification, structure, reproduction and economic importance.

Unit-4: Plant Pathology: Introduction, classification of plant diseases, symptoms, causal agents of plant diseases, Biology and management of Blast of Rice, Tikka disease of groundnut, Early blight of potato, Late blight of potato, Early blight of Tomato and Late blight of Tomato, Citrus Canker, Tobacco Mosaic Disease, Papaya ring spot disease, Sandal Spike Disease, Root Knot of Mulberry.

Practicals: One Practical of 4 Hours

- 1) Demonstration of microbiological instruments - Inoculation loop, Hot air oven, Incubator, Pressure cooker, Haemocytometer.
- 2) Staining and mounting of algae (Safranin)
- 3) Staining and mounting of fungi (cotton blue).
- 4) Simple staining of bacteria (Crystal violet)
- 5) Study of *Nostoc*, *Scytonema*
- 6) Study of *Oedogonium*,
- 7) Study of *Vaucheria*, Diatoms
- 8) Study of *Sargassum*,
- 9) Study of *Polysiphonia*
- 10) Study of *Rhizopus*, *Penicillium*
- 11) Study of *Lycoperdon*, and *Puccinia*
- 12) Study of plant diseases: Blast of Rice, Tikka disease of Groundnut, Early and Late blight of potato, Early and Late blight of Tomato
- 13) Citrus Canker, Tobacco mosaic disease, Papaya ring spot disease, Sandal Spike, Root Knot of Mulberry.
- 14) Study of lichens-Types, LS of Apothecium.

BOTANY - SECOND SEMESTER -DSCB 1.2
BRYOPHYTA, PTERIDOPHYTA, GYMNOSPERMS, PLANT ANATOMY
(Course duration: 16 weeks with 4 hours of instruction per week)

Theory-64 Hrs

Unit-1: Bryophytes: General characteristics and classification, thallus organization and reproduction (developmental details not required). Economic Importance of Bryophytes. Type Study- *Marchantia*, *Anthoceros*, *Funaria*. Paleobotany- Geological time scale, fossils, fossilization, types of fossils.

Unit-2: Pteridophyta: Introduction, general characteristics, classification, structure and reproduction. (Developmental details not required). Type Study- *Rhynia*, *Psilotum*, *Selaginella*, *Equisetum*, *Marsilea*. A brief account on Heterospory and seed habit; Stellar evolution in Pteridophytes.

Unit-3: Gymnosperms: Introduction, general characteristics and classification; Morphology and reproduction of *Cycadeioidea*, *Cycas*, *Pinus* and *Gnetum*. (Anatomy of Root, Stem and Leaf are to be studied). Economic importance of Gymnosperms.

Unit-4: Plant Anatomy: Tissue and organ system; Meristems - Classification, Tunica-carpus theory, Histogen theory. Tissues -simple tissues, parenchyma, collenchyma, sclerenchyma; Complex tissues: xylem, phloem, types of vascular bundles; trichomes, stomata: structure and types; Laticifers - structure, types and functions, Anatomy of dicot and monocot root, stems and leaf; Secondary growth in dicot stem; Anomalous secondary growth in *Dracaena* and *Boerhaavia*

Practicals: One Practical of 4 Hours

- 1) Study of morphology, internal structure and reproduction in *Marchantia*.
- 2) Study of morphology, internal structure and reproduction in *Anthoceros*
- 3) Study of morphology, internal structure and reproduction in *Funaria*.
- 4) Study of morphology, anatomy and reproductive organs of *Psilotum*, *Selaginella*.
- 5) Study of morphology, anatomy and reproductive organs of *Equisetum*, *Marsilea*
- 6) Study of morphology, anatomy and reproductive organs of *Cycas*
- 7) Study of morphology, anatomy and reproductive organs of *Pinus*
- 9) Study of morphology, anatomy and reproductive organs of *Gnetum*
- 10) Study of Tissue systems: Parenchyma, Collenchyma and Sclerenchyma, Xylem and Phloem.
- 11) Anatomy of dicot and monocot-Stems.
- 12) Anatomy of dicot and monocot-Roots.
- 13) Anatomy of dicot and monocot- Leaves.
- 14) Paleobotany-*Rhynia*, *Cycadeioidea*

SUGGESTED READINGS
VIRUSES AND BACTERIA

R.C. Dubey and D.K. Maheshwari P.D. Sharma	A text book of Microbiology Microbiology	S. Chand & company, Ramnagar N.Delhi-110005. Rastogi Publications; Shivaji road Meerat; 250002; India
P. D. Sharma	Microbiology and Plant pathology	Rastogi Publications; Shivaji road Meerat; 250002; India
H. C. Dube	Text book of fungi, Bacteria & Virus	Vani Educational Books ,Vikas house 20/4, Industrial area, Sahidabad, 201010, Ghaziabad, UP.
Power & Dagainawala	General Microbiology. Vol. I	Himalaya Publishing house, Bombay
Power & Dagainawala	General Microbiology. Vol.II	Himalaya Publishing house, Bombay
Pelzar Michael.Jr Prescott, Lansing and Others Ananthanarayana .R .	Text Book of Microbiology Microbiology Text Book of Microbiology	Orient and Longman, New Delhi.
Jayaram Panicker .	Functional Principles of Bacteriology	Tata McGraw Hil
Vinita Kale and Kishore Bhusari	Applied Microbiology.	Himalaya Publishing house, Bombay
Frazier William. C. Cruckishank	Food Microbiology Text book of Medical Microbiology	ELBS Publisher , New Delhi
Rangaswamy. G.	Diseases of crop plants in India.	Prentice Hall of India New Delhi
Sundar Rajan	College Microbiology	Vardaman Publishers , Bangalore. Vol. III & Vol. IV.
William. C. Frazier and Dennis C. Westhoff	Food Microbiology	Tata McGraw Hill Publishing company.

ALGAE

K.N. Bhatia	A Treatise on Algae	R. Chand & company, Publishers, N.Delhi.
Chopra. G.L G. M. Smith	A Text book of Algae Cryptogamic Botany Vol. I	Pradeep Pub., Jalandhar. Mc graw Hill , New york. Thomas, Nelson and Sons
Prescott, G.W Kumar, M.A and Kashyap. A.K.	The Algae to Review Recent advances in physiology	Rastogi Publications
Fritsch. F. E.	Structure and Reproduction of	Cambridge University Press

Chapman V.J. & Chapman D.J. Singh, Pande, Jain.	Algae Vol. I & Vol. II The Algae 2nd edn. A text book of Botany	Mac Milan, Publishing New York. Rastogi Publications; Shivaji Road Meerat; 250002; India
B. P. Pandey	Simplified course in Botany	S. Chand & company, Ltd. Ramnagar N. Delhi-110005. Blackwell Publishers.
Darley. M. W.	Algal Biology	
	FUNGI	
Smith. G. M. Allexopolos. C. J. and Mims. C. W.	Cryptogamic Botany Vol. I Introduction to Mycology	Mc Graw Hill, New York. Wiley Eastern Ltd. New Delhi.
Chopra G. L. and Verma. V Mundkur, B. B. Rangaswamy, G.	Text Book of Fungi Fungi & Plant diseases Diseases of India 3rd Edition	Pradeep Publications, Jalandar Mac Milan & Co Calcutta Prentice Hall of India New Delhi.
Sharma, P. D. Vashista, R.R	The fungi Fungi	Rastogi Publications S. Chand and Company, ND De
	BRYOPHYTA	
Pandey, B.P.	Bryophyta	S. Chand and Company, New Delhi.
Vashista. B. P.	Bryophyta	S. Chand and Company, New Delhi.
Parihar. N.S. G. M. Smith G. L. Chopra Chauhan D.K.S	Bryophyta Cryptogamic Botany vol. I Class Book and Pteridophytes Bryophytes and Pteridophytes	Central book depot, Allahabad. Mc Grawhill, New York Pradeep Publications, Jalandar.
	ANATOMY	
Eames A.J. and Mac Daniels, L. H	Introduction to Plant Anatomy	McGraw Hill, New York.
Katherien Esau Pandey. B. P	Anatomy of seed plants Introduction to Plant Anatomy	Wiley Eastern, New Delhi. S. Chand and Company.
Singh. V. Pandey, P.C and Jain, D.K.	Anatomy of seed plants	Rastogi publications, Meerat.
Tayal M. S. Ganguli Das L Datta Venkateshvaralu	Plant anatomy College Botany Vol. I Cytology and Anatomy	Rastogi publications, Meerat.
	PTERIDOPHYTA	
Bold, H.C., Alexopoulos, C.J & Delevoryas, T. Eames, Arthur, J. Parihar, N.S. 1977	Morphology of plants and Fungi Morphology of vascular plants The Biology and Morphology of Pteridophytes.	Harper C Row, New York. Mc Graw Hill, New York. Central book depot. Allahabad.
Pandey, S.N. & Others	Text book of Botany, Vol. II	Vikas publishing House, New Delhi.
Rashid, A. 1986	An introduction to Pteridophyta.	Vani educational books, New

- Sporne, K. R. 1970
The Morphology of Pteridophytes
Hutchinson university library, London.
- Vashista, P.C. 1987
Pteridophyta
S. Chand and Co., New Delhi.
- GYMNOSPERMS**
- Datta, S.C.
An Introduction to Gymnosperms.
Asia publishing house, New Delhi.
- Pandey, B.P.
Gymnosperms.
K. Nath and Co.
- Ramaswamy, S.N. 1984
Anavrutha beeja sasyagalu (Gymnosperms)
Prasaranga, University of Mysore, Mysore.
- Saxena and Sarabhai 1993
Text book of Botany Vol. II.
Ratna Prakashana Mandir, Agra
- Sporne, K.R. 1969
The Morphology of Gymnosperms.
Hutchinson university library, London.
- Trivedi, B.S. & Singh, D.K.
An Introduction to Gymnosperms.
Shashidhar Malaviya Prakashan.
- Vashista, B.R.
Gymnosperms.
S.Chand & Co. New Delhi.
- Andrews, H.N. 1961
Studies in Palaeobotany.
Wiley, New York.
- Biswas, C. & Johri, B.M. 1997
The Gymnosperms.
Narosa, New Delhi.

TITLE OF CBCS AUTINOMOUS UG (2019-20)

**BOTANY - FIRST SEMESTER -DSCB- 1.1DIVERSITY OF MICROBES, ALGAE, FUNGI
& PLANT PATHOLOGY**

**BOTANY - SECOND SEMESTER -DSCB 1.2 BRYOPHYTA, PTERIDOPHYTA,
GYMNOSPERMS, PLANT ANATOMY**

**BOTANY - THIRD SEMESTER -DSCB 1.3: REPRODUCTIVE BIOLOGY, PLANT
PHYSIOLOGY, PLANT ECOLOGY**

**BOTANY - FOURTH SEMESTER -DSCB 1.4: CELL AND MOLECULAR BIOLOGY,
GENETICS AND GENETIC ENGINEERING**

BOTANY - FIFTH SEMESTER –

DSEB 1.5: MORPHOLOGY OF ANGIOSPERMS AND TAXONOMY

SECB 1.1 MEDICINAL AND ORNAMENTAL PLANT

SECB 1.2 MUSHROOM CULTIVATION TECHNOLOGY

BOTANY - SIXTH SEMESTER –

DSEB 1.4: ECONOMIC BOTANY AND MEDICINAL PLANT

SECB 1.3 NURSERY AND GARDENING

SECB 1.4 FLORICULTURE

BOTANY - FIRST SEMESTER -DSCB- 1.1
DIVERSITY OF MICROBES, ALGAE, FUNGI & PLANT PATHOLOGY
 (Course duration: 16 weeks with 4 hours of instruction per week)

MARKS WEIGHTAGE FOR THEORY QUESTION PAPER

UNITS	I	II	III	IV	TOTAL MARKS
VIRUS	03	8(4+4)	6	8	25
BACTERIA AND ALGAE	03	04	12(6+6)	8	27
FUNGI	03	8(4+4)	6	8	25
PLANT PATHOLOGY	03	8(4+4)	6	8	25
NO OF QUESTIONS	12	5/7	4/5	3/4	102
	12	24	24	24	80

BOTANY - SECOND SEMESTER -DSCB 1.2
BRYOPHYTA, PTERIDOPHYTA, GYMNOSPERMS, PLANT ANATOMY
 (Course duration: 16 weeks with 4 hours of instruction per week)

MARKS WEIGHTAGE FOR THEORY QUESTION PAPER

UNITS	I	II	III	IV	TOTAL MARKS
BRYOPHYTES	03	8(4+4)	6	8	25
PTERIDOPHYTES	03	04	12(6+6)	8	27
GYMNOSPERMS	03	8(4+4)	6	8	25
PLANT ANATOMY	03	8(4+4)	6	8	25
PALEOBOTANY	*	4	*	*	04
NO OF QUESTIONS	12	5/7	4/5	3/4	102
	12	24	24	24	80

BOTANY - FIRST SEMESTER -DSCB- 1.1
DIVERSITY OF MICROBES, ALGAE, FUNGI & PLANT PATHOLOGY
(Course duration: 14 practical with 4 hours of instruction per week)

Time-3hours

Max marks-40

I Identify the specimen A and B with reasons and labeled sketches

3x2=6m

one from cyanobacteria/algae and one from fungi
(Identification-1m, labeled sketches-1m, reasons-1m)

II prepare a temporary stained slide of the material C. Sketch, label and identify with reasons.

Leave the preparation for evaluation

(cyanobacteria/algae/Fungi)

5m

(Staining and Mounting-2m, sketch/labeled diagram-1m, reasons-2m)

III Write critical notes on D, E, F and G

4X3=12m

One from algae, one from fungi, one from pathology, one from microbiological instruments

IV Identify the Micro slides with reasons H, I, J and K

4x3=12m

One from algae, one from fungi, one from pathology, one from lichens
(Identification-1m, labeled sketches-1m, reasons-1m)

V Viva-voce

5m

Note-The students shall produce the record during practical examination

BOTANY - SECOND SEMESTER -DSCB 1.2
BRYOPHYTA, PTERIDOPHYTA, GYMNOSPERMS, PLANT ANATOMY

(Course duration: 14 practical with 4 hours of instruction per week)

Time-3hours

Max marks-40

I Identify the specimen A and B with reasons and labeled sketches

3x2=6m

one from Pteridophyta and one from Gymnosperms

(Identification-1m, labeled sketches-1m, reasons-1m)

II prepare a temporary stained slide of the material C. Sketch, label and identify with reasons.

Leave the preparation for evaluation

(plant anatomy-root, stem and leaf)

5m

(Staining and Mounting-2m, sketch/labeled diagram-1m, reasons-2m)

III Write critical notes on D, E, F and G

4X3=12m

One from Bryophyta, one from Pteridophyta, one from Gymnosperms, one from Paleo botany

IV Identify the Micro slides with reasons H, I, J and K

4x3=12m

One from Bryophyta, one from Pteridophyta, one from Gymnosperms, one from histology

(Identification-1m, labeled sketches-1m, reasons-1m)

V Viva-voce

5m

Note-The students shall produce the record during practical examination