

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD**  
**B. Sc. I, II & III Year Botany Curriculum**  
**(SEMESTER PATTERN)**  
**Course Structure**

Class	Paper No	Title of Paper	*Credits	Lectures	Marks
<b>B. Sc. I</b>	<b>SEMESTER - I</b>				
	I	Diversity of Cryptogams - I	3	45	50
	II	Morphology of Angiosperms	3	45	50
	III	Practical based on Paper - I	1.5	45	50
	IV	Practical based on Paper - II	1.5	45	50
	<b>SEMESTER - II</b>				
	V	Diversity of Cryptogams - II	3	45	50
	VI	Histology, Anatomy and Embryology	3	45	50
	VII	Practical based on Paper - V	1.5	45	50
	VIII	Practical based on Paper - VI	1.5	45	50

**\*Note:** For theory paper: 1credit = 15 periods/lectures,  
For Practical paper 1credit = 30 periods/lectures

**B. Sc. I Year (Theory)**  
**Semester - I**  
**Paper I**  
**(Diversity of Cryptogams - I)**

**Lectures - 45**  
**Credit - 1**

**Unit - 1**

**1.1 Viruses:**

General characters, classification based on host, economic importance,  
TMV – structure and multiplication (04)

**1.2 Mycoplasma:**

General characters (01)

**1.3 Bacteria:**

General characters, ultra structure, classification based on shape,  
reproduction, economic importance (05)

**1.4 Cryptogams:**

General characters, classification according to G.M. Smith up to class level  
(01)

**1.5 Lichens:**

General characters, nature of association, forms of thalli, economic  
importance, structure and reproduction in *Usnea* (04)

**Unit – 2**

**Credit - 1**

**2. Algae:**

2.1 General characters, classification according to F.E. Fritsch (1935)  
up to the class level, economic importance. (02)

2.2 Systematic position, occurrence, thallus structure, reproduction vegetative,  
asexual and sexual, (excluding development of sex organs) and graphic life  
cycle with respect to following types:

- i. Cyanophyceae – *Nostoc* (02)
- ii. Chlorophyceae – *Chara* (03)
- iii. Xanthophyceae – *Botrydium* (02)
- iv. Phaeophyceae – *Sargassum* (03)
- v. Rhodophyceae – *Batrachospermum* (03)

**Unit – 3**

**Credit - 1**

**3. Fungi:**

3.1 General characters, classification according to Alexopoulos and  
Mims (1979) up to the class level, economic importance (03)

3.2 Systematic position, occurrence, structure of mycelium,  
reproduction - asexual, sexual and graphic life cycle with respect to the  
following types:

- i) Oomycetes – *Albugo* (03)
- ii) Zygomycetes – *Mucor* (02)
- iii) Ascomycetes – *Eurotium* (02)
- iv) Basidiomycetes – *Agaricus* (03)
- v) Deuteromycetes – *Cercospora* (02)

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**B. Sc. I Year (Theory)**  
**Semester - I**  
**Paper - II**  
**(Morphology of Angiosperms)**

45L

**Unit – 1**

**Credit 1**

1.1- Basic body plan of flowering plant, modular type of growth, diversity of plant forms – Herbs, Shrubs, Trees, Climbers; annuals, biennials and perennials. (02)

**1.2 Morphology of vegetative organs:**

a) **Root:** Characteristics, functions, regions of root, types – tap and adventitious, modification of root for storage, mechanical support (stilt root) and vital functions (Pneumatophore). (04)

b) **Stem:** Characteristics, functions, modification – underground, sub aerial and aerial (03)

c) **Leaf:** Parts of typical leaf, phyllotaxy, types (simple and compound), diversity in shape and size, venation and modifications of leaf. (06)

**Unit – 2**

**Credits 2**

**2. Morphology of reproductive organs:**

**2.1 Inflorescence:** Racemose, cymose and special types (05)

**2.2 Flower:** Definition, parts of typical flower, forms of thalamus, androphore, gynophore, gynandrophore, insertion of floral whorls on thalamus (hypogyny, perigyny and epigyny ), structure, function and modification of calyx, corolla, androecium, gynoecium, aestivation and placentation (15)

**2.3 Fruit:** Types of fruits (06)

**2.4 Fruit and Seed dispersal strategies.** (04)

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**B. Sc. I Year (Practical)**  
**Semester - I**  
**Paper – III**  
**(Diversity of Cryptogams - I)**

**45L**  
**Credits – 1.5**

**Note:** Study of specimens of Bacteria, Algae, Fungi, through temporary mounting, permanent slides, field work and biovisual aids. Observation of disease symptoms in hosts infected by Fungi may be observed

1. Study of simple and compound microscope
2. Virus: Tobacco Mosaic Virus
3. Gram staining in bacteria, forms of Bacteria
4. **Algae:**
  - a) *Nostoc*
  - b) *Chara*
  - c) *Botrydium*
  - d) *Sargassum*
  - e) *Batrachospermum*
5. **Fungi:**
  - a) *Albugo*
  - b) *Mucor*,
  - c) *Eurotium*
  - d) *Agaricus*
  - e) *Cercospora*
6. **Lichens:** Form - Crustose, Foliose, Fruticose; *Usnea*.

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**B. Sc. I Year (Practical)**  
**Semester - I**  
**Paper – IV**  
**(Morphology of Angiosperms)**

**45L**  
**Credits - 1.5**

**Note:** Study of the following with the help of temporary mountings, permanent slides, charts, models, specimens and biovisual aids.

- 1. Study of root and its modifications :**
  - a) Tap root
  - b) Adventitious root
  - c) Storage roots
  - d) Stilt root
  - e) Respiratory root.
- 2. Study of stem and its modifications :**
  - a) Underground stem
  - b) Sub aerial stem
  - c) Aerial stem
- 3. Study of leaf and its diversity:**
  - a) Types of leaf (Simple, Compound)
  - b) Shape and size
  - c) Venation
  - d) Phyllotaxy
  - e) Modifications
- 4. Study of inflorescence:**
  - a) Racemose
  - b) Cymose
  - c) Special
- 5. Study of flowers:**
  - a) Typical flower (*Hibiscus / Datura*)
  - b) Hypogynous, Perigynous and Epigynous
  - c) Aestivation
  - d) Forms of corolla – cruciform, papilionaceous, infundibuliform and bilabiate
  - e) Parts of typical stamen, adhesion and cohesion.
  - f) Parts of typical carpel and placentation
- 6. Study of flowers with respect to pollination mechanism:**
  - a) *Calotropis*
  - b) *Ocimum*
  - c) *Salvia*
  - d) *Helianthus*
  - e) *Ficus*
  - f) *Clitoria*
- 7. Study of fruits:**
  - a) Simple: legume, capsule, caryopsis, achene, drupe, berry.
  - b) Aggregate: an etaerio of berries, an etaerio of follicles
  - c) Composite fruit: sorosis, syconus

**Note for paper III and IV:**

Candidate shall submit the following at the time of practical exam.

1. Certified laboratory record book.
2. Field note book / Tour report.
3. Collection of specimens from algae and fungi.

In addition to number of practicals prescribed above, the students are required to undertake field excursions to the places of botanical interest and industrial places under the guidance of teacher. Collection of rare flowering and non flowering plants should be avoided during excursion. There shall be frequent study tours in local areas. T.A. and D.A. be paid to the teachers, peons and field collectors as per university rules. The record book is to be signed periodically by teacher in charge and certified by the Head of Department at the end of the term. Candidate should not be allowed to appear for practical examination without a certified record book or a certificate from the Head of Department.

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**B. Sc. I Year (Theory)**  
**Semester – II**  
**Paper - V**  
**(Diversity of Cryptogams - II)**

**45 L.**

**Unit- 1**

**Credit 1**

**1. Bryophytes:**

1.1 General characters of bryophytes, classification as per G. M. Smith (02)

1.2 Systematic position, occurrence, thallus structure (external and internal), reproduction -vegetative, asexual, and sexual (excluding developmental stages), graphic life cycle and alternation of generations of the following types:

a) Hepaticopsida – *Marchantia* (07)

b) Bryopsida – *Funaria* (06)

**Credits 2**

**2. Pteridophytes:**

2.2 General characters of Pteridophytes, classification as per G. M. Smith (02)

Systematic position, occurrence, external and internal structure of sporophyte and gametophyte, reproduction (excluding developmental stages), graphic life cycle and alternation of generations of the following types:

a) Psilopsida – *Psilotum* (03)

b) Lycopsida – *Lycopodium, Selaginella* (12)

c) Sphenopsida – *Equisetum* (06)

d) Pteropsida – *Marsilea* (07)

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**B. Sc. I Year (Theory)**  
**Semester - II**  
**Paper - VI**  
**(Histology, Anatomy and Embryology)**

**Unit – 1** **45 L.**  
**Credit - 1**

**Histology:**

- a) **Types of tissue:**
- i. Meristematic tissue – Meristem, structure and types based on origin and position. (03)
  - ii. Permanent tissues: Simple, Complex and Secretary (06)
  - iii. Epidermal tissues: Trichomes and Stomata (02)
- b) Histological organization of root and shoot apices (02)
- c) Various theories of cellular organization (02)

**Unit – 2** **Credit 1**

**Anatomy:**

- a) Primary structure of root, stem and leaf of Monocot (Maize) and Dicot (Sunflower) (07)
- b) Secondary growth in root and stem of Dicot (Sunflower) (04)
- c) Wood anatomy: Growth rings, heart wood and sap wood (02)
- d) Periderm: Origin, structure and functions. (02)

**Unit – 3** **Credit 1**

**Embryology:**

- a) Structure of anther, microsporogenesis and development of male gametophyte (03)
- b) Structure and types of ovule, megasporogenesis and development of female gametophyte (Polygonum type). (04)
- c) Pollination -Mechanism, types and agencies. (02)
- d) Double fertilization and its significance (01)
- e) Development of Dicot embryo (Crucifer type). (01)
- f) Structure, development and types of endosperm. (02)
- g) Structure of Dicot and Monocot seed (02)

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**B. Sc. I Year (Practical)**  
**Semester - II**  
**Paper - VII**  
**(Diversity of Cryptogams II )**

**45L**  
**Credits – 1.5**

**Note:** Study of specimen of Bryophytes, and Pteridophytes through temporary mounting, permanent slides, field work and biovisual aids.

a) Bryophytes:

- i. *Marchantia*
- ii. *Funaria*

b) Pteridophytes:

- i. *Psilotum*
- ii. *Lycopodium*
- iii. *Selaginella*
- iv. *Equisetum*
- v. *Marsilea*

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**B. Sc. I Year (Practical)**  
**Semester - II**  
**Paper - VIII**  
**(Histology, Anatomy and Embryology)**

**45L**  
**Credits – 1.5**

**Histology:**

1. Meristem: root apex and shoot apex
2. Permanent tissues – simple, complex and secretory
3. Epidermal tissues: trichomes and stomata

**Anatomy:**

1. Anatomy of young dicot (Sunflower) and monocot (Maize) root.  
(Double stained permanent slide preparation)
2. Anatomy of young dicot (Sunflower) and monocot (Maize) stem.  
(Double stained permanent slide preparation)
3. Anatomy of dicot (Sunflower) and monocot (Maize) leaf.  
(Double stained permanent slide preparation)

**Embryology:**

1. Study of T.S. of anther
2. Structure of ovule (anatropous), types of ovules
3. Study of Dicot and Monocot seed (embryo)

**Note for Paper VII and VIII:**

Candidate shall submit the following at the time of practical exam.

1. Certified laboratory record book.
2. Field note book and Tour report.
3. Collection of specimens
4. Permanent slides of root stem and leaf.

In addition to number of practicals prescribed above, the students are required to undertake field excursions to the places of botanical interest and industrial places under the guidance of teacher. Collection of rare flowering and non flowering plants should be avoided during excursion. There shall be frequent study tours in local areas. T.A. and D.A. be paid to the teachers, peons and field collectors as per university rules. The record book is to be signed periodically by teacher in charge and certified by the Head of Department at the end of the term. Candidate should not be allowed to appear for practical examination without a certified record book or a certificate from the Head of Department.

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