

| <b>LESSON PLAN</b><br><b>SUBJECT: BOTANY (Theory)</b><br><b>SEMESTER- 2, PAPER: BOTN2011 - Botany (Theo): Biomolecules &amp; Cell Biology</b> |                                                                                                                                                                                                                                                                                                                                                   |                         |
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| Unit                                                                                                                                          | TOPIC                                                                                                                                                                                                                                                                                                                                             | Teacher                 |
| Unit 1: Biomolecules                                                                                                                          | Chemical Bond types and characteristics, non-covalent bonds and their biological significance. Basic chemical structure and roles of bio molecules- carbohydrates, lipids, proteins and nucleic acids. ATP as energy rich molecule. Basic Enzyme chemistry, Organic chemical principles in life processes, Basic concept of signalling molecules. | Dr. Sk. Aftabul Alam    |
| Unit 2: Cell architecture                                                                                                                     | Prokaryotic and eukaryotic cells; Origin of eukaryotic cell (endosymbiotic theory).                                                                                                                                                                                                                                                               | Dr. Manjusha Sarkar     |
| Unit 3: Cell Wall and Plasma Membrane                                                                                                         | Chemistry, structure and function of Plant Cell Wall. Singer and Nicolson's fluid mosaic model of cell membrane. Membrane transporters.                                                                                                                                                                                                           | Dr. Sayani Biswas       |
| Unit 4: Cell organelles: Structure and function of the following Organelles                                                                   | Nucleus: Nuclear envelope, nuclear pore complex, nuclear lamina; types of chromatins; nucleolus.<br>Chloroplast and Mitochondria: Structural organization; Function; chloroplast and mitochondrial genomes.                                                                                                                                       | Mr. Subir Kumar Samanta |
|                                                                                                                                               | Endomembrane system: RER and SER, folding of protein in ER, export of proteins and lipids; Golgi Apparatus organization, protein sorting and export from Golgi Apparatus. PTM (Post Translational Modifications).<br>Cytoskeleton: Role and structure of microtubules, microfilaments, intermediary filament and motor proteins.                  | Mr. Sujit Pal           |
| Unit 5: Cell division                                                                                                                         | Cell cycle; mitosis and meiosis.                                                                                                                                                                                                                                                                                                                  | Dr. Jiban Kumar Pal     |

| <b>LESSON PLAN</b><br><b>SUBJECT: BOTANY (Practical)</b><br><b>SEMESTER- 2, PAPER: BOTN2011 - Botany (Pract): Biomolecules &amp; Cell Biology</b> |                                                                                                     |                         |
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| Sl.No.                                                                                                                                            | TOPIC                                                                                               | Teacher                 |
| 1.                                                                                                                                                | Microchemical tests for proteins, reducing and non reducing carbohydrates, starch and lipid.        | Dr. Sk. Aftabul Alam    |
| 2.                                                                                                                                                | Separation of chloroplast pigments by paper chromatography.                                         | Dr. Manjusha Sarkar     |
| 3.                                                                                                                                                | Study the effect of organic solvent and temperature on membrane permeability.                       | Mr. Sujit Pal           |
| 4.                                                                                                                                                | Study of cell and its organelles with the help of electron micrographs and other digital resources. | Mr. Sujit Pal           |
| 5.                                                                                                                                                | Study of plant cell structure with the help of epidermal peel mount of Allium/Rhoeo                 | Dr. Jiban Kumar Pal     |
| 6.                                                                                                                                                | Demonstration of the phenomenon of protoplasmic streaming in Hydrilla leaf.                         | Dr. Sayani Biswas       |
| 7.                                                                                                                                                | Demonstration of the phenomenon of plasmolysis and deplasmolysis.                                   | Mr. Subir Kumar Samanta |
| 8.                                                                                                                                                | Demonstration of separation of biomolecules by dialysis.                                            | Dr. Manjusha Sarkar     |

| <b>LESSON PLAN</b><br><b>SUBJECT: BOTANY (Theory)</b><br><b>SEMESTER- 2, PAPER: BOTN2021 - Botany (Theory): Biomolecules &amp; Cell Biology</b> |                                                                                                                                                                                                                                                                                                                                                   |                         |
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| Unit                                                                                                                                            | TOPIC                                                                                                                                                                                                                                                                                                                                             | Teacher                 |
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| Unit 2: Cell architecture                                                                                                                       | Prokaryotic and eukaryotic cells; Origin of eukaryotic cell (endosymbiotic theory).                                                                                                                                                                                                                                                               | Dr. Manjusha Sarkar     |
| Unit 3: Cell Wall and Plasma Membrane                                                                                                           | Chemistry, structure and function of Plant Cell Wall. Singer and Nicolson's fluid mosaic model of cell membrane. Membrane transporters.                                                                                                                                                                                                           | Dr. Sayani Biswas       |
| Unit 4: Cell organelles: Structure and function of the following Organelles                                                                     | <b>Nucleus:</b> Nuclear envelope, nuclear pore complex, nuclear lamina; types of chromatin; nucleolus.<br><b>Chloroplast and Mitochondria:</b> Structural organization; Function; chloroplast and mitochondrial genomes.                                                                                                                          | Mr. Subir Kumar Samanta |
|                                                                                                                                                 | <b>Endomembrane system:</b> RER and SER, folding of protein in ER, export of proteins and lipids; Golgi Apparatus organization, protein sorting and export from Golgi Apparatus. PTM (Post Translational Modifications).<br><b>Cytoskeleton:</b> Role and structure of microtubules, microfilaments, intermediary filament and motor proteins.    | Mr. Sujit Pal           |
| Unit 5: Cell division                                                                                                                           | Cell cycle; mitosis and meiosis.                                                                                                                                                                                                                                                                                                                  | Dr. Jiban Kumar Pal     |

| <b>LESSON PLAN</b><br><b>SUBJECT: BOTANY (Practical)</b><br><b>SEMESTER- 2, PAPER: BOTN2011 - Botany (Pract): Biomolecules &amp; Cell Biology</b> |                                                                                                     |                         |
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| Sl.No.                                                                                                                                            | TOPIC                                                                                               | Teacher                 |
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| 3.                                                                                                                                                | Study the effect of organic solvent and temperature on membrane permeability.                       | Mr. Sujit Pal           |
| 4.                                                                                                                                                | Study of cell and its organelles with the help of electron micrographs and other digital resources. | Mr. Sujit Pal           |
| 5.                                                                                                                                                | Study of plant cell structure with the help of epidermal peel mount of Allium/Rhoeo                 | Dr. Jiban Kumar Pal     |
| 6.                                                                                                                                                | Demonstration of the phenomenon of protoplasmic streaming in Hydrilla leaf.                         | Dr. Sayani Biswas       |
| 7.                                                                                                                                                | Demonstration of the phenomenon of plasmolysis and deplasmolysis.                                   | Mr. Subir Kumar Samanta |
| 8.                                                                                                                                                | Demonstration of separation of biomolecules by dialysis.                                            | Dr. Manjusha Sarkar     |

**LESSON PLAN**  
**SUBJECT: BOTANY (Theory)**  
**SEMESTER- 2, SEC: (BOTN2051) – Organic Cultivation and Protected Agriculture**

| Unit                                                     | TOPIC                                                                                                                                                                                                                                                                                                                                                                                                                                                | Teacher                 |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Unit 1: Organic farming and its management               | Organic farming and its significance, management practices (nutritional requirements, pest, diseases, weeds); Use of biofertilizers, biopesticides, bioherbicides, biocontrol agents (plant growth promoting rhizobacteria (PGPR), pheromone trapping, Trichoderma, Pseudomonas, neem oil, garlic etc.)in management.                                                                                                                                | Dr. Jiban Kumar Pal     |
| Unit 2: Marketing and Policies                           | Marketing of the produce and government institutes and policies related to protected farming (hydroponics and organic farming)                                                                                                                                                                                                                                                                                                                       | Dr. Jiban Kumar Pal     |
| Unit 3: Protected Agriculture                            | Protected Agriculture types (hydroponics, aquaponics and organic farming), definition history, terminology, importance and advantages over traditional agriculture, limitations and challenges.                                                                                                                                                                                                                                                      | Mr. Subir Kumar Samanta |
| Unit 4: Plant Growth Requirements and Media formulations | Physical parameters Light (quality and quantity), light balancers; pH, conductivity, salinity (Dissolved Oxygen-DO, Total Dissolved Solid - TDS) and temperature; Chemical parameters-mineral nutrient requirements, deficiencies, heavy metal toxicities, growth regulators (auxins, gibberellins, cytokinin and abscisic acids); Growth media-types, properties, uses, nutrient formulae, preparation of solutions, solid Media and nutrient film. | Dr. Jiban Kumar Pal     |