

GONDWANA UNIVERSITY
GADCHIROLI

SYLLABUS
For
B. Sc.
BOTANY
SEMESTER I & II

Under
Choice Based Credit System
(CBCS)

(With effect from : 2016-17)

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SEMESTER – I:

Papers	Title of the Paper	Th/Pr	Int.Assessment	Total Marks
Paper – I USCBOTT01	Plant Diversity I (Micro-organisms, Algae, Fungi and Plant Pathology)	50 Marks	10 Marks	60 Marks
Paper – II USCBOTT02	Plant Diversity II (Bryophyta, Pteridophyta, Gymnosperm and Paleobotany)	50 Marks	10 Marks	60 Marks
Practical USCBOTP01	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 USCBOTT03	Morphology and Anatomy of Angiosperms	50 Marks	10 Marks	60 Marks
Paper – II USCBOTT04	Taxonomy & Diversity of Angiosperms	50 Marks	10 Marks	60 Marks
Practical USCBOTP02	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 (48 Periods)

USCBOTT01

(Micro-organisms, Algae, Fungi and Plant Pathology)

UNIT – I:	1. General characteristics of life	(12 Periods)
	2. Viruses: <ul style="list-style-type: none">i. General characteristics & nature of virusesii. Structure of T4 and TMViii. Economic importance	
	3. Mycoplasma: Structure & pathogenecity	
	4. Bacteria: <ul style="list-style-type: none">i. Cell structureii. Classification (on the basis of Gram Staining)iii. Economic importance	
	5. Cyanobacteria : <ul style="list-style-type: none">i. General character, ultrastructure and reproduction of <i>Nostoc</i>ii. Economic importance	
UNIT – II:	1. Concept of plant kingdom – Cryptogams and Phanerogams	(12 Periods)
	2. Algae: <ul style="list-style-type: none">i. General characters, Classification (G.M. Smith, 1955) and Economic importanceii. Life history of – Chlorophyceae e. g. <i>Oedogonium</i>iii. Life history of – Charophyceae e. g. <i>Chara</i>iv. Life history of – Xanthophyceae e. g. <i>Vaucheria</i>v. Life history of – Phaeophyceae e. g. <i>Ectocarpus</i>vi. Life history of – Rhodophyceae e. g. <i>Batrachospermum</i>	
UNIT – III:	1. Fungi: <ul style="list-style-type: none">i. General characteristics Classification (G. C. Ainsworth, 1971) and Economic importanceii. Life history of – Mastigomycotina e. g. <i>Albugo</i>iii. Life history of- Zygomycotina e. g. <i>Mucor</i>iv Life history of – Ascomycotina e. g. <i>Penicillium</i>v. Life history of - Basidiomycotina e. g. <i>Puccinia</i>vi. Life history of - Deuteromycotina e. g. <i>Cercospora</i>	(12 Periods)
UNIT – IV	1. Lichens: <ul style="list-style-type: none">i. General characteristics, Types (Crustose, Foliose, Fruticose) and Economic importance.	(12 Periods)
	2. Plant Pathology: <ul style="list-style-type: none">i. Classification of plant diseases (Viral, Bacterial, Fungal)ii. Symptoms, management and control measures of -<ul style="list-style-type: none">a) Viral Disease: Mosaic of Tobacco (TMV)b) Fungal Disease: Red rot of Sugarcane (<i>Colletotrichum fulcatum</i>) : Brown spot of rice (<i>Helminthosporium oryzae</i>) : Loose smut of wheat (<i>Ustilago hordei</i>)c) Bacterial disease: Bacterial Blight of Cotton (<i>Xanthomonas compestris</i>)	

Note: Developmental stages not expected.

SEMESTER – I

Paper – II

Plant Diversity- II (48 Periods)

USCBOTT02

(Bryophyta, Pteridophyta, Gymnosperm and Paleobotany)

UNIT – I:	1. Bryophyta: i. General characteristics ii. Classification (G. M. Smith) and Economic importance	(12 Periods)
	2. Life history of: i. Hepaticopsida e. g. <i>Riccia</i> ii. Anthocerotopsida e. g. <i>Anthoceros</i> iii. Bryopsida e. g. <i>Funaria</i>	
UNIT – II:	1. Pteridophyta: i. General characteristics ii. Classification (G. M. Smith) and Economic importance ii. Telome theory and Types of stele	(12 Periods)
	2. External Morphology and Reproduction of: i. Psilophyta e. g. <i>Rhynia</i> ii. Lycophyta e. g. <i>Selaginella</i> iii. Arthophyta e. g. <i>Equisetum</i> iv. Filicophyta e. g. <i>Marsilea</i>	
	3. Concept of Heterospory and Seed habit	
UNIT – III:	1. Gymnosperm: i. General characteristic ii. Classification (Sporne, 1965) and Economic importance	(12 Periods)
	2. External Morphology and Reproduction of: : i. Cycadales e. g. <i>Cycas</i> ii. Coniferales e. g. <i>Pinus</i>	
UNIT – IV:	1. Paleobotany: i. Geological time scale ii. The process of fossilization (Replacement theory, Infiltration theory) iii. Types of fossils (Impression, Compression and Petrification) iv. Fossil gymnosperm: (a) <i>Glossopteris</i> (Pteridospermatophyta) (b) <i>Cycadeoidea</i> (Cycadopsida)	(12 Periods)

Note: Developmental stages not expected.

B.Sc. BOTANY

SEMESTER – I

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4. Sharma, P.D. [1993] : Microbiology and plant pathology (Rastogi & Co.)
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6. Carr, N. J. and B. A. Whitton [1973] : The Biology of Blue Green Algae (Univ. of California press, Berkeley)
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Botany Practicals
USCBOTP01
SEMESTER – I

Laboratory Exercises:

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

- 1) Study of construction, working principle and handling of Compound and Dissecting microscopes
- 2) Study of various bacterial forms.
- 3) To perform Gram staining of Bacteria
- 4) Study of Cyanobacteria e.g. ***Nostoc, Gleocapsa***
- 5) Study of various forms of Algae:
 - (i) *Chlamydomonas*
 - (ii) *Oedogonium*
 - (iii) *Chara*
 - (iv) *Voucheria*
 - (v) *Ectocarpus*
 - (vi) *Batrachospermum*
- 6) Study of various forms of Fungi:
 - (i) *Albugo*
 - (ii) *Mucor*
 - (iii) *Penicillium*
 - (iv) *Puccinia*
 - (v) *Cercospora*
- 7) Study of different types of Lichens:
 - (i) Crustose
 - (ii) Foliose
 - (iii) Fruticose
- 8) Study of different Plant Diseases:
 - a) Viral Disease: Mosaic disease of Tobacco (TMV)
 - b) Fungal Disease: Red rot of Sugarcane (***Colletotrichum fulcatum***)
: Brown spot of rice (***Helminthosporium oryzae***)
: Loose smut of wheat (***Ustilago hordei***)
 - c) Bacterial disease: Bacterial Blight of Cotton (***Xanthomonas compestris***)
- 9) Study of different forms of Bryophytes:
 - (i) *Riccia*
 - (ii) *Anthoceros*
 - (iii) *Funaria*
- 10) Study of different forms of Pteridophytes:
 - (i) *Selaginella*
 - (ii) *Equisetum*
 - (iii) *Marsilea*
- 11) Study of different forms of Gymnosperms:
 - (i) *Cycas*
 - (ii) *Pinus*
- 12) Study of different types of fossil:
 - (i) Impression
 - (ii) Compression
 - (iii) Petrification
- 13) Study of fossil Gymnosperms:
 - (i) *Glossopteris*
 - (ii) *Cycadeoidea*

GONDWANA UNIVERSITY, GADCHIROLI
CBCS Semester Pattern Syllabus

For
B.Sc. BOTANY
SEMESTER – I

PRACTICAL
USCBOTP01

Based on Theory Paper - I & II of Semester – I

[Time 5 Hours]

[Max. Marks – 30]

- Que. 1: Gram-stain the **Bacterial** strain/stain the **Cyanobacterial** material **[A]** and identify?
[Writing not necessary] 03 Marks
- Que. 2: Prepare temporary mount, Identify and classify the given **Algal** material **[B]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 3: Prepare temporary mount, Identify and classify the given **Fungal** material **[C]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 4: Prepare temporary mount, Identify and classify the given **Bryophytic** material **[D]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 5: Prepare temporary mount, Identify and classify the given **Pteridophytic** material **[E]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 6: Prepare temporary mount, Identify and classify the given **Gymnospermic** material **[F]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 7: SPOTTING:
SPOT-G: Algae 06 Marks
SPOT-H: Fungi/ Lichens
SPOT-I: Plant Pathology
SPOT-J: Bryophyta/Pteridophyta
SPOT-K: Gymnosperms
SPOT-L: Fossils
- Que. 8: Practical Record (2 Marks)
Excursion Report (2 Marks)
Viva-voce (2 Marks) 06 Marks

NOTE: Well labeled diagrams are expected wherever necessary.

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

Theory

All questions are compulsory and carry equal marks
Draw well labelled diagram where ever necessary

[Time 3 Hours]

[Max. Marks – 50]

Question 1. Based on Unit - I

05 x 2 = 10

a. Unit - I

b. Unit - I

OR

02½ x4 = 10

c. Unit - I

d. Unit - I

e. Unit - I

f. Unit - I

Question 2. Based on Unit - II

05 x 2 = 10

a. Unit II

b. Unit II

OR

02½ x4 = 10

c. Unit II

d. Unit II

e. Unit II

f. Unit II

Question 3. Based on Unit - III

05 x 2 = 10

a. Unit III

b. Unit III

OR

02½ x4 = 10

c. Unit III

d. Unit III

e. Unit III

f. Unit III

Question 4. Based on Unit - IV

05 x 2 = 10

a. Unit IV

b. Unit IV

OR

02½ x4 = 10

c. Unit IV

d. Unit IV

e. Unit IV

f. Unit IV

Question 5. Write any Ten questions in one or two lines only

1 x 10 =10

(Diagrams are NOT necessary)

- 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)

USCBOTT03

UNIT – I:	Vegetative Morphology of Angiosperm	(12 Periods)
	1. Mode of living: i. Autotrophic ii. Heterotrophic	
	2. Habit: Erect forms, weak forms	
	3. Root: i. Normal root (Tap and Fibrous) ii. Modified root (Modification of Tap & 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:	Reproductive Morphology of Angiosperm	(12 Periods)
	1. Inflorescence: Definition and Types (Racemose, Cymose and Special)	
	2. Flower: i. Flower is a modified shoot evidences ii. Types (Neuter, Achlamydeous, Monochlamydeous, Dichlamydeous, Sessile & Pedicellate, Cyclic and Acyclic) iii. Parts of flower (Perianth, Calyx and its modification, Corolla, Aestivation, Androecium, Gynoecium) iv. Floral formula and Floral diagram	
	3. Fruit: Types of fruit	
UNIT – III:	Anatomy	(12 Periods)
	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 Secretary)	
	3. Vascular Bundle: Types	
	4. Tissue Systems: Epidermal, Ground or Fundamental and Vascular Tissue Systems.	
	5. Xylem: Structure and function	
	6. Phloem: Structure and function	
	7. Cambium: Structure and function	
	8. Periderm: Structure and function	
UNIT – IV:	Anatomy	(12 Periods)
	1. Primary structure: i. Dicot root e. g. Sunflower ii. Monocot root e. g. Maize iii. Dicot stem e. g. Sunflower iv. Monocot stem e. g. Maize v. Dicot leaf e. g. Sunflower	

Contd.....

vi. Monocot leaf e. g. **Maize**

2. Secondary structure: Dicot stem e. g. ***Moringa***

3. Anamolous secondary structure in stem: i. ***Bignonia***
 ii. ***Boerhaavia***
 iii. ***Dracaena***

4. Anamolous secondary structure in root: e. g. ***Beta vulgaris (Beet)***

B.Sc. SEMESTER – II
Paper – II
Taxonomy & Diversity of Angiosperms (48 Periods)
USCBOTT04

UNIT – I:	1. Angiosperms: Origin (Bennettitalian Theory). 2. Example of primitive angiosperm – <i>Magnolia</i>. 3. Fossil Angiosperms: <ul style="list-style-type: none"> i. Flower- <i>Saharianthus</i> ii. Fruit - <i>Enigmocarpon</i>. 4. Botanical Nomenclature: Principles, rules, taxonomic ranks, typification. 5. Brief History of classification: Theophrastus and Linnaeus	(12 Periods)
UNIT – II:	1. Classification of Angiosperms: <ul style="list-style-type: none"> i. Types (Artificial, Natural and Phyllogenetic), ii. System proposed by Bentham and Hooker and its Merits & Demerits 2. Herbarium Techniques: Classical and Virtual (Digital)	(12 Periods)
UNIT – III:	1. Diversity of flowering plants: Dicot families	(12 Periods) <ul style="list-style-type: none"> i. Ranunculaceae ii. Brassicaceae iii. Malvaceae iv. Fabaceae (Pappilionaceae) v. Caesalpiniaceae vi. Mimosaceae vii. Solanaceae
UNIT – IV:	1. Dicot families (contd.)	(12 Periods) <ul style="list-style-type: none"> i. Lamiaceae ii. Apocynaceae iii. Asclepiadaceae iv. Asteraceae v. Euphorbiaceae
	2. Diversity of flowering plants: Monocot families	<ul style="list-style-type: none"> i. Liliaceae ii. Poaceae iii. Orchidaceae

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B.Sc. Botany Practical's
USCBOTP02
SEMESTER – II

Laboratory Exercises:

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

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

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

- 3) Study of Anatomy of primary structure in :
 - (i) Dicot : Root, stem & leaf *e. g.* Sunflower
 - (ii) Monocot : Root, stem & leaf *e. g.* Maize

- 4) Study of Anatomy of secondary structure in Dicot stem *e. g.* *Moringa*

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

- 6) Study of Anamolous secondary growth in root *e. g.* *Beta vulgaris* (Beet)

- 7) Study of fossil Angiosperms: *Sahanianthus*, *Enigmocarpon*

- 8) Study of locally available plants belonging to families included in the syllabus

- 12) To construct/compose Virtual (Digital) herbarium of plant resources available in the area

NOTES:

1. Frequent field visits in the surrounding areas to study the vegetation are necessary.
2. One long excursion is necessary along with excursion report duly signed by HOD.
3. The teacher should prevent students from collecting plants from the wild and submitting for practical examination, instead the students should asked to prepare the field report [photographic evidences, virtual (Digital) herbarium can be given.]

GONDWANA UNIVERSITY, GADCHIROLI
CBCS Semester Pattern Syllabus
For
B.Sc. BOTANY
SEMESTER – II,
PRACTICAL
USCBOTP02
Based on Theory Papers of Semester – II

[Time 5 Hours]

[Max. Marks – 30]

- Que. 1: Write the vegetative and reproductive morphology of given Angiosperm plant **[A]** 06 Marks
- Que. 2: Prepare double stained permanent mount of the given Angiosperm material **[B]**
and identify giving diagnostic characters
[Slide preparation 4 marks, writing 2 mark] 06 Marks
- Que. 3: Draw floral diagram and write floral formula of the given flower**[C]**
[Slide preparation 2 marks, writing 2 mark] 04 Marks
- Que. 4: SPOTTING:
SPOT-D: Vegetative Morphology of Angiosperms 04 Marks
SPOT-E: Reproductive Morphology of Angiosperms
SPOT-F: fossil Angiosperms
SPOT-G: Anatomy
- Que. 8: Practical Record (2 Marks)
Excursion Report (2 Marks)
Viva-voce (2 Marks)
Virtual (Digital) herbarium (4 Marks) 10 Marks

NOTE: Well labeled diagrams are expected wherever necessary.