



**RAJARSHI SHAHU MAHAVIDYALAYA, LATUR**

**(AUTONOMOUS)**

**AFFILATED TO**

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,  
NANDED**

**B. Sc. GENERAL (SEMESTER PATTERN)**

**B. Sc. FIRST YEAR( CBCS)**

**BOTANY – CURRICULUM**

**UNDER ACADEMIC AUTONOMOUS STATUS 2013 -2018**

**(MCQ + Theory Pattern)**

**w. e. f. JUNE, 2018**

# RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

## B. Sc. GENERAL (SEMESTER PATTERN)

### B. Sc. FIRST YEAR (CBCS)

### BOTANY – CURRICULUM

### (MCQ Pattern + Theory Pattern)

Semester	Paper No. & Title	Period / practical	Marks			Credits
			In Sem. Evaluation	End Sem. Evaluation	Total	
Semester-I	<b>Theory Paper-I:</b> Biodiversity of Cryptogams and Gymnosperms	45	20	30	50	02
	<b>Theory Paper-II:</b> Cell biology and Molecular biology	45	20	30	50	02
	<b>Lab course -I:</b> Practical bases on theory papers -I&II	24	--	--	50	02
Semester-II	<b>Theory Paper-III:</b> Histology Anatomy and Embryology of Angiosperms	45	20	30	50	02
	<b>Theory Paper-IV:</b> Fundamentals of Genetics	45	20	30	50	02
	<b>Lab course -II:-:</b> Practical based on theory papers -III&IV	24	--	--	50	02
					300	12

#### Workload:

**1. Theory:** Three Lectures / Paper / Week.

**2. Practical:** One practical (Three Lectures) / Batch / Week

# RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

**B. Sc. First Year**  
**Semester – I**  
(MCQ + Theory Pattern)

## **BOTANY**

**Theory Paper-I:** Biodiversity of Cryptogams and Gymnosperms

(Viruses, Bacteria, Fungi, Lichens, Algae, Bryophytes, Pteridophytes and Gymnosperms)

Periods – 45

Maximum Marks – 50

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### **OBJECTIVES**

1. To awaken the students about microbial world and the nature of diseases of plants.
2. To understand the principles and concept in plant pathology.
3. To understand the relationships between pathogens and plants.
4. To become familiar with algae and bryophytes
5. To develop the awareness about the importance of Viruses, Bacteria, Fungi, Lichens, Algae, Bryophytes, Pteridophytes
6. To learn the life cycles of, Fungi, Lichens, Algae, Bryophytes, Pteridophytes

### **UNIT – I: BACTERIA AND VIRUSES (10 L)**

#### **BACTERIA:**

1. General characters.
2. Size, Shape and Ultra structure.
3. Asexual reproduction (By binary fission).
4. Sexual reproduction (By conjugation).
5. Economic importance.

#### **VIRUSES:**

1. General characters.
2. Classification based on host.
3. Ultra structure of TMV.
4. Economic importance.

### **UNIT – II: FUNGI (12 L)**

1. General characters and.
2. Classification (Alexopolous and Mims, 1979).
3. Systematic position, occurrence, structure, reproduction, and graphic life cycle of *Erysiphe*.
4. Economic importance.
5. Mycorrhiza (General characters).

6. General characters of lichens.
7. Types of Lichens.
8. Economic importance of Lichens.

### **UNIT – III: ALGAE AND BRYOPHYTES (10 L )**

#### **ALGAE:**

1. General characters.
2. Classification (F.E.Fritsch,1935).
3. Systematic position, occurrence, thallus structure, reproduction and graphic life cycle of *Oedogonium*.

#### **BRYOPHYTES:**

1. General characters.
2. Classification (N.S.Parihar).
3. Systematic position, occurrence, thallus structure(external and internal), reproduction, and graphic life cycle of (Developmental stages not expected) *Funaria*.

### **UNIT – IV: PTERIDOPHYTES AND GYMNOSPERMS (13 periods)**

#### **PTERIDOPHYTES :**

1. General characters.
2. Classification ( N.S.Parihar)Systematic position, occurrence, thallus structure (external and internal), reproduction, and graphic life cycle with alternation of generation of (Developmental stages not expected) *Nephrolepis (ferm)*.

#### **GYMNOSPERMS:**

1. General characters.
2. classification (Arnold, 1948).
3. Morphology of vegetative and reproductive structures(Developmental stages are not expected), and life cycle of *Cycas*.

# RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

**B. Sc. First Year**  
**Semester – I**  
(MCQ + Theory Pattern)

**BOTANY**  
**Theory Paper- II: Cell and Molecular Biology**

Periods – 45

Maximum Marks – 50

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## OBJECTIVES

1. To acquire good knowledge about cell biology
2. To acquire good knowledge about chemistry of active constituents of medicinal plants.
3. To know the techniques of Molecular biology.
4. Identification of different stages of cell division

## UNIT –I: CELL BIOLOGY (12 L)

1. **Cell:** Ultra structure of Prokaryotic cell and Eukaryotic cell.
2. **Structure and functions of:** Cell wall and Plasma membrane.
3. **Structure and functions of cell organelles:** Nucleus, Golgi apparatus, Endoplasmic reticulum and Ribosome, Chloroplast and Mitochondria.

## UNIT –II: CHROMOSOME (10 L)

1. Organization of Chromosome (Nucleosome Solenoid Model).
2. Morphology, structure and function of typical chromosome.
3. Types of chromosome.
4. Karyotype and Ideogram and their significance.
5. Chromosomal Aberrations (structural and numerical).

## UNIT –III: CELL DIVISION (11 L)

1. Cell cycle: Inter phase G<sub>1</sub> - S - G<sub>2</sub>–M phase and G<sub>0</sub> phase
2. Phages and significance of Mitosis.
3. Phages and significance of Meiosis.

#### **UNIT –IV: MOLECULAR BIOLOGY (12 L)**

- 1.** Structure of DNA (Watson and Crick model).
- 2.** Replication of DNA.
- 3.** Structure, function and types of RNA.
- 4.** Introduction to genetic code and wobble hypothesis.
- 5.** Protein synthesis.

# RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

## B.Sc. First Year Semester – I BOTANY

### Practical Paper-III: Practical based on theory papers -I&II

Practicals: 12

Marks: 50

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**Practical 1:** Study of forms of Bacteria.

**Practical 2:** Study of external features of *Oedogonium*.

**Practical 3:** Study of external features of *Erysiphe* with classification.

**Practical 4:** Study of types of Lichens (Crustose, Foliose and Fructicose).

**Practical 5:** Study of external and internal features of *Funaria*.

**Practical 6:** Study of external and internal features of *Nephrolepis*.

**Practical 7:** Study of cell organelles with the help of photocopies / slides.

**Practical 8:** Study of mitosis (Onion/Garlic Root tips).

**Practical 9:** Study of Mitotic index (Onion/Garlic Root tips).

**Practical 10-11 :** Study of Meiosis from onion floral buds or any other available material.

**Practical 12:** Study of karyotype and ideogram from photocopies of onion / Aloe plant material.

**Practical 13:** Botanical excursions (one short excursion is compulsory)

# RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

## B.Sc. First Year Semester – II BOTANY

### Theory Paper-III: Histology, Anatomy and Embryology of Angiosperms

Periods – 45

Maximum Marks – 50

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#### OBJECTIVES

1. To awaken the students about Tissue system of plants.
2. To understand the process and concepts in plant Embryology.
3. To understand the relationships between pathogens and plants.
4. To become familiar with histology and anatomy of plants
5. To learn the internal structures of plant organs.

#### UNIT – I: HISTOLOGY

##### Plant Tissues

(12 L )

A. Meristematic tissues and their classification based on position

##### B. Permanent Tissues

###### I Simple Tissues:

1. Parenchyma
2. Collenchyma
3. Sclerenchyma

###### II Complex Tissues

1. Xylem
2. Phloem

###### III Secretory Tissues

###### 1. Laticiferous Tissues

ex. Latex cells

###### 2. Glandular Tissues

###### a. External glands

ex. Digestive glands

###### b. Internal glands

ex. Oil glands

#### UNIT – II: ANATOMY (12 periods)

1. Anatomy of dicot Stem (Sunflower).
2. Anatomy of monocot Stem (Maize).
3. Secondary growth in dicot stem.
4. Leaf anatomy of dicotyledons (Sunflower) and monocotyledons (Maize).
5. Anomalous secondary growth in *Dracaena* stem.



**UNIT –III: EMBRYOLOGY –I (11 periods)**

1. Structure of a Microsporangium (T.S. of anther).
2. Structure of a Microspore.
3. Development of male gametophyte (Microgametogenesis).
4. Structure of a Megasporangium.
5. Anatropous ovule
6. Types of ovule.
7. Development of female gametophyte (Monosporic).

**UNIT – IV: EMBRYOLOGY –II (10 L)**

1. Fertilization.
2. Post fertilization changes.
3. Endosperm and its types.
4. Development of dicot embryo (Crucifer type).
5. Structure of Dicot seed.
6. Structure of Monocot seed.

# RAJARSHI SHAHU MAHAVIDYALAYA, LATUR

## B. Sc. First Year Semester – II BOTANY

### Theory Paper-V: Fundamentals of Genetics

Periods – 45

Maximum Marks – 50

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1. To awaken the students about genetic terms
2. To understand the principles of genetics and laws of inheritance.
3. To understand the relationships between epistatic and non epistatic genes.
4. To develop the awareness about genetic disorders

#### UNIT –I: MENDELISM (10 L)

1. Mendel's experiments (biography)
2. Genetic terminologies
3. Explanation and examples of (monohybrid cross, dihybrid cross and back cross and test cross)
4. Mendel's Laws of Inheritance.

#### UNIT –II: GENE INTERACTIONS (12 L)

- A. Allelic interactions: Explanation and examples of Incomplete dominance, Co- dominance (4 o'clock plant inheritance of coat color in cattle)
- B. Non-Allelic interactions
- I. Epistatic: Explanation and examples of
    - a. Dominant epistasis - 12:3:1
    - b. Recessive epistasis - 9:3:4 (Supplementary gene)
    - c. Duplicate dominant epistasis - 15:1
    - d. Duplicate recessive epistasis - 9:7 (Complementary gene)
  - II. Non-epistatic: Explanation and examples of
    - a. Collaborator gene - 9:3:3:1 (Comb shape in fowl)

#### UNIT –III: SEX DETERMINATION: (11 L)

1. Sex determination: Discovery of sex chromosomes,
2. Chromosomal theory of sex determination.
  - i. Sex determination in Animals XX,XY (Drosophila )
  - ii. Sex determination in insects (XO-XX),
  - iii. Sex determination in Birds (ZW-ZZ method),
  - iv. Sex determination in Plants (*Asparagus*).
3. Linkage: Definitions, significance, Coupling and repulsion hypothesis.

#### **UNIT –IV: SEX LINKED INHERITANCE: (12 L)**

- 1. Sex linked inheritance: Definition classification (x-linked, y-linked and xy-linked)**
  - a) Sex linked inheritance in *Drosophila* (White eye colour)
  - b) Sex linked inheritance in Man (Hemophilia, colour blindness and hypertrochosis)
  - c) Inheritance bobbed bristles in *Drosophila*
- 2. Gene related diseases: Phenylketonuria (PKU), Alkaptonuria (AKU) and Albinism.**
- 3. Syndromes in Man (Autosomal and sex - chromosomal syndromes).**
  - i) Down's syndrome
  - ii) Klinefelter's Syndrome.

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## B.Sc. First Year Semester – II BOTANY

### **Practical Paper-VI:** Practical based on theory papers - IV & V

Practicals: 12

Marks: 50

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**Practical 1:** Study of permanent tissues (Mechanical and Complex) with the help of permanent slides/models/

Charts/photocopies.

**Practical 2:** Study of T.S. of Anther and types of ovule with the help of

Permanent slides/models/ charts/photocopies.

**Practical 3:** Preparation of double stained permanent slides of Sunflower Stem.

**Practical 4:** Preparation of double stained permanent slides of Maize Stem.

**Practical 5-10:** Problems based on monohybrid/Dihybrid ratio; 9:7//12:3:1/15:1 and collaborator gene.

**Practical 11-12:** Problems based on sex-linked inheritance.

**Practical 13-14:** Botanical excursions (one long excursion is compulsory)

**SKELETON OF QUESTION PAPER**  
**B.Sc. First Year**

**Semester – I & II**

**Theory Paper-I, II, III and IV**

**Time: 1.30 hours**

**Maximum Marks: 30**

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**Note: (i)** Attempt all questions.

(ii) Draw neat and well labeled diagrams wherever necessary.

**Q1. Attempt all of the following (Each 3 marks) 12**

- a)
- b)
- c)
- d)

**Q2. Attempt any ONE of the following 08**

- a)
- b)

**Q3. Attempt any ONE of the following 10**

- a)
- b)

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