

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

SEMESTER – V					
Title of Paper		Credits*	Lectures	Marks	
B. Sc. III	XVII	Cell Biology and Molecular Biology	3	45	50
	XVIII (A)	Diversity of Angiosperms - I OR	3	45	50
	XVIII (B)	Plant Breeding and Seed Technology OR			
	XVIII (C)	Plant Pathology OR			
	XVIII(D)	Biotechnology			
	XIX	Practical based on Paper - XVII	1.5	45	50
	XX	Practical based on Paper - XVIII	1.5	45	50
	SEMESTER – VI				
	XXI	Genetics and Biotechnology	3	45	50
	XXII (A)	Diversity of Angiosperms - II	3	45	50
XXIII	Practical based on Paper - XXI	1.5	45	50	
XXIV	Practical based on Paper - XXII	1.5	45	50	

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

B.Sc.III Botany (Theory)

Semester -V Paper XVII (Cell Biology & Molecular Biology)

(45L)

Unit-1

Credit-1

1. Cell:
Structure of Prokaryotic cell (Bacterial cell) and Eukaryotic cell (plant cell) (02)
2. Cell wall and cell organelles:
Structure and functions of cell wall and Cell organelles – Golgi complex, Endoplasmic reticulum, Lysosomes (08)
3. Nucleus:
Ultra structure, (nuclear membrane, nucleolus, chromatin material, nucleoplasm), Functions of nucleus. (05)

Unit-2

Credit-1

1. **Cell division:** (06)
 - a) Cell cycle -G1 phase, S phase, G2 phase and M phase
 - b) Mitosis – definition, process and significance.
 - c) Meiosis-definition, process and significance.
2. **Nucleic acids:** (09)
 - a. DNA: Definition, structure, chemical composition (nitrogenous bases, purines, pyrimidines, nucleosides, nucleotides, phosphate and sugars) Watson and Crick's model, Z - DNA, B - DNA, functions of DNA
 - b. Replications of DNA – conservative, semi conservative and dispersive.
 - c. RNA: Structure, types and functions

Unit-3

Credit-1

- 1) **Chromosome:** (07)
Definition, morphology-size, shape, number, Ultra structure – chromatid, chromonema, chromomere, centromere, kinetochore, secondary constriction, satellite, telomere, heterochromatin, euchromatin, Nucleosome model (Woodlock 1973), chemical composition, Functions of chromosome, Giant chromosomes-polytene and lampbrush chromosome.
- 2) Chromosomal aberrations : (08)
 - a) Structural-deletion, duplication, inversion and translocation
 - b) Numerical: – euploidy and aneuploidy

B.Sc. III Year (Theory)
Semester – V
Paper XVIII(A)
(Diversity of Angiosperms-I) (45 L)

Unit: 1	Credit-1
1. Biodiversity	(03)
Definition, concept, origin and evolution	
2. Types of biodiversity:	(05)
Species, genetic, ecological, cropland and agricultural diversity; biodiversity in India; endemism and hot spots; threatened species, threats to biodiversity	
3. Conservation of biodiversity:	(07)
Major causes for loss of biodiversity, listing of threatened biodiversity; threatened categories – extinct, endangered, vulnerable, rare and indeterminate. Conservation measures: – ex-situ, and in-situ; biodiversity conservation in India.	

Unit -2	Credit -2
Phytotaxonomy:	(08)
Classification of Angiosperms with special reference to Linnaeus, A. P. de Candole, Bentham and Hooker.	
Study of diversity following families with reference to the system of classification of Bentham and Hooker	
	(22)

- | | |
|--------------------|------------------|
| 1. Magnoliaceae | 2. Nymphaeaceae |
| 3. Papveraceae . | 4. Brassicaceae |
| 5. Capparidaceae . | 6. Rutaceae |
| 7. Rhamnaceae | 8. Combretaceae |
| 9. Lythraceae | 10.Cucurbitaceae |
| 11. Apiaceae | |

B.Sc.III Botany (Practical)
Semester -V
Paper XIX
(Cell Biology & Molecular Biology)

45 L
Credit – 1.5

Unit-1

1. Study of the cell structure from onion leaf or *Tradescantia* leaf
2. Preparation of cytological (AA, FAA etc.) fixatives and stains (acetocarmine, aceto-orcein).
3. Study of electron micrographs of viruses, bacteria and cyanobacteria
4. Study of electron micrographs of eukaryotic cell and different cell organelles
5. Preparation of slides for the study of mitosis (root tips of onion)
6. Preparation of slides for the study of meiosis (*Rhoeo*, *Aloe* or onion flower buds)
7. Preparation of idiogram from the given micrograph of karyotype
8. Observation of giant chromosomes in *Chironomous* larvae
9. Preparation of wool models of mitosis, meiosis, cell structure, Chromosome, DNA and RNA.

**B.Sc. III Year (Practical)
Semester – V
Paper XX (A)
(Diversity of Angiosperms-I)**

45 L

Unit: 1

Credits-1.5

1. Study of herbarium
2. Study of analytical characters
3. Preparation of indented and bracketed keys
4. Study of following families:
 1. Magnoliaceae
 2. Nymphaeaceae
 3. Papaveraceae
 4. Brassicaceae
 5. Capparidaceae
 6. Rutaceae,
 7. Rhamnaceae
 8. Combretaceae
 9. Lythraceae
 10. Cucurbitaceae
 11. Apiaceae,
5. Mounting of pollen grains (acetolysis method)

Note for paper No. XIX and XX

Students should undertake excursion to ecologically different areas for plant study and submission of at least 20 wild plants at the time of practical examination.

B.Sc.III (Theory)
Semester -VI
Paper XXI
(Genetics and Biotechnology)

45 L
Credit : 1

Unit : 1

1. Mendelism:

(04)

- i. Introduction -G.J. Mendel
- ii. Mendelian principles –Law of Dominance , law of segregation, law of independent assortment, back cross and test cross

2. Interaction of genes:

(07)

- i. Allelic interaction: incomplete dominance, co dominance, lethal genes and blood group inheritance
- ii. Non allelic and non epistatic -comb shapes in fowls
- iii. Non allelic and epistatic:
 - a) Complementary genes or duplicate recessive epistasis (9:7)
 - b) Supplementary genes or recessive epistasis (9:3:4)
 - c) Dominant epistatic genes or dominant epistasis (12:3:1)
 - d) Duplicate genes or duplicate dominant epistasis (15:1)

3. Sex determination:

(04)

- i. Chromosomal theory of sex determination
- ii. Mechanism of sex determination in man (xx -xy), Drosophila (xx and xy), birds (zz-zw), grasshopper (xx-xo) and genic balance theory in Drosophila
- iii. Sex determination in plants – *Melandrium*

Unit : 2

Credit : 1

1. Sex linked inheritance:

(07)

- X, XY and Y linked inheritance:
- i) Colourblindness and hemophilia in man
 - ii) Holandric genes
 - iii) White eye colour in Drosophila,
 - iv) Gynandromorphs,

2. Structure and function of gene:

(08)

- i. Fine structure of gene (Seymour Benzer)
- ii. One gene one enzyme hypothesis
- iii. Genes and related diseases – phenylketonuria, and alkaptonuria
- iv. Detection of genetic diseases –amniocentesis Genetic counseling

Unit: 3

Credit : 1

Biotechnology:

(15)

1. Concept of genetic engineering and recombinant DNA technology
2. Restriction endonucleases, their properties and uses
3. Cloning vectors -plasmids and phage vectors
4. Techniques of genetic engineering -isolation of desired gene, gene cloning, transfer of gene into plants
5. Applications of genetic engineering

B.Sc. III Year (Theory)
Semester – VI
Paper XXII (A)
(Diversity of Angiosperms-II)

45 L

Unit: 1

Credit-1

Plant identification: keys, herbaria and botanical gardens	(04)
Origin of angiosperms: origin and evolution, Bennettitalean, Ralian and Caytonial theory	(05)
Binomial nomenclature: Principles and rules	(03)
Modern trends in taxonomy:	(03)
Cytotaxonomy, chemotaxonomy, and numerical taxonomy	

Unit: 2

Credits-2

1. Phytotaxonomy:

(10)

Study of Engler & Prantle, Hutchinson, Takhtajan system of classification

2. Study of diversity of families:

(20)

- a. Asclepiadaceae
- b. Scrophulariaceae
- c. Oleaceae
- d. Convolvulaceae
- e. Verbenaceae
- f. Amaranthaceae
- g. Euphorbiaceae
- h. Orchidaceae
- i. Liliaceae
- j. Commelinaceae

B.Sc. III (Practical)
Semester -VI
Paper XXIII
(Genetics and Biotechnology)

(45 L)
Credits : 1.5

1. Quiz
2. Working out laws of inheritance by using seed mixtures
3. Problems based on gene interaction
4. Problems based on sex linked inheritance

B.Sc. III Year (Practical)
Semester – VI
Paper XXIV (A)
(Diversity of Angiosperms-II)

(45 L)
Credits-1.5

- 1 . Study of following families:
 1. Oleaceae
 2. Asclepiadaceae
 3. Convolvulaceae
 4. Scrophulariaceae
 5. Verbenaceae
 6. Amaranthaceae
 7. Euphorbiaceae
 8. Orchidaceae
 9. Liliaceae
 10. Commelinaceae
2. Mounting of pollen grains (acetolysis method) and measurement of pollen size.
3. Study of different types of stomata and epidermal structures (Trichome)
4. Identification of plants up to species by using flora (Flora of Bombay Presidency/ Flora of Marathwada)
5. Students should undertake excursion to ecologically different areas for plant study and submission of at least 10 wild plants at the time of examination.

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

**Faculty of Science
Pattern of Theory Question Paper
B.Sc. III YEAR (BOTANY)
Semester V
Paper XVII
(Cell Biology and Molecular Biology)**

Time: 1½ Hour

Max. Marks: 30

-
- N.B.: i) Attempt all questions
ii) All questions carry equal marks
iii) Draw neat and well-labelled diagrams wherever necessary
- Q.1. Long answer type question(Unit 1) 10
or
Describe in brief:
a. Short answer type(Unit 1)
b. Short answer type(Unit 1)
- Q.2. Long answer type question(Unit 2) 10
or
Describe in brief:
a. Short answer type(Unit 2)
b. Short answer type(Unit 2)
- Q.3. Write short notes on: (Any two) 10
a. Short note (Unit 3)
b. Short note (Unit 3)
c. Short note (Unit 3).

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Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XVIII (A)

(Diversity of Angiosperms - I)

Time: 1½ Hour

Max. Marks: 30

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 2) 10

or

Describe in brief:

a. Short answer type(Unit 2)

b. Short answer type(Unit 2)

Q.2. Long answer type question(Unit 2) 10

or

Describe in brief:

a. Short answer type(Unit 2)

b. Short answer type(Unit 2)

Q.3. Write short notes on: (Any two) 10

a. Short note (Unit 1)

b. Short note (Unit 1)

c. Short note (Unit 1).

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Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XVII

(Cell Biology and Molecular Biology)

Time: 1½ Hour

Max. Marks: 30

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 1) 10
or

Describe in brief:

a. Short answer type(Unit 1)

b. Short answer type(Unit 1)

Q.2. Long answer type question(Unit 2) 10
or

Describe in brief:

a. Short answer type(Unit 2)

b. Short answer type(Unit 2)

Q.3. Write short notes on: (Any two) 10

a. Short note (Unit 3)

b. Short note (Unit 3)

c. Short note (Unit 3).

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Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester VI

Paper XXII(A)

(Diversity of Angiosperms - II)

Time: 1½ Hour

Max. Marks: 30

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 2) 10

or

Describe in brief:

a. Short answer type(Unit 2)

b. Short answer type(Unit 2)

Q.2. Long answer type question(Unit 2) 10

or

Describe in brief:

a. Short answer type(Unit 2)

b. Short answer type(Unit 2)

Q.3. Write short notes on: (Any two) 10

a. Short note (Unit 1)

b. Short note (Unit 1)

c. Short note (Unit 1).