



GOVERNMENT COLLEGE (AUTONOMOUS) KALABURAGI

DEPARTMENT OF STUDIES & RESEARCH IN BOTANY

Choice Based Credit System (CBCS)

As per the New SEP guidelines

Syllabus Scheme of Examination Pattern of Papers for
B.Sc (Botany) I &II Semester Courses with effect from

2024-25

Government College (Autonomous), KALABURAGI
Department of Studies and Research in Botany

**NEW CURRICULUM STRUCTURE OF BOTANY FOR UNDERGRADUATE PROGRAM TO
BE EFFECTIVE FROM 2024-25**

Sl. No.	Semesters	Paper Titles	Paper code
1	Semester-I	Microbial Diversity and Plant pathology.	DSC -1B
2	Semester-II	Diversity of Non Flowering Plants.	DSC -2B
3	Semester-III	Plant Anatomy and Developmental Biology.	DSC -3B
	Elective-1	Herbal technology	
4	Semester-IV	Plant Systematics Ecology and Phytogeography.	DSC-4B
	Elective-2	Organic farming	
5	Semester-V	Cell and molecular Biology, Genetics and Plant breeding	DSC -5B
6	Semester-VI	Plant Physiology and Plant Biotechnology	DSC -6B

B.Sc.:Semester I. BOTANY

Course DSC 1BT (Theory): Microbial Diversity and Plant Pathology

(Credits-3, No. of teaching hours-48 & 4h/week)

Course Title : Microbial Diversity and Plant Pathology	Course Credit : 3
Total Teaching Hourse : 48 Hours	Course Code : DSC-I BT-1.1
Teaching Hourse / week : 3 Hourse	Max.Marks: 100 (SEE -80+-20 = 100)

Course Learning Objectives

- a. To study the history, distribution and structure of microbes along with their economic importance
- b. To study history and the methodology involved in microbiology.
- c. To study the classification, structures, reproduction and economic importance of viruses and bacteria.
- d. To study the structure and reproduction in bacteria and lichens and their applications.
- e. To study the basic concept, etiology and control measures of important plant diseases.

Course Outcome:

1. The students will be able to study the microbes in laboratory and understand their importance in human welfare.
2. The students will understand the history and methodology involved in microbial studies.
3. The students will understand the structures of viruses and bacteria and their role in agriculture and industry.
4. The students will understand the structure and reproduction in fungi and they will be able to use the fungi in industries for valuable products.
5. The students will be able to identify different plant diseases and apply suitable control measures.

Unit-I

12.Hrs

Microscopy and stains: Working principle and applications of light, dark field, phase contrast microscope and electron microscopes (SEM and TEM). Microbiological stains, acidic, basic and special stains, Gram's staining technique..

Microbial diversity: distribution of microbes in soil, water, air and food. Hierarchical level of organization: Whittaker's five-kingdom system and Carl Richard Woese's three-domain system. Significance of microbiology.

Brief history and Contributions of Microbiologists- Leeuwenhoek, Louis Pasteur and Robert Koch. **Mycologist-** Edwin John Butler, K.C. Mehta and B.B. Mundkur.

Unit-II

12.Hrs

Viruses: General characters, ICTV system of classification. Structure & multiplication of TMV and Bacteriophage (T2) (Lytic and lysogenic methods). Brief account on SARS-COV-2. Economic importance of viruses. Vaccines- Introduction, types and applications.

Brief account on Viroids, prions and Mycoplasmas, Potato Spindle Tuber Viroid (PSTV), Brief account on Sandal spike disease.

Bacteria- General characters, Classification, Ultrastructure, chemistry of cell wall and reproduction (transformation, conjugation and transduction methods). Role of bacteria and cyanobacteria in agriculture (Biofertilizers) and pharmaceutical industries.

Unit-III

12.Hrs

Fungi-General characteristics, classification (Alexopolus), structure and reproduction of, *Albugo, Rhizopus, Agaricus, Penicillium*, and *Cercospora*. Role of fungi in alcohol production, bread making, drug production & food processing. Brief account on **VAM Fungi** and their significance.

Lichens- Types, habitat, morphology, classifications, structure and reproduction. Economic importance of lichens.

Unit-IV

12.Hrs

Plant Pathology - Introduction, definition, terminology, disease triangle, Koch's postulate. Symptoms, etiology, causal organisms and control measures of Leaf curl of Papaya, and Bunchy top of Banana, Citrus canker, Angular leaf spot of Cotton, Sandal spike disease, Downy Mildew of Bajra, Grain smut of Sorghum, stem rust of wheat, Red rot of sugarcane and Wilt of pigeon pea. Biological control of plant diseases.

REFERENCES

1. B.R. Vashishta. A Text Book of Fungi, S.Chand Publication New Delhi.
2. Arora DR.2004.Text book of Microbiology,CBS, New Delhi.
3. Dubey RC and Maheshwari DK. 2007. A textbook of Microbiology, S. Chand and Company, New Delhi.
4. Dubey RC and Maheshwari DK.2002.A Text book of Microbiology, SC hand and Company, Ltd. Ramnagar, New Delhi.
5. Sharma R.2006.Text book of Microbiology. Mittal Publications, New Delhi.
6. Sharma PD. 1999. Microbiology and Plant Pathology. Rastogi publications. Meerut, India.
7. VasanthkumariR.2007. A text book of Microbiology, BI Publications Pvt. Ltd., New Delhi.
8. V.Singh, Pandey and Jain. A Text book of Lower Botany. Rastogi Publication Meerut.
9. Alexopoulos CJ and Mims CW. 1989. Introductory Mycology, Wiley Eastern Ltd. New Delhi.
10. B.P.Pandey plant pathology S Chand and Company, Ltd. Ram nagar, New Delhi.

B.Sc I Semester Botany Practical Content
Course DSC 1BP (Practical): Microbial Diversity and Plant Pathology
(Credits-2, No. of teaching hours-48 & 4h/week)

Course Title : Microbial Diversity and Plant Pathology	Course Credit : 2
Total Teaching Hourse : 48 Hours	Course Code : DSC-I BP-1
Teaching Hourse / week : 4 Hourse	Max.Marks: 50 (SEE -40+10 =50)

1. Microbiological standards and safety measures in microbiology laboratory.
2. Demonstartion and working principles of Autoclave, hot air oven, laminar air flow, inoculation loop, micrometry.
3. Simple staining of bacteria (Crystal violet) Gram's staining of Lactobacillus bacteria from butter milk.
4. Isolation and identification of fungi and bacteria from soil using serial dilution method.
5. Isolation and study of *Rhizobium* from root nodules of legumes.
6. Isolation and identification of *Trichoderma* from soil.
7. Study of vegetative and reproductive structures of specimens/slides of *Albugo* ,*Rhizopus*, *Agaricus*, *Penicillium* and *Cercospora*.
8. Study of well-known Microbiologist/Mycologist and their contributions through charts and photographs as mention in theory.
9. Study of plant diseases as per theory syllabus.

Note: The students shall submit a report on Field visit along with 5 specimens of local plants diseases.

Model Question Paper for Practical examinations

B.Sc.- I Semester Practical Examination, ----year
Sub-BOTANY
Course -DSC 1B: Microbial Diversity and Plant Pathology

Time:3 Hours

Max. Marks: 40

Q I. Perform the major experiment A, record the observations and show to the examiners.	08 marks
Q II. Perform the minor experiment/Demonstrate B, record the observations and Show to the examiners.	05 marks
Q III. Identify the specimen and critically comment on C,D, E &F	12 Marks
Q IV. Identify and comment on the slides/specimen G, H, I, &J.	08 Marks
Q V. Viva voce.	02 Marks
Q VI. Submissions	02 Marks
Q VII. Records	03 Marks

General instructions:

- Q1. A : Major experiment
- Q2. B- Gram staining of bacteria/ sterilization, media/stain preparations
- Q3. C- Viral disease d-Bacterial disease, E-Fungal disease, F-Mycorrhizae or Biopestides,
- Q 4. G-Fungal slide, H-Scientist photograph, I &J- industrial products
- Q5.Viva voce
- Q6. Submissions
- Q 7.Records
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B.Sc.:Semester II. BOTANY

Course DSC 2B (Theory): Diversity of Non-Flowering Plants

(Credits-3, No. of teaching hours-48 & 4h/week)

Course Title : Diversity of Non Flowering Plans	Course Credit : 3
Total Teaching Hourse : 48 Hours	Course Code : DSC-I BT-2.1
Teaching Hourse / week : 3 Hourse	Max.Marks: 100 (SEE -80+IA-20

Course Learning Objectives

1. To study the diversity and affinities of Algae, Bryophytes, Pteridophytes and Gymnosperms.
2. To study the classifications, thallus organization, and reproduction of algae and their economic importance.
3. To study the morphology, anatomy, reproduction in Bryophytes and their ecological and economic importance.
4. To study the classification; morphology, anatomy and reproduction in Pteridophytes along with the concepts of stellar evolution, heterospory and telome.
5. To study the classification, morphology, anatomy and reproduction in Gymnosperms along with their applications, geological time scale and paleobotany

Course Outcome:

At the end of course, the students will be able to understand,

- a. the diversity and affinities of Algae, Bryophytes, Pteridophytes and Gymnosperms
- b. classifications, thallus organization, and reproduction in algae and their economic importance
- c. classification, morphology, anatomy, reproduction and life-cycles of Bryophytes and their ecological and economic importance.
- d. Classification, morphology, anatomy and reproduction in Pteridophytes along with their economic importance, concepts of stellar evolution, heterospory and telome.
- e. Classification, morphology, anatomy, reproduction and life-cycles in Gymnosperms along with their economic importance, geological time scale and paleobotany.

Unit-I

12.Hrs

Algae – General characteristics, Classification, habitat, thallus organization and alternation of

generation in Fresh water and marine algae. **Structure and Reproduction of *Spirulina, Diatoms, Oedogonium, Chara, Sargassum & Polysiphonia***. Algal Cultivation: Basic cultivation techniques of microalgae. Algal products: Food (SCP) and nutraceuticals, feed stocks, food colorants, therapeutics and cosmetics. Algal bloom and toxins.

Unit-II

12.Hrs

Bryophytes – General characteristics, classification of Bryophytes. Morphology, anatomy, reproduction and life-cycles of *Riccia, Anthoceros and Funaria*. Ecological and Economic importance of Bryophytes.

Unit-III

12.Hrs

Pteridophytes- General characteristics, classification of Pteridophytes. Morphology, anatomy, reproduction and life-cycles of *Lycopodium, Selaginella, Equisetum, Marsilea & Nephrolepis*. Economic importance of Pteridophytes. Telome theory, Heterospory and seed habits, Stelar evolution in pteridophytes

Unit-IV

12.Hrs

Gymnosperms - General characteristics, classification of Gymnosperms. Morphology, anatomy, reproduction and life-cycles of *Cycas, Pinus* and *Gnetum*. Economic importance of Gymnosperms.

Geological Time scale: Origin and evolution of plants through Geological Time scale.

Paleobotany - Preservation of plant fossils-impressions, compressions, petrification, moulds and casts.

References:

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2. Sharma, O.P. 1990. Text Book of Pteridophyta. McMillan India Ltd. New Delhi.
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5. Sambamurty, A.V.S.S. A Text Book of Algae. I.K. International Private Ltd., New Delhi.
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10. Kumar H. D., 1999, Introductory Phycology, Affiliated East-West Press, Delhi.
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13. Rashid, A. 1998. An Introduction to Pteridophyta. II ed., Vikas Publishing House, New Delhi.
14. Smith, G.M. 1971. Cryptogamic Botany. Vol. II. Bryophytes & Pteridophytes. Tata McGraw Hill Publishing, New Delhi.
15. Smith, G.M. 1971. Cryptogamic Botany. Vol. I. Algae & Fungi. Tata McGraw Hill Publishing. New Delhi.
16. Sporne, K.R. 1965. The Morphology of Gymnosperms. Hutchinson & Co., Ltd., London.
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14. Sundarajan, S. 1997. College Botany Vol. I. S Chand & Co. Ltd., New Delhi.
15. Vashista, B.R. 1978. Bryophytes. S Chand & Co. Ltd., New Delhi.

B.Sc II Semester Practical Content
Course DSC 1B (Practical): Diversity of Non-Flowering Plants
 (Credits-2, No. of teaching hours-48 & 4h/week)

Course Title :Diversity of Non-Flowering Plants	Course Credit : 2
Total Teaching Hourse : 48 Hours	Course Code : DSC-I BP-2
Teaching Hourse / week : 4 Hourse	Max.Marks: 50 (SEE -40+10 =50)

- 1: Study of Marine algae- *Diatoms, Sargassum, and Polysiphonia*
- 2: Study of fresh water algae- *Spirulina, Oedogonium, Chara,.*
- 3: Study of *Riccia, Anthoceros, Funaria.*
- 4: Study of *Lycopodium, Selaginella, Equisetum, Marsilea & Nephrolepis*
- 5: Study of *Cycas, Pinus* and *Gnetum.*
- 6: Study of *Rhynia & Lepidodendron.*
- 7: Algal Cultivation
- 8: Study of plant fossils.

(Note: Field visit report and submission of two specimens are compulsory)

Government College (Autonomous), Kalaburagi
Department of Studies & Research in Botany
B.Sc.- II SEMESTER PRACTICAL EXAMINATION,----- YEAR
Subject: BOTANY
Course DSC 2B: Diversity of Non-Flowering Plants

Time:3 Hours

Max. Marks: 40

- | | |
|---|-----------------|
| Q. I. Identify, classify and write salient features of specimens A, B, C & D | 12 Marks |
| Q. II. Perform minor experiment 'E'. Show the preparation to the examiners. | 02 Marks |
| Q.III. Identify and describe anatomical features of F and G | 06 Marks |
| Q.IV. Identify and comment on the given slides/specimen H, I, J, K and L | 10 Marks |
| Q.V. Viva voce | 02 Marks |
| Q.VI. Submission | |
| i. Study Tour Report | 05 Marks |
| ii. Practical Record | 03 Marks |
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General instructions to the examiners

Q1. Give specimen from Algae, Bryophytes, Pteridophytes, and Gymnosperms, **A, B, C, and D.**

Q2. Preparation and analysis of material Algae/ Bryophytes, **E.**

Q3. **F-Pteridophytes & Gymnosperms - G**

Q4. Identify and write the features in the slides/specimen **H, I, J, K and L**

From Algae, Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Q5. Viva Voce

Q6. Submissions

i. Study Tour Report

ii. Practical Record

Continuous Internal Assessment/Formative Assessment

Major Courses theory internal.

SL.NO	Continuous Internal Assessment /Assessment Programme.	Maximum Marks 20
1	Two session tests with proper record for assessment (10+10=20)	20
	Total marks	20

Internal Assessment for practicals from I to VI semester.

SL.NO	Internal Assessment	Maximum Marks. 10
1	Test (5+5)	10
	Total marks	10

**QUESTION PAPER PATTERN FOR DSC (MAJOR) SUBJECTS UNDER STATE EDUCATION POLICY
(WITH EFFECT FROM 2024-250)**

(SEMESTER I TO VI)
SUBJECT: BOTANY

TITLE OF THE PAPER:

SEMESTER: I & II

Time: 3 Hours

Max. Marks: 80

Section – A

I Answer any TEN of the following

(2x10=20)

1. }
2. } From Unit 1
3. }
4. }
5. } From Unit 2
6. }
7. }
8. } From Unit 3
9. }
10. }
11. } From Unit 4
12. }

Section – B

II Answer any SIX of the following

(5x6=30)

13. }
14. } From Unit 1
15. }
16. } From Unit 2
17. }
18. } From Unit 3
19. }
20. } From Unit 4

Section – C

II Answer any THREE of the following

(10x3=30)

21. From Unit 1
22. From Unit 2
23. From Unit 3
24. From Unit 4