

**DEPARTMENT OF BOTANY, ST. XAVIER'S COLLEGE (Autonomous), Mumbai.
F. Y. B. Sc. Botany Syllabus (2016-2017)**

SEMESTER-II Course: S.BOT. 2.01 PLANT PHYSIOLOGY AND BIOCHEMISTRY- I

LEARNING OBJECTIVES

The students will be able to understand-

- The transport mechanism in plants and differentiate between the physiological processes and their importance.
- The mechanism of enzyme actions.
- The major classes of organic compounds, their synthesis and breakdown in plants.

UNIT I : WATER RELATIONS: Water as a plant constituent, Functions of water in plants, Water molecule, Physical and chemical properties of water, Imbibition and osmosis, Water potential and its components, Role of turgor pressure in plant cells, Changes in Ψ_p and Ψ_w during reversible changes in cell volume. Transpiration and absorption: Water loss by transpiration, Measurements of transpiration rates, Movement of water vapor through stomatal pores, Plant antitranspirants, Stomatal movements, Absorption of water by absorbing plants, Movement of water across roots and through leaves.

UNIT II : TRANSPORT PROCESSES AND ENZYMES: **Transport processes:** Movement of solutes in plants, Passive transport, Protoplasmic membrane, Active transport across protoplasmic membranes, Mechanism of active transport, Shuttle systems, Electroosmosis and pinocytosis, Transcellular transport, Translocation in sieve tubes, Anatomy of sieve tubes, Mechanism of sieve tube translocation. **Enzymes:** Nomenclature, Properties, Classification, Specificity, Apoenzyme, prosthetic group, Mode of action, Kinetics (no derivation of Michaelis Menten equation), Enzyme inhibition, Isozymes.

UNIT III : PLANT BIOCHEMISTRY: Major Cellular compounds, their classification and functions in plants and *biosynthesis and degradation of selective compounds*.; Carbohydrates - *Starch, *Cellulose; Proteins; Lipids - *Triglycerides.

Practicals- Course: S.BOT PR2.01

1. Study of activity of amylase.
1. Determination of solute potential by plasmolytic method.
2. Demonstration of transpirational water loss by Ganong's potometer.
3. Determination of stomatal frequency.
4. Determination of stomatal size.
5. Tests for detection of Carbohydrates - Reducing sugars, non-reducing sugars, monosaccharides, non-reducing disaccharides, starch.
6. Tests for detection of proteins and amino acids.
7. Tests for detection of fats and oil.

CIA- multiple choice questions / test / assignments / puzzles / quizzes / field study report.

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SEMESTER-II Course: S.BOT.2.02 CYTOLOGY, GENETICS & ECOLOGY

LEARNING OBJECTIVES

The students will be able to understand-

- The structure and functions of various cell organelles.
- The phenomenon of inheritance.
- The interactions taking place in the ecosystem and flow of Energy.

UNIT I: CYTOLOGY: Ultra-structure and functions of the following: Cell wall, Plasma membrane (unit membrane and fluid mosaic model), Mitochondrion and Chloroplast, Nucleus: Chromosomes, Cell division – Mitosis.

UNIT II : GENETICS: Mendel's Laws, Allelic and non-allelic interaction, Epistatic interactions, Sex determination in plants.

UNIT III : ECOLOGY: Concept of Ecosystem: Components and their interactions, Food Chains and food web Ecological pyramids; Ecological adaptations of plants belonging to following ecological groups: Hydrophytes, Xerophytes and Halophytes.

Practicals- Course: S.BOT PR2.02

1. Examining various stages of mitosis in root tip cells.
2. Study of external and internal structures of *Hydrilla*, *Eichhornia* / *Nymphaea*, *Nerium*, *Opuntia* and *Avicennia*.
3. Study of pond ecosystem.
4. Study of terrestrial ecosystem.
5. Study of estuarine ecosystem.
6. Problems on Mendelian genetics- Mono hybrid and dihybrid ratios, Allelic and non-allelic interactions, Epistatic interactions.

CIA- multiple choice questions / test / assignments / puzzles / quizzes.
