



GONDWANA UNIVERSITY, GADCHIROLI

SYLLABUS

For

B. Sc.

BOTANY

Semester I & II

Under

**Choice Based Credit System
(CBCS)**

(With effect from : 2020-21)

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SEMESTER -I				
Papers	Title of the Paper	Th/Pr	Int. Assessment	Total Marks
Paper - I	Plant Diversity I (Micro- organisms, Algae, Fungi & Plant Pathology)	50 Marks	10 Marks	60 Marks
Paper -II	Plant Diversity II (Bryophyta, Pteridophyta, Gymnosperm & Paleobotany)	50 Marks	10 Marks	60 Marks
Practical	Based on Theory Paper -I & II of Semester - I	30 Marks	---	30 Marks
Internal Assessment: Based on Assignment, Seminar, Unit Test & overall attendance and performance of the student.				

SEMESTER -II				
Papers	Title of the Paper	Th/Pr	Int. Assessment	Total Marks
Paper - I	Morphology and Anatomy of Angiosperms	50 Marks	10 Marks	60 Marks
Paper - II	Taxonomy & Diversity of Angiosperms	50 Marks	10 Marks	60 Marks
Practical	Based on Theory Paper -I & II of Semester - II	30 Marks	---	30 Marks
Internal Assessment: Based on Assignment, Seminar, Unit Test & overall attendance and performance of the student.				

B.Sc. SEMESTER – I
Paper – I
Plant Diversity- I
(Micro-organisms, Algae, Fungi and Plant Pathology)
(48 Periods)

UNIT – I

(12 Periods)

1. **General characteristics of life** (Growth, metabolism and reproduction).
2. **Viruses:**
 - a) General characteristics and nature of viruses (living and non-living).
 - b) Morphology and Structure of T4 phage (DNA virus) and TMV (RNA virus).
 - c) Transmission of viruses in plants w.r.t. Grafting, Seeds, Contact, Air and water, Soil, Agricultural tools, Smokers, Store house and Insects.
3. **Mycoplasma:**

General characteristics and Structure.
4. **Bacteria:**
 - a) **Structure of bacterial cell.**
 - b) **Morphology of bacteria** (Bacillus, Coccus, Spirillum and Vibrio).
 - c) **Economic importance :** i) **Useful bacteria** (Agriculture, Industries and Medicine)
ii) **Harmful bacteria** (Pathogenic bacteria, Food spoiling, Food poisoning and Denitrification).

UNIT – II

(12 Periods)

Algae

1. **General Characters.**
2. **Habitats:** Aquatic, Terrestrial and Algae unusual habitats.
3. **Range of thallus structure in algae:** Unicellular, Colonial, Filamentous, Siphonaceous and Parenchymatous.
4. **Reproduction:** Vegetative, Asexual and Sexual.
5. **Classification** -G. M. Smith (1955) up to classes.
6. **Study of life cycle** w.r.t. Systematic position, thallus structure and reproduction of
 - a) *Nostoc* and
 - b) *Chara*.
7. **Economic importance** w.r.t. Agriculture, Industries, Medicine and Energy production.

Fungi

1. **General Characters.**
2. **Thallus structure.**
3. **Mode of nutrition** (Parasites, Saprophytes and Symbionts).
4. **Reproduction:** Vegetative, Asexual and Sexual.
5. **Classification of Fungi** - according to G. Ainsworth (1973) upto classes.
6. **Study of life cycle** w. r. t. Systematic position, thallus structure reproduction of
 - a) *Mucor* and
 - b) *Puccinia*.
7. **Economic importance** w. r. t. Agriculture, Industries, Food and Medicine.

1. Lichens:

- a) **Definition and General Characters.**
- b) **Types** - Crustose, Foliose and Fruticose.
- c) **Ecological importance and Economical importance** w.r.t. Agriculture, Industries, Food and Medicine.

2. Plant Pathology:

- a) **Classification of plant diseases based on pathogens** (viral, bacterial and fungal).
- b) **Plant diseases caused by -**
 - i. **Viruses**-w.r.t. Leaf curl of Papaya (Symptoms, Causal organism and Control measures).
 - ii. **Bacterial**- Bacterial blight of cotton (Symptoms, Causal organism and Control measures).
 - iii. **Fungal**- Red rot of Sugarcane (Symptoms, Causal organism- *Colletotrichum falcatum* and Control measures).

Note: Developmental stages not expected.

Note: Student activates like seminars, quiz, debate, assignments, field work, study Project and models etc. are part of curriculum for all units.

SEMESTER – I
Paper – II
Plant Diversity- II
(Bryophyta, Pteridophyta, Gymnosperm and Paleobotany)
(48 Periods)

UNIT – I

(12 Periods)

Bryophyta

1. **General characteristics** w.r.t. Habit, Habitat, Gametophytes, Reproduction and Sporophyte.
2. **Adaptations to land habit.**
3. **Range of thallus organization** w.r.t. Morphology and Anatomy.
4. **Classification as per G. M. Smith** (up to order).
5. **Morphology, reproduction and life cycle of following type.**
 - a) *Riccia* (Hepaticopsida) and
 - b) *Funaria* (Bryopsida)
6. **Economic importance** w.r.t. Formation of peat, Packing material, Bedding stock, Medicines, in experimental botany, Food and Source of fuel.

UNIT – II

(12 Periods)

Pteridophytes

1. **General characteristics** w.r.t. Habit, Habitat, Sporophyte and Reproduction.
2. **Classification of Pteridophytes** according to **G. M. Smith (1955)** upto classes.
3. **Study of early land plant- *Rhynia*** w.r.t. Systematic position and Morphology.
4. **Morphology, anatomy, reproduction and life cycle of following type.**
 - a) *Equisetum* and
 - b) *Marsilea*
5. **Types of stele.**
6. **Ecological and Economical importance** w.r.t. Food, Soil binding, Scouring, Nitrogen fixation, Medicines, Ornamentals etc.

Gymnosperm

- 1. General characteristic** w.r.t. Habit, Habitat, Morphological features of sporophyte and Reproduction.
- 2. Classification of Gymnosperms** by K. R. Sporne upto order with suitable examples.
- 3. Study of life cycle of following** (w.r.t. Morphology and Reproduction) :
 - a) *Cycas* and
 - b) *Pinus*
- 4. Economic importance** w.r.t. Food value, Medicinal value, Timber value, Source of oil, Industrial value, Ornamental value and other uses.

Paleobotany:

- 1. Definition, importance and significance.**
- 2. Contributions of Indian Paleobotanists-Birbal Sahni.**
- 3. The process of fossilization** (Replacement theory, Infiltration theory)
- 4. Types of fossils:**
 - a) **Impression,**
 - b) **Compression** and
 - c) **Petrification.**
- 5. Fossil gymnosperms** w.r.t. Morphology and Reproductive structure of following
 - a) *Glossopteris* (Pteridospermatophyta) and
 - b) *Cycadeoidea* (Cycadopsida)
- 6. Geological time scale** w.r.t. Era, Period, Epoch and Evolution of the different flora.

Note: Developmental stages not expected.

Note: Student activates like seminars, quiz, debate, assignments, field work, study Project and models etc. are part of curriculum for all units.

B.Sc. BOTANY SEMESTER – I

REFERENCE BOOKS

1. Agrios, G. N. 1997 Plant Pathology, 4th ed. (Harcourt Asia PTE Ltd. Academy Press)
2. Ainsworth, G. C. 1971 Ainsworth and Bisby's Dictionary of the Fungi, 6th ed. (Commonwealth Mycological Institute, Kew Surrey)
3. Alexopoulos, C. J. and G. W. Min & M. Blackwell, Introductory Mycology, CBS distributors & publishers, Delhi
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6. Bold, H. C. and M. J. Wynne [1978] : Introduction of Algae : Structure and Reproduction (Prentice Hall of India, Pvt. Ltd.).
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New Delhi
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22. Prem puri [1980] : Bryophyta (Atma Ram & Sons Delhi)
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24. Ram Udar [1970] : An Introduction ot Bryophyta (Shashidhar Malviya Prakashan, Lacknow)

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26. Round, F. E. [1973] : The Histology of the Algae, 2nd Ed. (Edward Arnold).
27. Sharma, O. P. : Fungi (TMH)
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30. Sharma, P. D. [1991] : The Fungi (Rastogi & Co. Meerut)
31. Sharma, P.D. [1993] : Microbiology and plant pathology (Rastogi & Co.).
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33. Singh, V.P. C. Pande, D. K. Jain [1995] : A Text Book of Botany (Rastogi & Co. Meerut).
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Botany Practicals SEMESTER – I Laboratory Exercises

Make use of the permanent micro-preparation, temporary mounts, transparencies, photographs, charts etc.

1) Study of construction and working principle of Compound and Dissecting microscopes.

2) Study of various bacterial forms w.r.t. Cocci, Bacillus, Spirillum and Vibrio.

3) To perform Gram staining of Bacteria.

4) Study of Cyanobacteria w.r.t. systematic position, structures and Identification and Classification with reasons. e.g. *Nostoc* :

- i. Specimen of *Nostoc* Ball,
- ii. Mounting of thallus: Colony, Trichome & filament and
- iii. Cell structure.

5) Study of various forms of Algae: w.r.t. systematic position, structures and Identification & Classification with reasons.

a) Chara :

- i. Mounting of thallus (Vegetative) and
- ii. Mounting of Reproductive Structures: Globule and Nucule.

b) Vaucheria :

- i. Mounting of thallus (Vegetative),
- ii. Gongrosira stage (permanent slides) and
- iii. Stage in sexual reproduction (permanent slides).

c) Ectocarpus :

- i. Mounting of thallus (Vegetative) and
- ii. Mounting of Reproductive Structures: Unilocular and Plurilocular sporangium

d) Batrachospermum :

- i. Mounting of thallus (Vegetative) and
- ii. Mounting of Reproductive Structures: glomerule with carposporangium.

6) Study of various forms of Fungi w.r.t. systematic position, structures and Identification & Classification with reasons.

a) Albugo :

- i. External features,
- ii. Asexual phase section/ temporary mounts and
- iii. Sexual structures through permanent slides.

b) Mucor :

- i. External features,
- ii. Asexual phase section/ temporary mounts and
- iii. Sexual structures through permanent slides.

c) Penicillium :

- i. External features,
- ii. Asexual phase section/ temporary mounts and
- iii. Sexual structures through permanent slides.

d) Puccinia :

- i. External features,
- ii. Asexual phase section/ temporary mounts and
- iii. Sexual structures through permanent slides.

7) Study of different types of Lichens: i) Crustose, ii) Foliose and iii) Fruticose.

8) Study of different Plant Diseases:

a) Viral Disease:

Mosaic disease of Tobacco (TMV)

b) Fungal Disease:

- i. Red rot of Sugarcane (*Colletotrichum falcatum*),
- ii. Brown spot of rice (*Helminthosporium oryzae*) and
- iii. Loose smut of wheat (*Ustilago tritici*).

c) Bacterial disease:

Bacterial Blight of Cotton (*Xanthomonas campestris*)

9) Study of different forms of Bryophytes w.r.t. systematic position, structures and Identification & Classification with reasons.

a) Riccia:

- i. External morphology,
- ii. Mounting of rhizoids & scales,
- iii. T. S. of Thallus,
- iv. V. S. of antheridia (Permanent Slide),
- v. V.S. of archegonia (Permanent Slide) and
- vi. V.S. of sporophyte (Permanent Slide).

b) Funaria

- i. External morphology,
- ii. T. S. of axis (Permanent Slide),
- iii. V.S. antheridial head (Permanent Slide),
- iv. V.S. of archegonial head (Permanent Slide) and
- v. V.S. of Capsule (Permanent Slide).

10) Study of different forms of Pteridophytes w.r.t. systematic position, structures and Identification & Classification with reasons.

a) Equisetum :

- i. External morphology,
- ii. T. S. stem,
- iii. Mounting of sporangia,
- iv. V. S. of Strobilus (Permanent Slide) and
- v. V. S. of Strobilus (Permanent Slide).

b) Marsilea

- i. External morphology,
- ii. T. S. rhizome,
- iii. Mounting of sporangia,
- iv. V. T. S. of the sporocarp (Permanent Slide),
- v. V.L.S. of the sporocarp (Permanent Slide) and
- vi. H.L.S. of the sporocarp (Permanent Slide).

11) Study of different forms of Gymnosperms w.r.t. systematic position, structures and Identification & Classification with reasons.

a) Cycas:

- i. T. S. of Rachis,
- ii. T. S. of leaflet,

- iii. Male cone, microsporophyll (Permanent Slide) OR Specimen,
- iv. Female cone, megasporophyll (Permanent Slide) OR Specimen and
- v. V. S. of Ovule (Permanent Slide).

b) Pinus :

- i. T. S. of Needle,
- ii. T. S. of Stem – dwarf shoot (Section/Permanent Slide),
- iii. Male cone, microsporophyll (Permanent Slide OR Specimen),
- iv. Pollen grain (Permanent Slide),
- v. Female cone, megasporophyll (Permanent Slide) OR Specimen and
- vi. V. S. of Ovule (Permanent Slide).

12) Study of different types of fossil:

- i. Impression (Specimen)
- ii. Compression (Specimen) and
- iii. Petrification (Specimen)

13) Study of fossil Gymnosperms:

- i. *Glossopteris* (Specimen) and
- ii. *Cycadeoidea* (Specimen)

14) Spotting:

- a) Algae** (two from each genus mentioned),
- b) Fungi** (two from each genus mentioned),
- c) Lichens,**
- d) Plant Pathology,**
- e) Bryophyta** (two from each genus mentioned),
- f) Pteridophyta** (two from each genus mentioned),
- g) Gymnosperms** (two from each genus mentioned) and
- h) Fossils.**

Submission:

1. Two Diseased Plant parts.
2. Tour report duly signed by HOD.

Note: Short or long excursion tour and visit to any botanical garden is compulsory.

GONDWANA UNIVERSITY, GADCHIROLI
CBCS Semester Pattern Syllabus
SEMESTER – I
PRACTICAL
Based on Theory Paper - I & II of Semester – I

[Time 5 Hours]

[Max. Marks – 30]

- Que. 1:** To stain given **Bacterial** strain/**Cyanobacterial** material **[A]** and identify. **02 M**
[Writing not necessary]
- Que. 2:** To prepare temporary mount of given **Algal** material **[B]** and identify and classify with diagnostic characters. [Slide preparation 2 marks, writing 1 mark]. **03 M**
- Que. 3:** To prepare temporary mount of given **Fungal** material **[C]** and identify and classify with diagnostic characters. [Slide preparation 2 marks, writing 1 mark]. **03 M**
- Que. 4:** To prepare temporary mount of given **Bryophytic** material **[D]** and identify and classify with diagnostic characters. [Slide preparation 2 marks, writing 1 mark]. **03 M**
- Que. 5:** To prepare temporary mount of given **Pteridophytic** material **[E]** and identify and classify with diagnostic characters. [Slide preparation 2 marks, writing 1 mark]. **03 M**
- Que. 6:** To prepare temporary mount of given **Gymnospermic** material **[F]** and identify and classify with diagnostic characters. [Slide preparation 2 marks, writing 1 mark]. **03 M**
- Que. 7: SPOTTING:** **07 M**
- **SPOT-G:** Algae
 - **SPOT-H:** Fungi/ Lichens
 - **SPOT I:** Plant Pathology
 - **SPOT-J:** Bryophyta
 - **SPOT-K:** Pteridophyta
 - **SPOT-L:** Gymnosperms
 - **SPOT-M:** Fossils
- Que. 8:**
- **Viva-voce.** **02 M**
 - **Practical Record.** **02 M**
 - **Excursion Report & diseased plant parts submission.** **02 M**

NOTE: Well labeled diagrams are expected wherever necessary.

GONDWANA UNIVERSITY, GADCHIROLI
CBCS Theory Question Paper Pattern
For
B.Sc. BOTANY SEMESTER - I
Theory

Note: 1) All questions are compulsory and carry equal marks.
2) Draw well labelled diagram where ever necessary.

[Time 3 Hours]

[Max. Marks - 50]

Question 1. Based on Unit - I

- | | |
|-------------|--------------------|
| a) Unit - I | 05 x 2 = 10 |
| b) Unit - I | |
| OR | |
| c) Unit - I | 2½ x 4 = 10 |
| d) Unit - I | |
| e) Unit - I | |
| f) Unit - I | |

Question 2. Based on Unit - II

- | | |
|--------------|--------------------|
| a) Unit - II | 05 x 2 = 10 |
| b) Unit - II | |
| OR | |
| c) Unit - II | 2½ x 4 = 10 |
| d) Unit - II | |
| e) Unit - II | |
| f) Unit - II | |

Question 3. Based on Unit - III

- | | |
|---------------|--------------------|
| a) Unit - III | 05 x 2 = 10 |
| b) Unit - III | |
| OR | |
| c) Unit - III | 2½ x 4 = 10 |
| d) Unit - III | |
| e) Unit - III | |
| f) Unit - III | |

Question 4. Based on Unit - IV

- | | |
|--------------|--------------------|
| a) Unit - IV | 5 x 2 = 10 |
| b) Unit - IV | |
| OR | |
| c) Unit - IV | 2½ x 4 = 10 |
| d) Unit - IV | |
| e) Unit - IV | |
| f) Unit - IV | |

Question 5. Write answers to any ten questions in one or two lines only
(Diagrams are NOT necessary)

1 x 10 = 10

- a. Unit - I
- b. Unit - I
- c. Unit - I
- d. Unit - II
- e. Unit - II
- f. Unit - II
- g. Unit - III
- h. Unit - III
- i. Unit - III
- j. Unit - IV
- k. Unit - IV
- l. Unit - IV

B.Sc. SEMESTER – II
Paper – I
Morphology and Anatomy of Angiosperms
(48 Periods)

UNIT – I

(12 Periods)

Vegetative Morphology of Angiosperm

- 1. Habit:**
 - i. Erect forms** w.r.t. Herbs, Shrubs and Trees.
 - ii. Weak forms** w.r.t. Creepers, Trailers and Climbers.
- 2. Root:**
 - i. General characters and functions.**
 - ii. Types of root system** – a) Tap and b) Adventitious (Fibrous, Foliar and Prop)
 - iii. Modified root -**
 - A) Tap root system** w.r.t.
 - a) Food storage** (Fusiform, Conical and Napiform),
 - b) Nitrogen fixation** (Nodulated roots) and
 - c) Respiration** (Respiratory roots).
 - B) Adventitious roots system** w.r.t.
 - a) Food storage** (Tuberous, Fasciculated, Moniliform & Nodulose) and
 - b) Mechanical strength** (Prop, Stilt, Climbing and Butteress).
- 3. Stem:**
 - i. General characters and functions.**
 - ii. Modification of stem** w.r.t.
 - a) Underground** (Rhizome, Bulb and Tuber),
 - b) Sub-aerial** (Runner, Sucker and Offset) and
 - c) Aerial** (Stem tendrils, Thorns and Phylloclades)
- 4. Leaf:**
 - i. Parts of foliage leaf** w.r.t. Hypopodium, Mesopodium and Epipodium.
 - ii. Venation** w.r.t Definition and types.
 - iii. Types of leaves** w.r.t.
 - a) Simple** and
 - b) Compound-**
 - i) Palmately compound & its types
 - ii) Pinnately compound & its types
 - iv. Modification of leaves** w.r.t. Storage, Leaf tendrils, Leaf spines, Phyllode, and Insect catching.
 - v. Phyllotaxy** w.r.t Definition and types (Alternate, Opposite and Whorled).

Reproductive Morphology of Angiosperm

- 1. Inflorescence:** Definition and Types w.r.t.
 - a) **Racemose** (Raceme, Spike and Umbel),
 - b) **Cymose** (Uniparous, Biparous and Multiparous) and
 - c) **Special** (Cyathium, Verticillaster and Hypanthodium).
- 2. Flower:** Parts and functions of typical flower.
- 3. Types of flower:** a) Hypogynous b) Epigynous and c) Perigynous.
- 4. Calyx and its modification** w.r.t. Pappus, Spurred, Leafy and Spinous.
- 5. Corolla and its forms** w.r.t.
 - a) **Polypetalous** (Cruciform, Caryophyllaceous and Papilionaceous) and
 - b) **Gamopetalous** (Tubular, Infundibuliform and Bilabiate).
- 6. Aestivation:** Definition and types (Valvate, Twisted, Imbricate, Quincuncial and Vexillary)
- 7. Androecium:**
 - a) **Anther filament relationship:** Basifixed, Adnate, Dorsifixed and Versatile.
 - b) **Cohesion of stamens** (Monadelphous, Syngenesious and Synandrous) and
 - c) **Adhesion of stamens** (Epipetalous, Epitepalous and Gynandrous).
- 8. Gynoecium:**
 - a) **Types** w.r.t Monocarpous and Multicarpous (Apocarpous and Syncarpous).
 - b) **Types of placentation** (Marginal, Axile, Parietal and Basal).
- 9. Types of fruits:**
 - A. Simple Fruits**
 - i) **Dry Fruits -a) Dehiscent Fruits** (Legume and Follicle) and
b) Indehiscent Fruits (Caryopsis and Achene).
 - ii) **Fleshy Fruits** -(Drupe and Berry).
 - B. Aggregate Fruits** (Etaerio of achenes and Etaerio of berries).
 - C. Composite Fruits** (Sorosis).

Anatomy

1. Meristems:

- a) **Classification** (Based on origin and position).
- b) **Root apical Meristem** (Newman's Theory).
- c) **Shoot apical Meristem** (Tunica-Carpus Theory).

2. **Tissue: Types** w.r.t. structure and function.

- a) **Simple** (Parenchyma, Collenchyma and Sclerenchyma),
- b) **Complex** (Xylem and Phloem) and
- c) **Secretary** (Secretary Cells, Glands and Laticiferous tissue)

3. **Tissue Systems:** Epidermal and Ground or Fundamental.4. **Cambium:** Structure and function.5. **Vascular Bundle: Types** w.r.t. Radial, Concentric and Conjoint.6. **Periderm:** Structure and function.

Anatomy

1. **Primary Structure of Dicotyledons** (e.g. Sunflower) w.r.t.

- a) **Root,**
- b) **Stem and**
- c) **Leaf.**

2. **Primary Structure of Monocotyledons** (e.g. Maize) w.r.t.

- a) **Root,**
- b) **Stem and**
- c) **Leaf.**

3. **Secondary structure:** Dicot stem e. g. *Moringa*.4. **Anomalous secondary structure in stem:** e.g.

- a) *Boerhaavia* and
- b) *Dracaena*.

5. **Anomalous secondary structure in root:** e. g. *Beta vulgaris* (Beet).

B.Sc. SEMESTER – II
Paper – II
Taxonomy & Diversity of Angiosperms
(48 Periods)

UNIT – I

(12 Periods)

Taxonomy:

- 1. Angiosperms:** Origin (Bennettitalean Theory).
- 2. Fossil Angiosperms:**
 - a) Flower- *Sahnianthus* and
 - b) Fruit- *Enigmocarpon*
- 3. Example of primitive angiosperm – *Magnolia***
- 4. Definition, Scope and Importance of taxonomy.**
- 5. Numerical Taxonomy** w.r.t. Definition, Advantages and Application.
- 6. Modern trends in Taxonomy** -Taxonomic evidences from
 - a) Palynology b)Cytology and c) Phytochemistry.
- 7. Botanical Nomenclature:**
 - a) Principles.
 - b) **Taxonomic Ranks:** Major Categories.
 - c) **Principle of priority.**
 - d) **Typification** (Nomenclatural type, Holotype, Isotype, Paratype, Lectotype, Syntype and Neotype).

UNIT – II

(12 Periods)

Taxonomy:

- 1. Binomial nomenclature** w.r.t Definition, rules and example.
- 2. Types of Classification.**
 - a) Artificial
 - b) Natural and
 - c) **Phylogenetic** (Definition and example)
- 3. Plant classification:**
 - a) **Theophrastus's system**
 - b) **Linnaeus's system**
 - c) **Bentham & Hooker's system** w.r.t outline, merits and demerits.

4. Botanical Gardens

a) **Definition and Functions.**

b) **Special Features of Following:**

- i) Indian Botanical Garden, Kolkata and
- ii) Royal Botanical Garden, Kew, England.

5. Herbarium Techniques:

a) **Classical** (steps and importance) and

b) **Virtual (Digital)** w.r.t. Equipment needed, merits and demerits.

UNIT - III

(12 Periods)

1. **Diversity of flowering plants:** w.r.t. systematic position, vegetative characters, reproductive characters and economic importance (at least 5 plant species from each family).

Dicotyledonous families

- a. **Brassicaceae** w.r.t. *Brassica campestris*.
- b. **Malvaceae** w.r.t. *Hibiscus rosa-sinensis*.
- c. **Fabaceae** w.r.t. *Pisum sativum*.
- d. **Solanaceae** w.r.t. *Datura stramonium*.

UNIT - IV

(12 Periods)

1. **Diversity of flowering plants:** w.r.t. systematic position, vegetative characters, reproductive characters and economic importance (at least 5 plant species from each family).

A) Dicotyledonous families

- a. **Asclepiadaceae** w.r.t. *Calotropis procera*.
- b. **Asteraceae** w.r.t. *Tridax procumbens*.

B) Monocotyledonous family

- a. **Liliaceae** w.r.t. *Allium cepa*.
- b. **Poaceae** w.r.t. *Triticum vulgare*.

B.Sc. BOTANY SEMESTER – II

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Botany Practicals SEMESTER – II Laboratory Exercises

Make use of the permanent micro-preparation, temporary mounts, transparencies, photographs, charts etc.

- 1) **Study of Vegetative Morphology of Angiosperms :**
 - a. **Root:**
 - i. Type (Tap and Adventitious) and
 - ii. Modifications (as per theory syllabus)
 - b. **Stem:** Modifications (as per theory syllabus).
 - c. **Leaves :**
 - i. Parts,
 - ii. Type (as per theory syllabus),
 - iii. Phyllotaxy (as per theory syllabus),
 - iv. Venation (as per theory syllabus)and
 - v. Modification (as per theory syllabus).

- 2) **Study of Reproductive Morphology of Angiosperms :**
 - a. **Inflorescence:** Types (as per theory syllabus).
 - b. **Flower :**
 - i. Types (as per theory syllabus)and
 - ii. Parts of flower
 - c. **Androecium:**
 - i. Anther filament relationship (as per theory syllabus).
 - ii. Cohesion of stamens (as per theory syllabus) and
 - iii. Adhesion of stamens (as per theory syllabus).
 - d. **Gynoecium:**
 - i. Types (as per theory syllabus).
 - ii. Types of placentation (as per theory syllabus).
 - e. **Fruit:** Types (as per theory syllabus).

- 3) **Study of types of tissues:** Parenchyma, Collenchyma and Sclerenchyma (Permanent Slides).

- 4) **Study of Anatomy of primary structure in following :** w.r.t. preparation of permanent slides.
 - i. Dicot : Root, stem & leaf *e. g.* Sunflower or other Dicot plant and
 - ii. Monocot : Root, stem & leaf *e. g.* Maize

- 5) **Study of Anatomy of secondary structure in Dicot stem** w.r.t. preparation of permanent slides *e. g.* *Moringa*

- 6) **Study of Anomalous secondary growth in stems** w.r.t. preparation of permanent slides i) *Boerhaavia* and ii) *Dracaena*

- 7) **Study of Anomalous secondary growth in root** w.r. t. *Beta vulgaris* (Permanent Slide only)

- 8) **Study of fossil Angiosperms** w.r. t. Flower- *Sahnianthus* and Fruit- *Enigmocarpon*

9) How to describe an angiospermic plant in technical language.

10) Study of locally available plants belonging to families included in the syllabus (at least one genus from each family included in theory syllabus) w.r.t.

- i. Morphological characters,
- ii. reproductive characters,
- iii. floral formula,
- iv. floral diagram and
- v. systematic position with reasons

11) To construct/compose Virtual (Digital) herbarium of plant resources available in the area. (at least two plants from each family prescribed in theory syllabus).

12) Spotting

- i. Vegetative morphology of angiosperms
- ii. Reproductive morphology of angiosperms
- iii. Fossil angiosperms
- iv. Anatomy

Submission:

1. Tour report duly signed by HOD.
2. Permanent slides (anatomy).
3. Digital herbarium (soft copy to dedicated email address).

Note:

1. *Short or long excursion tour and visit to any botanical garden is compulsory.*
2. *The teacher should prevent students from collecting plants from the wild and submitting for practical examination, instead the students should be asked to prepare the field report [photographic evidences].*
3. *Teachers are suggested to make a dedicated e-mail account for the submission of virtual (Digital) herbarium.*

GONDWANA UNIVERSITY, GADCHIROLI
CBCS Semester Pattern Syllabus
SEMESTER – II
PRACTICAL
Based on Theory Paper - I & II of Semester – II

[Time 5 Hours]

[Max. Marks – 30]

Que. 1: To describe vegetative morphology of given Angiospermic plant material [A]. **02 M**

Que. 2: To describe Reproductive morphology of given Angiospermic plant material [B]. **02 M**

Que. 3: To prepare double stained permanent mount of the given Angiosperm material [C] and identify giving diagnostic characters. **05 M**
[Slide preparation 3 marks, writing 2 mark]

Que. 4: To describe given angiospermic plant [D] in technical language (vegetative and reproductive characters only) & identify with reasons upto family level. **05 M**

Que. 5: To draw floral diagram and write floral formula of the given flower [E]. **04 M**
[T.S. of ovary 1 marks, Floral diagram 2 marks, and Floral formula 1 mark]

Que. 6: SPOTTING: **04 M**

- **SPOT- F:** Vegetative morphology of angiosperms
- **SPOT-G:** Reproductive morphology of angiosperms
- **SPOT- H:** Fossil angiosperms
- **SPOT-I:** Anatomy

Que. 7:

- **Viva-voce** **02 M**
- **Practical Record** **02 M**
- **Excursion Report and slide submission (Anatomy)** **02 M**
- **Digital Herbarium** **02 M**

NOTE: Well labeled diagrams are expected wherever necessary.

GONDWANA UNIVERSITY, GADCHIROLI
CBCS Theory Question Paper Pattern
For
B.Sc. BOTANY SEMESTER - II
Theory

Note: 1) All questions are compulsory and carry equal marks.
2) Draw well labelled diagram where ever necessary.

[Time 3 Hours]

[Max. Marks - 50]

Question 1. Based on Unit - I

- | | |
|-------------|--------------------|
| a) Unit - I | 05 x 2 = 10 |
| b) Unit - I | |
| OR | |
| c) Unit - I | 2½ x 4 = 10 |
| d) Unit - I | |
| e) Unit - I | |
| f) Unit - I | |

Question 2. Based on Unit - II

- | | |
|--------------|--------------------|
| a) Unit - II | 05 x 2 = 10 |
| b) Unit - II | |
| OR | |
| c) Unit - II | 2½ x 4 = 10 |
| d) Unit - II | |
| e) Unit - II | |
| f) Unit - II | |

Question 3. Based on Unit - III

- | | |
|---------------|--------------------|
| a) Unit - III | 05 x 2 = 10 |
| b) Unit - III | |
| OR | |
| c) Unit - III | 2½ x 4 = 10 |
| d) Unit - III | |
| e) Unit - III | |
| f) Unit - III | |

Question 4. Based on Unit - IV

- | | |
|--------------|--------------------|
| a) Unit - IV | 5 x 2 = 10 |
| b) Unit - IV | |
| OR | |
| c) Unit - IV | 2½ x 4 = 10 |
| d) Unit - IV | |
| e) Unit - IV | |
| f) Unit - IV | |

Question 5. Write answers to any ten questions in one or two lines only
(Diagrams are NOT necessary)

1 x 10 = 10

- a. Unit - I
- b. Unit - I
- c. Unit - I
- d. Unit - II
- e. Unit - II
- f. Unit - II
- g. Unit - III
- h. Unit - III
- i. Unit - III
- j. Unit - IV
- k. Unit - IV
- l. Unit - IV
