GONDWANA UNIVERSITY
GADCHIROLI

SEMESTER SYSTEM PATTERN SYLLABUS

for

B.Sc.

BOTANY

(With effect from : 2012-13)
### B.Sc. BOTANY
(With effect from : 2012-13)

#### SEMESTER – I

<table>
<thead>
<tr>
<th>Paper – I</th>
<th>: Diversity of Microbes and Algae</th>
<th>50 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – II</td>
<td>: Diversity of Fungi, Lichens, Bryophytes and Plant pathology</td>
<td>50 marks</td>
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<tr>
<td>Practical – I</td>
<td>: Based on Paper – I &amp; II Of Semester – I</td>
<td>30 marks</td>
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<tr>
<td>Internal Assessment</td>
<td>: Based on Assignment/Seminar &amp; Unit Test</td>
<td>20 marks</td>
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#### SEMESTER – II

| Paper – I                      | : Pteridophyta, Palaeobotany and Gymnosperms       | 50 marks |
| Paper – II                    | : Angiosperm : Morphology & Anatomy                 | 50 marks |
| Practical – II                | : Based on Paper – I & II Of Semester – II         | 30 marks |
| Internal Assessment           | : Based on Assignment/Seminar & Unit Test          | 20 marks |
### Semesterwise Distribution of Marks

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Class</th>
<th>Semester</th>
<th>Theory Paper Marks</th>
<th>Internal Assessment</th>
<th>Practical Marks</th>
<th>Total Marks</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Paper I</td>
<td>Paper II</td>
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<tr>
<td>1</td>
<td>B.Sc. Part I</td>
<td>I</td>
<td>50</td>
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<td></td>
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<td>II</td>
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<tr>
<td>2</td>
<td>B.Sc. Part II</td>
<td>III</td>
<td>50</td>
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<td>IV</td>
<td>50</td>
<td>50</td>
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<tr>
<td>4</td>
<td>B.Sc. Part III</td>
<td>V</td>
<td>50</td>
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<td>5</td>
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<td>VI</td>
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<td>300</td>
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### Semesterwise Workload

<table>
<thead>
<tr>
<th>Class</th>
<th>Semester</th>
<th>Paper</th>
<th>Theory</th>
<th>Practical</th>
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<tr>
<td>B.Sc. I</td>
<td>I</td>
<td>I</td>
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<td>II</td>
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<td>6</td>
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<tr>
<td>B.Sc. II</td>
<td>III</td>
<td>I</td>
<td>3</td>
<td>6</td>
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<td>IV</td>
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<td></td>
<td>II</td>
<td>I</td>
<td>3</td>
<td>6</td>
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<tr>
<td>B.Sc. III</td>
<td>V</td>
<td>I</td>
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<td>6</td>
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<tr>
<td></td>
<td>II</td>
<td>I</td>
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<td>VI</td>
<td>I</td>
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<td></td>
<td>II</td>
<td>I</td>
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PATTERN OF EXAMINATION

Theory:

Two theory papers of 50 marks each and of three hours duration will be conducted at the end of each semester.

Practicals:

1. One Practical examination of 30 marks and of five hours for each semester will be conducted at the end of the same semester.
2. Practical examination of semesters I, III and V will be conducted by Internal examiner only.
3. Practical examination of semesters II, IV and VI will be conducted by Internal & external examiners both.
4. Internal assessment of the student will be done on the basis of evaluation report from the concerned teacher and will be done at the end of each semester.
5. Distribution of 20 marks for internal assessment is as under –
   - Assignment/Seminar: 10 marks
   - Unit Test: 10 marks

Botanical Excursion:

Botanical Excursion is compulsory for B.Sc. I, II & III year students. One long excursion in or out of state and as many as short field visits to the places of Botanical interest, one is in each term are compulsory.

One teacher and one non-teaching staff for 20 students are taken for Botanical Excursion. If there are female students in a batch of twenty students, one additional lady teacher is permissible for excursion. T.A. and D.A. for teacher and non-teaching staff participating in excursions should be paid as per university rules. Tour report duly certified by teacher concerned and Head of the Department should be submitted at the time of practical examination.

Practical Course:

Botany practical course is to be covered in 26 practicals of 3 periods each as per the given schedule. These practicals are to be performed by the students. Each practical is to be supplemented by permanent slides/preserved or fresh specimens / materials / charts / herbarium sheet wherever necessary.
**Details of Practical Examination:**

A) Every student must produce a certificate from Head of the Department of his/her college, saying that he/she has completed practical course in satisfactory manner. The student should record his/her observations and report of each experiment in the journal. The journal is to be signed periodically by teacher-in-charge & certified by Head of the Department at the end of the semester. Students have to submit their certified journal and tour report at the time of practical examination. Practical Examination should be of five hours duration and shall test a candidate in the following respect.

1. Practical study of external & internal structure of different plant types and their classification
2. Making temporary or permanent stained preparations and identification
3. Study of plant families as per syllabus
4. Study of Anatomical material with temporary or double stained preparation
5. Spotting of the specimens/slides as per syllabus
6. Physiology experiments as per syllabus
7. Ecology experiments as per syllabus
8. Identification and setting of biochemical experiments
GONDWANA UNIVERSITY
GADCHIROLI

SEMESTER SYSTEM PATTERN

BOTANY

Question Paper Pattern

Time : 03 hrs.  

Total Marks : 50

Question 1. Write notes on :

A) Unit I OR A) Unit II
B) Unit I OR B) Unit II

02 x 05 = 10
OR 01 x 10 = 10

Question 2. Write notes on :

C) Unit III OR C) Unit IV
D) Unit III OR D) Unit IV

02 x 05 = 10
OR 01 x 10 = 10

Question 3. Write notes on :

a. Unit I OR e. Unit I
b. Unit II OR f. Unit II
c. Unit III OR g. Unit III
d. Unit IV OR h. Unit IV

04 x 2 ½ = 10

Question 4. Write notes on :

a. Unit I OR e. Unit I
b. Unit II OR f. Unit II
c. Unit III OR g. Unit III
d. Unit IV OR h. Unit IV

04 x 2 ½ = 10

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

01 x 10 = 10

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

GADCHIROLI

SEMESTER SYSTEM PATTERN SYLLABUS
FOR
B.Sc.
BOTANY
(With effect from : 2012-13)

DETAILS OF THE SYLLABUS
GONDWANA UNIVERSITY
GADCHIROLI
SEMESTER SYSTEM PATTERN SYLLABUS
FOR
B.Sc. BOTANY
B.Sc.
SEMESTER – I
Paper – I

Diversity of Microbes and Algae

UNIT – I:
1. General characteristics of life
2. Viruses:
   i. General characteristics & nature of viruses
   ii. Classification of viruses based on host
   iii. Modes of transmission of viruses
   iv. Structure and multiplication (Lytic & Lysogenic cycle) of T4-Bacteriophage.
   v. Ultra structure of TMV
   vi. Economic importance
3. Mycoplasma: Structure, characteristics & pathogenecity

UNIT – II:
1. Bacteria:
   i. Morphology of Bacteria (size and shape)
   ii. Cell structure
   iii. Classification (on the basis of Gram Staining)
   iv. Reproduction (Asexual and Sexual)
   v. Economic importance
2. Cyanobacteria:
   i. General character (unicellular and filamentous)
      Chroochocaceae eg. Gloeocapsa, Nostacaceae eg. Nostoc
   ii. Ultrastructure
   iii. Reproduction
   iv. Economic importance

UNIT – III:
1. Concept of plant kingdom – Cryptogams and Phanerogams
2. Algae:
   i. General characters
   ii. Classification (G.M. Smith, 1955)
   iii. Economic importance
   iv. Life history of – Chlorophyceae eg. Chlamydomonas
      eg. Oedogonium

UNIT – IV:
1. Life history of – Charophyceae eg. Chara
   Xanthophyceae eg. Vaucheria
   Phaeophyceae eg. Ectocarpus
   Rhodophyceae eg. Batrachospermum

Note: Developmental stages not expected.
UNIT – I:

1. Fungi: i. General characteristics
   ii. Classification (G. C. Ainsworth, 1971)
   iii. Life history of – Mastigomycotina eg. *Albugo*
       Zygomycotina eg. *Mucor*

UNIT – II:

1. Fungi: i. Life history of – Ascomycotina eg. *Penicillium*
   Basidiomycotina eg. *Puccinia*
   Deuteromycotina eg. *Cercospora*

   ii. Economic importance

2. Lichens: i. General characteristics
   ii. Types (Crustose, Foliose, Fruticose)
   iii. Economic importance

UNIT – III:

1. Bryophyta: i. General characteristics
   ii. Classification (Smith)
   iii. Economic importance
   iv. Life history of – Hepaticopsida eg. *Riccia*
       Anthocerotopsida eg. *Anthoceros*
       Bryopsida eg. *Funaria*

UNIT – IV:

1. Plant Pathology: i. Classification of plant diseases (Viral, Bacterial, Fungal)
   ii. Study of following diseases with respect to host pathology, symptoms, management and control measures.
   a) Viral Disease: Mosaic of Tobacco (TMV)
   b) Fungal Disease: Red rot of Sugarcane (*Colletotrichum fulvum*)
      :Brown spot of rice (*Helminthosporium oryzae*)
      :Loose smut of wheat (*Ustilago hordei*)
   c) Bacterial disease: Bacterial Blight of Cotton (*Xanthomonas campestris*)

Note: Developmental stages not expected.
**B.Sc.**  
*(BOTANY)*  
**SEMESTER – I**

**REFERENCE BOOKS**

3. Dubey, RC, DK Maheshwari [1999]: Text Book of Microbiology (S. Chand & Co.)
4. Sharma, P.D. [1993]: Microbiology and plant pathology (Rastogi & Co.)
16. Round, F. E. [1973]: The Histology of the Algae, 2nd Ed. (Edward Arnold)
20. Bhatia, Algae
25. Sharma, O. P.: Fungi (TMH)
29. Prem puri [1980]: Bryophyta (Atma Ram & Sons Delhi)
30. Ram Udar [1970]: An Introduction ot Bryophyta (Shashidhar Malviya Prakashan, Lacknow)
33. Sporne, K. R. J: The Morphology of Bryophytes (Hutchinson University, London)
34. Srivastava H. N. [2006]: Diversity of Microbes & Cryptogams (Pradeep Publications, Jalandhar)
35. Pandey, B. P. [2007]: Botany for Degree Students (S. Chand & Co. New Delhi)
B.Sc.

Botany Practicals

SEMESTER – I

Laboratory Exercises:

Make use of the permanent micropreperation, transparencies, photographs, temporary mounts, etc.

1) Study of Compound and Dissecting microscope

2) Study of bacterial forms and permanent micropreparations

3) Gram staining of Bacteria

4) Study of Cyanobacteria (Nostoc)

5) Study of Algae: (i) *Oedogonium*  
   (ii) *Chara*  
   (iii) *Voucheria*  
   (iv) *Ectocarpus*  
   (v) *Batrachospermum*

6) Study of Fungi: (i) *Albugo*  
   (ii) *Mucor*  
   (iii) *Penicillium*  
   (iv) *Puccinia*  
   (v) *Cercospora*

7) Study of Lichens: Crustose, Foliose & Fruticose

8) Study of Bryophyta: (i) *Riccia*  
   (ii) *Anthoceros*  
   (iii) *Funaria*

9) Study of Plant Diseases: (i) Viral Mosaic Disease of Tobacco (TMV)  
   (ii) Red rot of sugarcane  
   (iii) Brown spot of rice  
   (iv) Loose smut of wheat  
   (v) Bacterial disease on cotton
GONDWANA UNIVERSITY

GADCHIROLI

SEMESTER SYSTEM PATTERN SYLLABUS

FOR

B.Sc. BOTANY

B.Sc.

SEMESTER – I

PRACTICAL

Based on Theory Papers of Semester-I

[Time 5 hours]  [Marks – 30]

Que 1:  Gram- stain the bacterial strain / stain the Cyanobacterial material [A] and Identify? (Writing not necessary)  03 marks

Que 2:  Identify & classify the given Algal material [B] (Writing 2 marks, Slide preparation 2 marks)  04 marks

Que 3:  Identify & classify the given Fungal material [C] (Writing 2 marks, Slide preparation 2 marks)  04 marks

Que 4:  Identify & classify the given Bryophytic material [D] (Writing 2 marks, Slide preparation 2 marks)  04 marks

Que 5:  Spotting – Identification 1/2 mark and characters 1/2 mark  10 marks

E)  Bacteria  J)  Fungi
F)  Cyanobacteria  K)  Bryophyta
G)  Algae  L)  Bryophyta
H)  Algae  M)  Plant pathology
I)  Fungi  N)  Plant pathology

Que 6:  Practical Record  (3 marks)
Excursion Report  (2 marks)  05 marks

Note: Well labelled diagrams are expected wherever necessary
B.Sc. SEMESTER – II

Paper – I

Pteridophyta, Paleobotany and Gymnosperm

UNIT – I:
1. Pteridophyta: i. General characteristics
   ii. Classification (G. M. Smith)
   iii. Types of stele
   iv. Life history of – Psilophyta eg. Rhynia
      Lycophyta eg. Selaginella

UNIT – II:
1. Pteridophyta: Life history of – Arthrophta eg. Equisetum
   Filicophyta eg. Marsilea
2. Concept of Heterospory and seed habit
3. Telome theory

UNIT – III:
1. Paleobotany: i. Geological time scale
   ii. The process of fossilization
      (Replacement theory, Infiltration theory)
   iii. Types of fossils (Impression, Compression and Ptrification)
   iv. Fossil gymnosperm: (a) Glossopteris(Pteridospermatophyta)
      (b) Cycadeoidea (Cycadopsida)

UNIT – IV:
1. Gymnosperm: i. General characteristic
   ii. Classification (Sporne, 1965)
   iii. Life history of – Cycadales eg. Cycas
      Coniferales eg. Pinus

Note: Developmental stages not expected.
   2. Habit: Erect forms, weak forms
   3. Root: i. Normal root (Tap and Fibrous)
      ii. Modified root (Modification of Tap and Adventitious roots)
   4. Stem: i. Branching pattern
      ii. Modification of stem
   5. Leaf: i. Parts of foliage leaf
      ii. Lamina – shape, margin, apex, base surface, texture, venation.
      iii. Types of leaves (simple and compound)
      iv. Modification of leaves
      v. Phyllotaxy
      vi. Stipules

UNIT – II: Morphology of Angiosperm: 1. Inflorescence: Types – (Racemose, Cymose and Special)
   2. Flower: i. Flower is a modified shoot evidences
      ii. Types (Neuter, Aclamyleous, Monochlamydeous, Dichlamydeous, Sessile & Pedicellate, Cyclic and Acyclic)
      iii. Parts of flower (Perianth, Calyx and its modification, Corolla, Aestivation, Anderocium, Gynoecium)
      iv. Floral formula and Floral diagram
   3. Fruit: Types of fruit
UNIT – III: Anatomy:

1. Meristems:
   i. Classification (based on origin and position)
   ii. Root apical Meristem (Newman Theory)
   iii. Shoot apical Meristem (Tunica-Carpus Theory)

2. Tissue: Types (Simple, Complex, and Secretory)

3. Vascular Bundle: Types

4. Xylem: Structure and function

5. Phloem: Structure and function

6. Cambium: Structure and function

7. Periderm: Structure and function

UNIT – IV: Anatomy:

1. Primary structure:
   i. Dicot root eg. Sunflower
   ii. Monocot root eg. Maize
   iii. Dicot stem eg. Sunflower
   iv. Monocot stem eg. Maize
   v. Dicot leaf eg. Sunflower
   vi. Monocot leaf eg. Maize

2. Secondary structure:
   Dicot stem eg. Moringa

3. Anomalous secondary growth in stem:
   i. Bignonia
   ii. Boerhaavia
   iii. Dracaena

4. Anomalous secondary growth in root:
   eg. Beta vulgaris
REFERENCE BOOKS

26. Dutta, A. C. – College Botany
27. Naik, V. N. – Taxonomy of Angiosperm
B.Sc.

Botany Practicals

SEMESTER – II

Laboratory Exercises:

Make use of the permanent micropreparation, transparencies, photographs, temporary mounts, etc.

1) Study of Pteridophytes:
   (i) Selaginella
   (ii) Equisetum
   (iii) Marsilea

2) Study of types of fossils (Impression, Compression and Petrification)

3) Study of fossil Gymnosperms:
   (i) Glossopteris
   (ii) Cycadeoidea

4) Study of Gymnosperms:
   (i) Cycas
   (ii) Pinus

5) Study of Vegetative Morphology of Angiosperms:
   (i) Root (Type, modification)
   (ii) Stem (Branching pattern, modification)
   (iii) Leaves (Type, phyllotaxy, venation, modification)

6) Study of Reproductive Morphology of Angiosperms:
   (i) Inflorescence (Types: Racemose, Cymose & Special)
   (ii) Flower (Types, parts of flower)
   (iii) Fruit (Types)

7) Study of Anatomy of primary structure in:
   (i) Dicot: Root, stem & leaf eg. Sunflower
   (ii) Monocot: Root, stem & leaf eg. Maize

8) Study of Anatomy of secondary structure in Dicot stem eg. Moringa

9) Study of Anamolous secondary growth in stems of:
   (i) Bignonia
   (ii) Boerhaavia
   (iii) Dracaena

10) Study of Anamolous secondary growth in root eg. Beet
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GADCHIROLI

SEMESTER SYSTEM PATTERN SYLLABUS

FOR
B.Sc. BOTANY
B.Sc. Part I
SEMESTER – II

PRACTICAL
Based on Theory Papers of Semester-II

[Time 5 hours] [Marks – 30]

Que 1 : Identify & classify the given Pteridophytic material [A][ Writing 2 marks, Slide preparation 2 marks] 04 marks

Que 2 : Identify & classify the given Gymnospermic material [B] (Writing 2 marks, Slide preparation 2 marks) 04 marks

Que 3 : Explain the vegetative morphology of given Angiospermic material [C] 04 marks

Que 4 : Prepare double stained permanent mount/s of the given Angiospermic material [D] and identify giving diagnostic characters ] (Writing 3 marks, Slide preparation 3 marks) 06 marks

Que 5 : Spotting - Identification 1/2 mark and characters 1/2 mark 06 marks
E) Pteridophyta
F) Paleobotany
G) Gymnosperm
H) Vegetative Morphology of Angiosperm
I) Reproductive Morphology of Angiosperm
J) Anatomy

Que 6 : Practical Record.............02 06 marks
Excursion Report.............02
Vice-voce .......................02

Note : Well labelled diagrams are expected wherever necessary