

# J.S.S. BANASHANKARI ARTS, COMMERCE AND SHANTIKUMAR GUBBI SCIENCE COLLEGE, VIDYAGIRI, DHARWAD

Affiliated to Karnatak University, Dharwad

Accredited with 'A' Grade in last three cycles



## Fourth Cycle NAAC Accreditation SELF STUDY REPORT (SSR)

### ≡ CRITERION - I ≡

#### 1.2.1 (Q<sub>n</sub>M)

#### **BOTANY (CBCS)**



Submitted to  
**NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL, BENGALURU**



**KARNATAK UNIVERSITY, DHARWAD**  
**ACADEMIC (S&T) SECTION**  
 ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ  
 ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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**ಅಧಿಸೂಚನೆ**

ವಿಷಯ: 2020-21ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳಿಗೆ 1 ಮತ್ತು 2ನೇ ಸೆಮಿಸ್ಟರ್ ಸಿ.ಬಿ.ಸಿ.ಎಸ್. ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

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ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ, 2020-21ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸುಗಳ 1 ಮತ್ತು 2ನೇ ಸೆಮಿಸ್ಟರ್‌ಗಳಿಗೆ ಸಿ.ಬಿ.ಸಿ.ಎಸ್. ಮಾದರಿ ಪಠ್ಯಕ್ರಮವನ್ನು ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದನೆಯನ್ನು (Pending Approval of Academic Council Meeting) ನಿರೀಕ್ಷೆಯಲ್ಲಿರಿಸಿ ಅಳವಡಿಸಲಾಗಿದೆ.

ಮುಂದುವರೆದು, ಈ ಮೇಲಿನ ಸಿ.ಬಿ.ಸಿ.ಎಸ್. ಪಠ್ಯಕ್ರಮವು ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ [www.kud.ac.in](http://www.kud.ac.in) ದಲ್ಲಿ ಬಿತ್ತರಿಸಲಾಗಿದೆ ಎಂದು ಈ ಮೂಲಕ ತಿಳಿಸಲಾಗಿದೆ.

*Handwritten signature: Hanu 13/08/2020*

(ಡಾ. ಹನುಮಂತಪ್ಪ ಕೆ.ಟಿ)  
 ಕುಲಸಚಿವರು

ಗೆ,

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ.

**ಪ್ರತಿ ಮಾಹಿತಿಗಾಗಿ:** ಡೀನರು, ಕಲಾ, ಸಮಾಜ ವಿಜ್ಞಾನ, ವಿಜ್ಞಾನ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, ವಾಣಿಜ್ಯ, ಕಾನೂನು, ಶಿಕ್ಷಣ ಮತ್ತು ಮಾನ್ಯೇಜಮೆಂಟ್ ನಿಖಾಯ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

**ಪ್ರತಿ:**

1. ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕುಲಪತಿಗಳ ಕಾರ್ಯಾಲಯ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕುಲಸಚಿವರ ಕಾರ್ಯಾಲಯ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕುಲಸಚಿವರು(ಮೌಲ್ಯಮಾಪನ) ಕಾರ್ಯಾಲಯ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ನಿರ್ದೇಶಕರು, ಇಂಟರ್‌ನೆಟ್ ಸೆಕ್ಷನ್, ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ಅಧೀಕ್ಷಕರು, ಸಿಡಿಸಿ (ಸಂಯೋಜನೆ) ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ

# SEMESTER I

## CORE COURSE: BOTANY PAPER - I

### BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

(Credits: Theory-4, Practicals-2)

#### THEORY

Lectures: 60

#### Unit 1: Microbes (10 Lectures)

Viruses – Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance; Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.

#### Unit 2: Algae (12 Lectures)

General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: *Nostoc*, *Chlamydomonas*, *Oedogonium*, *Vaucheria*, *Sargassum*, *Batrachospermum*. Economic importance of algae

#### Unit 3: Fungi (12 Lectures)

Introduction- General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification; True Fungi- General characteristics, ecology and significance, life cycle of *Rhizopus* (Zygomycota) *Penicillium*, *Alternaria* (Ascomycota), *Puccinia*, *Agaricus* (Basidiomycota); Symbiotic Associations-Lichens:

General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance

#### Unit 4: Introduction to Archegoniate (2 Lectures)

Unifying features of archegoniate, Transition to land habit, Alternation of generations.

#### Unit 5: Bryophytes (10 Lectures)

General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family), morphology, anatomy and reproduction of *Marchantia* and *Funaria*. (Developmental details not to be included). Ecology and economic importance of Bryophytes with special mention of *Sphagnum*.

#### Unit 6: Pteridophytes (8 Lectures)

General characteristics, classification, Early land plants (*Cooksonia* and *Rhynia*). Classification (up to family), morphology, anatomy and reproduction of *Selaginella*, *Equisetum* and *Pteris*. (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Ecological and economical importance of Pteridophytes.

## Unit 7: Gymnosperms

(6 Lectures)

General characteristics, classification. Classification (up to family), morphology, anatomy and reproduction of *Cycas* and *Pinus*. (Developmental details not to be included). Ecological and economical importance.

## Practical

1. EMs/Models of viruses – T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic cycle.
2. Types of Bacteria from temporary/permanent slides/photographs; EM bacterium; Binary Fission; Conjugation; Structure of root nodule.
3. Gram staining
4. Study of vegetative and reproductive structures of *Nostoc*, *Chlamydomonas* (Electron micrographs), *Oedogonium*, *Vaucheria*, *Fucus\** and *Polysiphonia* through temporary preparations and permanent slides. (\* *Fucus* - Specimen and permanent slides)
5. *Rhizopus* and *Penicillium*: Asexual stage from temporary mounts and sexual structures through permanent slides.
6. *Alternaria*: Specimens/photographs and tease mounts.
7. *Puccinia*: Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves; section/tease mounts of spores on Wheat and permanent slides of both the hosts.
8. *Agaricus*: Specimens of button stage and full grown mushroom; Sectioning of gills of *Agaricus*.
9. Lichens: Study of growth forms of lichens (crustose, foliose and fruticose)
10. Mycorrhiza: ecto mycorrhiza and endo mycorrhiza (Photographs)
11. *Marchantia*- morphology of thallus, w.m. rhizoids and scales, v.s. thallus through gemma cup, w.m. gemmae (all temporary slides), v.s. antheridiophore, archegoniophore, l.s. sporophyte (all permanent slides).
12. *Funaria*- Morphology, w.m. leaf, rhizoids, operculum, peristome, annulus, spores (temporary slides); permanent slides showing antheridial and archegonial heads, l.s. capsule and protonema.
13. *Selaginella*- morphology, w.m. leaf with ligule, t.s. stem, w.m. strobilus, w.m. microsporophyll and megasporophyll (temporary slides), l.s. strobilus (permanent slide).
14. *Equisetum*- morphology, t.s. internode, l.s. strobilus, t.s. strobilus, w.m. sporangiophore, w.m. spores (wet and dry)(temporary slides); t.s. rhizome (permanent slide).
15. *Pteris*- morphology, t.s. rachis, v.s. sporophyll, w.m. sporangium, w.m. spores (temporary slides), t.s. rhizome, w.m. prothallus with sex organs and young sporophyte (permanent slide).
16. *Cycas*- morphology (coralloid roots, bulbil, leaf), t.s. coralloid root, t.s. rachis, v.s. leaflet, v.s. microsporophyll, w.m. spores (temporary slides), l.s. ovule, t.s. root (permanent slide).
17. *Pinus*- morphology (long and dwarf shoots, w.m. dwarf shoot, male and female), w.m. dwarf shoot, t.s. needle, t.s. stem, l.s./t.s. male cone, w.m. microsporophyll, w.m. microspores (temporary slides), l.s. female cone, t.l.s. & r.l.s. stem (permanent slide).

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# SEMESTER I

## CORE COURSE: BOTANY PAPER - I

### BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

#### THEORY

Time : 3 Hours

Max. Marks: 80

Q. I. Answer any **TEN** of the following: 10 x 2 = 20 Marks

- From Unit – 1 : Two Sub questions
- From Unit – 2 : Two Sub questions
- From Unit – 3 : Two Sub question
- From Unit – 4 : One Sub questions
- From Unit – 5 : Two Sub questions
- From Unit – 6 : One Sub question
- From Unit – 7 : Two Sub questions

Q. II. Answer any **SIX** of the following: 6 x 05 = 30 Marks

- From Unit – 1 : One Sub question
- From Unit – 2 : Two Sub question
- From Unit – 3 : Two Sub question
- From Unit – 5 : One Sub questions
- From Unit – 6 : One Sub question
- From Unit – 7 : One Sub question

Q. III. Answer any **THREE** of the following: 3 x 10 = 30 Marks

- From Unit – 1 : One Sub question
- From Unit – 2 : One Sub question
- From Unit – 3 : One Sub question
- From Unit – 5 : One Sub questions
- From Unit – 6 : One Sub question

# SEMESTER I

## CORE COURSE: BOTANY PAPER - I

### BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

#### THEORY

Time : 3 Hours

Max. Marks: 80

#### BLUE PRINT OF THE QUESTION PAPER

Sl. No.	Unit	Title	Teaching Hours	Total Questions Allotted			Total Marks
				2 marks	5 Marks	10 Marks	
1.	1	Microbes	10	02	01	01	19
2.	2	Algae	12	02	02	01	24
3.	3	Fungi	12	02	02	01	24
4.	4	Introduction to Archegoniate	02	01	00	00	02
5.	5	Bryophytes	10	02	01	01	19
6.	6	Pteridophytes	08	01	01	01	17
7.	7	Gymnosperms	06	02	01	00	09
Total			60	12	08	05	114



# SEMESTER I

## CORE COURSE: BOTANY PRACTICAL - I

### BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

Time : 03 Hours

Max. Marks: 40

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|-------|--|----------|
| Q. 1. | Identify and classify the given specimen A, B, C, D, E and F giving reasons.   | 12 marks |
| Q. 2. | Make Simple/ Differential staining of the given specimen H and show the preparation to the examiner (No written answer is expected). | 03 marks |
| Q. 3. | Identify the given specimen / slide I, J, K, L, M and N giving reasons.  | 09 marks |
| Q. 4. | Identify the given specimen / Photograph O giving reasons.   | 02 marks |
|       | Practical Record (Journal)   | 05 Marks |
|       | Botanical Study-Tour Report  | 05 marks |
|       | Viva-voce  | 04 Marks |

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### Instructions to the Examiner

- Q. 1. One Specimen each from Algae, Fungi, Bryophyte, Pteridophyte and Gymnosperm.
- Q.2. Simple/ Differential staining of Bacteria
- Q. 3. One specimen / slide each from Algae, Fungi, Bryophyte, Pteridophyte and Gymnosperm.
- Q. 5. One specimen / slide / Electron Micrograph of Viruses or Bacteria.

**SEMESTER II**  
**CORE COURSE BOTANY –PAPER II**  
**PLANT ECOLOGY AND TAXONOMY**  
(Credits: Theory-4, Practicals-2)

**THEORY**  
**Lectures: 60**

<b>Unit 1: Introduction</b>	<b>(02 Hours)</b>
<b>Unit 2: Ecological factors</b> Soil: Origin, formation, composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes.	<b>(10 Hours)</b>
<b>Unit 3: Plant communities</b> Characters; Ecotone and edge effect; Succession; Processes and types.	<b>(06 Hours)</b>
<b>Unit 4: Ecosystem</b> Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon, nitrogen and Phosphorous	<b>(08 Hours)</b>
<b>Unit 5: Phytogeography</b> Preinciple Biogeographical zones, Endemisim	<b>(04 Hours)</b>
<b>Unit 6 : Introduction to Taxonomy</b> Identification, Classification, Nomenclature	<b>(02 Hours)</b>
<b>Unit 7 : Identification</b> Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access	<b>(04 Hours)</b>
<b>Unit 8 : Taxonomic Evidences</b> From Palynology, Cytology, Phytochemistry and Molecular data.	<b>( 06 Hours)</b>
<b>Unit 9 : Taxonomic Hierarchy</b> Ranks, categories and taxonomic groups	<b>(02 Hours)</b>
<b>Unit 10 : Botanical Nomenclature</b> Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.	<b>( 06 Hours)</b>
<b>Unit 11 Classification</b> Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series).	<b>(06 Hours)</b>

## Unit 12 Biometrics, numerical taxonomy and cladistics

(04 Hours)

Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).

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### PRACTICALS

1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.
2. Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.
3. Comparison of bulk density, porosity and rate of infiltration of water in soil of three habitats.
4. (a) Study of morphological adaptations of hydrophytes and xerophytes (four each).  
(b) Study of biotic interactions of the following: Stem parasite (*Cuscuta*), Root parasite (Orobanche), Epiphytes, Predation (Insectivorous plants)
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method. (species to be listed)
6. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law
7. Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): **Brassicaceae** -*Brassica, Alyssum / Iberis*; **Asteraceae** -*Sonchus/Launaea, Vernonia/Ageratum, Eclipta/Tridax*; **Solanaceae** -*Solanum nigrum, Withania*; **Lamiaceae** -*Salvia, Ocimum*; **Liliaceae** -*Asphodelus / Lilium / Allium*.
8. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book).

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**SEMESTER II**  
**CORE COURSE BOTANY –PAPER II**  
**PLANT ECOLOGY AND TAXONOMY**  
(Credits: Theory-4, Practicals-2)

**THEORY**

Time : 3 Hours

Max. Marks: 80

Q. I. Answer any **TEN** of the following: 10 x 2 = 20 Marks

- From Unit – 2 : Two Sub questions
- From Unit – 3 : One Sub questions
- From Unit – 4 : Two Sub questions
- From Unit – 5 : One Sub questions
- From Unit – 7 : One Sub questions
- From Unit – 8 : One Sub questions
- From Unit – 9 : One Sub questions
- From Unit – 10 : One Sub questions
- From Unit – 11 : One Sub questions
- From Unit – 12 : One Sub questions

Q. II. Answer any **SIX** of the following: 6 x 05 = 30 Marks

- From Unit – 2 : Two Sub questions
- From Unit – 3 : One Sub questions
- From Unit – 4 : One Sub questions
- From Unit – 5 : One Sub questions
- From Unit – 7 : One Sub questions
- From Unit – 10 : One Sub questions
- From Unit – 11 : One Sub questions

Q. III. Answer any **THREE** of the following: 3 x 10 = 30 Marks

- From Unit – 2 : One Sub questions
- From Unit – 3 : One Sub questions
- From Unit – 4 : One Sub questions
- From Unit – 8 : One Sub questions
- From Unit – 11 : One Sub questions

**SEMESTER II**  
**CORE COURSE BOTANY –PAPER II**  
**PLANT ECOLOGY AND TAXONOMY**  
(Credits: Theory-4, Practicals-2)

**THEORY**

**Time : 3 Hours**

**Max. Marks: 80**

**BLUE PRINT OF THE QUESTION PAPER**

Sl. No.	Unit	Title	Teaching Hours	Total Questions Allotted			Total Marks
				2 marks	5 Marks	10 Marks	
1.	1.	Introduction	02	00	00	00	00
2.	2.	Ecological Factors	10	02	02	01	24
3.	3.	Plant communities	06	01	01	01	17
4.	4.	Ecosystem	08	02	01	01	19
5.	5.	Phytogeography	04	01	01	00	07
6.	6.	Introduction to Taxonomy	02	00	00	00	00
7.	7.	Identification	04	01	01	00	07
8.	8.	Taxonomic Evidences	06	01	00	01	12
9.	9.	Taxonomic Hierarchy	02	01	00	00	02
10.	10.	Botanical Nomenclature	06	01	01	00	07
11.	11.	Classification	06	01	01	01	17
12.	12	Biometrics, Numerical Taxonomy and Cladistics	04	01	00	00	02
<b>Total</b>			<b>60</b>	<b>12</b>	<b>08</b>	<b>05</b>	<b>114</b>

**SEMESTER II**  
**CORE COURSE BOTANY – PRACTICAL - II**  
**PLANT ECOLOGY AND TAXONOMY**  
**(Credits: Theory-4, Practicals-2)**

**PRACTICAL**

Time : 3 Hours

Max. Marks: 40

- |       |  |           |
|-------|--|-----------|
| Q. 1. | Give an account of external and internal features of ecological adaptations of specimen A and mention the habitat to which it belongs. | 05 marks  |
| Q. 2. | Assign the specimens B, C and D to the respective families giving diagnostic features and their classifications ( up to family).       | 09 marks. |
| Q. 3. | Estimate the salinity / P <sup>H</sup> of given water sample E. Write the procedure and inference                                      | 04 marks  |
| Q. 4. | Draw the floral diagram and write floral formula of specimen F.  | 03 marks. |
| Q. 5. | Identify the slides / specimens G, H, I, giving reasons.   | 06 marks  |
|       | Practical Record (Journal)   | 05 Marks  |
|       | Submission of Herbaria of weeds ( Any Five)  | 04 marks  |
|       | Viva-voce (On Ecology / Vegetation types)  | 04 Marks  |
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**Instructions to the Examiner**

- Q. 1. One ecological specimen (External adaptation – 1 mark, Internal adaptation – 2 marks, diagram (T.S.) – 2 marks, mentioning habitat – 1 mark)
- Q. 2. Three families done in the practical class.  
(Identification – 1 mark, Classification – 1 mark, Features – 2 marks)
- Q. 3. For P<sup>H</sup> (Setting instrument – 2 marks, record of reading – 2 marks, conclusion & result – 1 mark)  
For salinity of water ( conducting the test – 2 marks, tabulation of readings – 1 mark, calculation and result – 2 marks)
- Q. 4. A twig with flower buds (Floral diagram – 2 marks, Floral formula – 1 mark)
- Q. 5. 3 Slides / specimens of ecological interest (Identification – 1 mark, description – 1 mark)
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