



# **BENGALURU CITY UNIVERSITY**

**CHOICE BASED CREDIT SYSTEM**

**(as per SEP 2024)**

## **Syllabus for I & II Semester B.Sc. Botany**

**2024-25**

COURSE PATTERN AND SCHEME OF EXAMINATION FOR B.SC. DEGREE AS PER SEP (2024-25 ONWARDS)																
SUBJECT : BOTANY																
Sl. No	Semester	Title Of The Paper	Teaching Hours	Hours/Week		Examination pattern Max. and Min. Marks/Paper						Duration of exam (hours)		Total marks/ paper	Credits	
				Theory	Practical	Theory			Practical			Theory	Practical		Theory	Practical
						Max.	Min.	IA	Max.	Min.	IA					
1	I	CORE SUBJECT	60	4	3	80	32	20	40	16	10	3	3	150	3	2
2	II	CORE SUBJECT	60	4	3	80	32	20	40	16	10	3	3	150	3	2

Proceedings of the meeting of BoS (UG) in Botany held on 5<sup>th</sup> & 6<sup>th</sup> July 2024  
at the Department of BCU School of Management, Jnana Jyothi Campus,  
Bangalore City University, Bengaluru – 560 001

**Venue:** Department of BCU School of Management, Jnana Jyothi  
Campus, Bangalore City University, Bengaluru – 560 001

Date: 06/07/2024

Time: 11:00 AM

Agenda:

1. To finalize the syllabus for I and II Semester B.Sc. Botany (UG) (CBCS) SEP-2024 for approval.
2. To approve the panel of examiners recommended for the examinations of 2024-25.
3. To recommend and approve the constitution of BoE for the academic year 2024-25.

Members Present

Signature

1. Smt. Zaiba Nishath Bano

Member

Zaiba

2. Dr. Mallikarjuna P.B.

Member

Mallikarjuna

3. Dr. B. L. Manjula

Member

Manjula

4. Smt. Shobharani

Co-opted Member

Shobharani

5. Esther Watson

Co-opted Member

Esther

6. Roopashree M. G.

Co-opted Member

Roopashree

7. Dr. N. S. Suresha

Co-opted Member

Suresha

8. Dr. L. Rajanna

CHAIRMAN

Rajanna  
06/7/24

Members Absent

1. Smt. K. R. Kavitha

Member

2. Smt. Chandrakala Shivakumar

Member

### MINUTES OF THE MEETING OF BoS (UG) IN BOTANY

Chairman welcomed the members of the BoS (UG) in Botany to the meeting and the agenda was placed for discussion.

- a). Discussed and finalized the syllabus for theory and practical of I and II Semester B.Sc., Botany (CBCS) SEP 2024, question paper pattern, blue print of question paper Formative assessment and Scheme of valuation for SEP programme to be implemented from the academic year 2024-25.
- b). The panel of Examiners was approved and recommended for UG Examination for the academic year 2024-25.
- c). Recommendations were made to constitute BoE for the academic year 2024-25.
- d). The Chairman was authorized to change / incorporate the corrections as per the directions of Bangalore City University.
- e). Discussed about the III, IV, V & VI semester papers to be introduced

The meeting ended with a vote of thanks by the Chairman.

1. Smt. Zaiba Nishath Bano *Zaiba*
2. Dr. Mallikarjuna P.B. *Mallikarjuna*
3. Dr. B. L. Manjula *Manjula (STEC, Race Course Road, Bellur-9)*
4. Smt. Shobharani *Shobharani (GFGC Yelahanka)*
5. Esther Watson *Esther (Bishop Cotton Women's Christian College)*
6. Roopashree M. G. *Roopashree (KUE Souren's S. Nijalingappa College)*
7. Dr. N. S. Suresha *N. S. Suresha*
8. Dr. L. Rajanna *L. Rajanna*

**Dr. L. RAJANNA**  
Senior Professor  
Department of Botany  
Bangalore University  
BANGALORE - 560 056.

## BOTANY CURRICULUM

### I SEMESTER

#### PAPER – I: MICROBIAL DIVERSITY, MYCOLOGY AND PHYCOLOGY

<b>Programme name</b>	<b>B. Sc. BOTANY</b>	<b>SEMESTER</b>	<b>I</b>
<b>Course Title</b>	<b>PAPER – I: MICROBIAL DIVERSITY, MYCOLOGY AND PHYCOLOGY</b>		
<b>Course Code</b>	<b>BOTT - 101</b>	<b>No. of Credits</b>	<b>03</b>
<b>Contact Hours</b>	<b>60 Hours</b>	<b>Duration of Exam</b>	<b>03 Hours</b>
<b>Formative Assessment Marks</b>	<b>20</b>	<b>Summative Assessment Marks</b>	<b>80</b>

#### Course objectives:

- To understand the microbial diversity through isolation techniques from various environments, mastering methods of sterilization and learning microbial culture and preservation techniques.
- Students will explore the structure, classification and multiplication of viruses like TMV and Bacteriophage T4, along with the economic importance of viruses and vaccination strategies
- Students will explore the structure, reproduction of Fungi, economic importance and disease caused by Fungi.
- The course also covers bacterial characteristics, reproduction, plasmid biology and bacterial diseases such as Citrus canker and Phytoplasma – related diseases.
- Additionally, students will study Cyanobacteria, algae(Phycology) and their economic roles and the environmental applications of algae in industries and agriculture.

#### Course outcomes:

- To understand the fascinating diversity, evolution and significance of microorganisms.
- To comprehend the systematic position, structure, physiology and life cycles of microbes and their impact on humans and environment.
- To gain laboratory skills such as microscopy, microbial cultures, staining, identification, preservation of microbes and their applications in research and industries.
- To understand the diversity and affinities among Fungi, Cyanobacteria and Algae and their applications in Biotechnology and industries.

## I SEMESTER

### PAPER – I: MICROBIAL DIVERSITY, MYCOLOGY AND PHYCOLOGY

**60 Hrs.**

<b>UNIT I</b>	<p><b>Microbiology</b> - Introduction and Scope of Microbiology.  <b>Branches of microbiology</b> - Industrial, Medical, Agricultural and Environmental Microbiology.  <b>Contributions of scientists to the field of Microbiology</b> - Anton von Leeuwenhoek, Louis Pasteur, Robert Koch and Iwanowsky.  <b>Microbial culture techniques</b> - Culture media, serial dilution and pour plate method.  <b>Viruses</b> - Properties, structure of TMV &amp; T4 Bacteriophage, Multiplication (lytic and lysogenic cycle) &amp; Transmission of viruses. Tomato leaf curl disease.  Brief account of Prions and Viroids</p>	<b>15 Hrs.</b>
<b>UNIT II</b>	<p><b>Bacteriology</b> - Introduction, classification of Bacteria based on shape and flagella. Ultra structure of bacterial cell with special reference to Gram positive and Gram negative cell wall composition. Endospore – a brief account.  <b>Reproduction</b> – Binary fission and genetic recombination (Transformation, Transduction and Conjugation).  A brief account of plasmids – definition and properties.  Structure and importance of Ti plasmid.  Bacterial nutrition, Citrus canker disease  <b>Economic importance</b> – Role of bacteria in Agriculture, Medicine and Industry  General account of Phytoplasma and Sandal spike disease.</p>	<b>15 Hrs.</b>
<b>UNIT III</b>	<p><b>Mycology</b> - General characters and reproduction in fungi.  Structure, reproduction and life cycle of <i>Albugo</i>, <i>Peziza</i> and <i>Puccinia</i>.  <b>Economic importance</b> - Role of fungi in Medicine, Agriculture and Industry.  <b>Plant Diseases</b> - Tikka disease of Groundnut, Red rot of Sugarcane, Grain smut of Sorghum and Koleroga of Arecanut.  <b>Lichens</b> - General account, reproduction and ecological importance.  A brief account of Mycorrhiza and Biopesticides</p>	<b>15 Hrs.</b>
<b>UNIT IV</b>	<p><b>Cyanobacteria and Phycology</b>  <b>Cyanobacteria:</b> Introduction, general characteristics, reproduction, and economic importance.  Type study: <i>Anabaena</i> and <i>Scytonema</i>.  <b>Algae</b> - General characters, occurrence, structure, reproduction and life cycle of <i>Chlamydomonas</i>, <i>Hydrodictyon</i>, <i>Spirogyra</i>, <i>Chara</i>, Diatoms, <i>Sargassum</i>, and <i>Polysiphonia</i>.  Economic importance of Algae in Agriculture, Medicine and Industry</p>	<b>15 Hrs.</b>

<b>Assessment:</b>	<b>Marks:</b>
Attendance	05 Marks
Assignment	05 Marks
Test	10 Marks
<b>Total</b>	<b>20 Marks</b>

### PRACTICAL PAPER – I

#### PAPER – I: MICROBIAL DIVERSITY, MYCOLOGY AND PHYCOLOGY

**No of Credits: 02**

**45 Hrs.**

	<b>BOTP – 102; MICROBIAL DIVERSITY, MYCOLOGY AND PHYCOLOGY</b>	<b>15 Units</b>
<b>1.</b>	<b>Study of instruments:</b> autoclave, inoculation chamber/LAF, hot air oven, incubator and inoculation loop.	<b>1 Unit</b>
<b>2</b>	Sterilization of glassware, media preparation - nutrient media (Nutrient Agar), Isolation of Bacteria from soil by pour plate method, Colony characteristics of Bacteria to identify colonies.	<b>1 Unit</b>
<b>3</b>	Diseases: Citrus Canker, Sandal spike, Tomato leaf curl, Tikka disease of Groundnut, Red rot of Sugarcane, Grain smut of Sorghum and Koleroga of Arecanut.	<b>2 Units</b>
<b>4</b>	Gram staining: Rhizobium from root nodules and Lactobacillus from curd.	<b>1 Unit</b>
<b>5</b>	Measurement of cell concentration – yeast cells / fungal spores using Haemocytometer	<b>1 Unit</b>
<b>6</b>	<b>Type study of Cyanobacteria:</b> <i>Anabaena</i> and <i>Scytonema</i>	<b>1 Unit</b>
<b>7</b>	<b>Type study of Algae:</b> <i>Chlamydomonas</i> , <i>Hydrodictyon</i> , <i>Spirogyra</i> , <i>Chara</i> , <i>Diatoms</i> , <i>Sargassum</i> and <i>Polysiphonia</i>	<b>5 Units</b>
<b>8</b>	<b>Type study of fungi:</b> <i>Albugo</i> , <i>Peziza</i> and <i>Puccinia</i>	<b>2 Units</b>
<b>9</b>	Lichens and Mycorrhiza	<b>1 Unit</b>

<b>Assessment:</b>	<b>Marks:</b>
Continuous assessment/Attendance	05 Marks
Test	05 Marks
<b>Total</b>	<b>10 Marks</b>

## PRACTICAL QUESTION PAPER

### BOTP 102: Paper– I: MICROBIAL DIVERSITY, MYCOLOGY AND PHYCOLOGY

Time 3 Hours

Max Mars - 40

1.	Identify & classify the specimens <b>A, B, &amp; C</b> with labelled diagrams and reasons	3 x 3 = 9 Marks
2.	Identify and Comment on the instrument / Disease/Lichen <b>D</b>	1 x 3 = 3 Marks
3.	Prepare a temporary slide of <b>E</b> . Sketch, label and identify with reasons. Leave the preparation for evaluation	1 x 5 = 5 Marks
4.	Stain the given material <b>F</b> by Gram staining. Write the procedure and identify with reasons. Leave the preparation for evaluation <b>OR</b> Calculate the population of fungal spores /yeast cells in <b>F</b> using Haemocytometer	1 x 6 = 6 Marks
5.	Identify the Slides <b>G, H</b> and <b>I</b> with labelled diagrams with reasons.	3 x 3 = 9 Marks
6.	Record and Submission	5 + 3 = 8 Marks

### SCHEME OF EVALUATION

1	Three specimens <b>A, B and C</b> , - one from <b>A</b> - Fungi, <b>B</b> - Cyanobacteria <b>C</b> - Algae, (Identification – 1 mark, classification – 1 mark, reasons 1 mark)
2	Instrument/Disease/Lichens of <b>D</b> – 3 marks, (Identification 1 mark, working principle 1 Mark, Labelled diagram 1mark) /Diseases/Lichens(Identification 1 mark, Comment and Labelled diagram 2 marks)
3	Specimen <b>E</b> from algae –(mounting – 2 marks. Identification – 1 mark, Sketch with reasons 2 marks)
4	Specimen <b>F</b> – Gram staining (Staining – 4 marks, Procedure and result –2 mark). <b>OR</b> Calculation of fungal spores/yeast cells using haemocytometer (Procedure -2 marks, observation – 2 marks, calculation – 2 marks)
5	Three permanent slides <b>G,H &amp;I</b> - from Fungi/Cyanobacteria / algae (Identification – 1 mark, sketch with reasons- 2marks)
6	a) Record –5 marks b) Submission of 3 specimens –3 marks

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# **BOTANY CURRICULUM**

## **II SEMESTER**

### **PAPER – II: BRYOPHYTES, PTERIDOPHYTES, PALEOBOTANY AND PLANT ANATOMY**

<b>Programme name</b>	<b>B. Sc. BOTANY</b>	<b>SEMESTER</b>	<b>II</b>
<b>Course Title</b>	<b>PAPER – II: BRYOPHYTES, PTERIDOPHYTES, PALEOBOTANY AND PLANT ANATOMY</b>		
<b>Course Code</b>	<b>BOTT - 201</b>	<b>No. of Credits</b>	<b>03</b>
<b>Contact Hours</b>	<b>60 Hours</b>	<b>Duration of Exam</b>	<b>03 Hours</b>
<b>Formative Assessment Marks</b>	<b>20</b>	<b>Summative Assessment Marks</b>	<b>80</b>

#### **Course objectives**

- Understand the basics of Bryophytes and Pteridophytes covering the characteristics, occurrence, organization, and classification of Bryophytes and Pteridophytes.
- Explore the economic and ecological roles of Bryophytes and Pteridophytes in the field of medicine, agriculture and industry.
- Investigate the structure, reproduction and life cycles of Bryophytes and Pteridophytes.
- To understand the mode of evolution of plants through paleobotanical studies, formation of fossils and type study.
- Explore meristematic tissues, root and shoot apical meristems, their organization, types of vascular bundles and anomalous secondary growth in plants.

#### **Course outcomes:**

- Understand the diversity and affinities among Bryophytes and Pteridophytes.
- Understand the morphology, anatomy, reproduction and life cycle across Bryophytes and Pteridophytes and their economic, ecological and evolutionary significance.
- Observation of fossil types, their formation and structure of various plant parts in different era.
- Skill development for the proper description of internal structure using botanical terms, their identification and further classification.
- Obtain laboratory skills/ explore non-flowering plants for their commercial applications.

## II SEMESTER

### PAPER – II: BRYOPHYTES, PTERIDOPHYTES, PALEOBOTANY AND PLANT ANATOMY

**60 Hrs.**

<b>Unit I</b>	<b>BRYOPHYTES</b> General characters, classification, distribution, structure, reproduction and alternation of generations in <i>Marchantia</i> , <i>Anthoceros</i> and <i>Funaria</i> . Ecological and economic importance of Bryophytes.	<b>15 Hrs.</b>
<b>Unit II</b>	<b>PTERIDOPHYTES</b> Introduction and general characters of Pteridophytes Study of diversity in morphology, anatomy, reproduction and life cycle of the following groups in representative forms: 1. Psilotopsida – Ex. <i>Psilotum</i> 2. Lycopsidea – Ex. <i>Lycopodium</i> and <i>Selaginella</i> 3. Filicopsida - Ex. <i>Marsilea</i> (Developmental stages not required) Brief account of stelar evolution, heterospory and seed habit.	<b>15 Hrs.</b>
<b>Unit III</b>	<b>PALEOBOTANY</b> <b>Contributions of paleobotanist</b> – Birbal Sahni. Outline of geological time scale with special emphasis on Paleozoic and Mesozoic Era. Process of fossilization – Compression, Impression, Petrification, Compaction, Casts and Moulds, Coal balls. <b>Type study</b> – <i>Rhynia</i> , <i>Cycadeoidea</i> and <i>Pentaxylon</i> .	<b>15 Hrs.</b>
<b>Unit IV</b>	<b>Meristematic Tissues</b> - Structure, function and classification. <b>Organisation of Apical Meristems:</b> Apical cell theory, Tunica-cortex theory and Histogen theory. Shoot and root apical meristems. <b>Histology:</b> Structure, Classification and significance of simple, complex and secretory tissues. Types of vascular bundles. <b>Secondary growth:</b> Dicot stem Ex. – <i>Tridax</i> . <b>Anomalous Secondary growth:</b> <i>Boerhaavia</i> and <i>Dracaena</i> . Brief account of wood anatomy	<b>15 Hrs.</b>

<b>Assessment:</b>	<b>Marks:</b>
Attendance	05 Marks
Assignment	05 Marks
Test	10 Marks
<b>Total</b>	<b>20 Marks</b>

## II SEMESTER

### PAPER – II: BRYOPHYTES, PTERIDOPHYTES, PALEOBOTANY AND PLANT ANATOMY

No. of credits: 02

45 Hrs.

	<b>BOTP – 202: BRYOPHYTES, PTERIDOPHYTES, PALEOBOTANY AND PLANT ANATOMY</b>	<b>15 Units</b>
<b>1.</b>	Study of Bryophytes (Forms studied in theory)	<b>3 Units</b>
<b>2</b>	Study of Pteridophytes (Forms studied in theory)	<b>4 Units</b>
<b>3</b>	Paleobotany – Type study (Fossil material/slide/photos)	<b>2 Units</b>
<b>4</b>	Histology – Permanent tissues	<b>2 Units</b>
<b>5</b>	Study of T. S of Dicot stem and sectioning: <i>Tridax</i>	<b>1 Unit</b>
<b>6</b>	Study of T. S of <i>Boerhaaviastem</i> and sectioning.	<b>1 Unit</b>
<b>7</b>	Study of T. S of <i>Dracaena</i> stem and sectioning.	<b>1 Unit</b>
<b>8</b>	Visit to Institute of Wood Science	<b>1 Unit</b>

<b>Assessment:</b>	<b>Marks:</b>
Continuous assessment/Attendance	05 Marks
Test	05 Marks
<b>Total</b>	<b>10 Marks</b>

### PRACTICAL QUESTION PAPER

#### BOTP 202: PAPER – II: BRYOPHYTES, PTERIDOPHYTES, PALEOBOTANY AND PLANT ANATOMY

Time: 3Hrs

Marks: 40

<b>1.</b>	Identify and classify the specimens <b>A, B, C</b> and <b>D</b> giving reasons	<b>4 x 3 = 12 Marks</b>
<b>2.</b>	Comment on Slide/ Specimen/ Photograph of <b>E</b>	<b>1 x 3 = 3 Marks</b>
<b>3.</b>	Identify the slides <b>F, G, H</b> and <b>I</b> with reasons and diagrams	<b>4 x 3 = 12 Marks</b>
<b>4.</b>	Prepare a temporary stained T. S of the material <b>J</b> . Sketch, label and identify with reasons. Leave the preparation for evaluation.	<b>1 x 5 = 5 Marks</b>
<b>5.</b>	Record and report of visit to Wood Science Institute	<b>5 + 3 = 8 Marks</b>

### SCHEME OF EVALUATION

<b>1</b>	<b>A&amp;B</b> Bryophytes and <b>C&amp;D</b> Pteridophytes: (Identification and Classification- 1 mark, Reasons- 2 marks)
<b>2</b>	Slide/ Specimen/ Photograph of <b>E. (Paleobotany)</b> (Identification – 1 mark, Reasons- 1 mark and Diagram – 1 mark)
<b>3</b>	Slides <b>F (Bryophytes), G (Pteridophytes), H (Paleobotany)</b> and <b>I Anatomy</b> (Identification – 1 mark, Reasons- 1 mark and Diagram – 1 mark) for each slide.
<b>4</b>	<b>J (Plant Anatomy)</b> – (Staining and mounting – 2 marks, Sketch and labelling – 1 mark, Identification – 1 mark and reasons – 1 mark)
<b>5</b>	a) Record – 5 marks. b) visit to Wood Science Institute – 3 marks

## REFERENCES

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## QUESTION PAPER FORMAT

### THEORY EXAMINATION

Marks for each question	No. of questions to be		Total marks
	Answered	Out of	
A. 2	10	12	20
B. 5	6	8	30
C. 10	3	5	30
			80

**B.Sc. Degree Examination December/January 2025**

**(Undergraduate Credit Based Semester Scheme)**

**BOTANY**

**BOTT: 101- PAPER-I: Microbial Diversity, Mycology and Phycology**

**Time: 3 Hours**

**Max. Marks: 80**

**Section-A**

A. Explain/define **any ten** of the following in **two** or **three** sentences: **(10 X 2 = 20)**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

**Section- B**

B. Write critical notes on **any six** of the following:

**(6 X 5 = 30)**

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

**Section- C**

C. Give a comprehensive account on **any three** of the following:

**(3 X 10 = 30)**

- 21.
- 22.
- 23.
- 24.
- 25.

## Question Paper Format for Discipline Specific (Elective) Subjects

### THEORY EXAMINATION

Marks for each question	No. of questions to be		Total marks
	Answered	Out of	
A. 2	5	7	10
B. 5	6	8	30
			40

**B.Sc Degree Examination December/January 2025**

**(Undergraduate Credit Based Semester Scheme)**

**BOTANY**

**BOTT: Paper: Elective**

**Time: 2 Hours**

**Max Marks: 40**

#### **Section-A**

A. Explain/define **any ten** of the following in **two** or **three** sentences: **(5 X 2 = 10)**

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

#### **Section- B**

B. Write critical notes on **any six** of the following:

**(6 X 5 = 30)**

- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.