Department of Botany
Sarat Centenary College

Academic Plan - 2023-24

Distribution of syllabus into Modules and Units of B.Sc. Major/Minor Course CCFUP (NEP)

Orientation Programme – 1st week f July - General outline on the emergence of Botany as an academic discipline and its Scope & Importance along with brief introduction programme

SEMESTER-I

Ist Module (July to September)
Major: (BOTN 1011) - Plant Diversity and Evolution

Credits: Theory-3, Practical-1, Marks – 75, Theory – 40, Practical – 20, Internal Assessment – 15

Name of the teacher : Dr. K. M. Hasib

Unit 1: Origin of life Chemical basis of origin of life, concepts of evolution, Tree and classification of life, and classification (up to six kingdoms)
Unit 2: Bacteria: Characteristic features, cell structure and genetic element, asexual reproduction and modes of gene transfer (conjugation, transformation and transduction), brief introduction to Archaea. Role of bacteria in agriculture, medicine and industry.
Unit 3: Viruses: Characteristic features, replication, RNA virus (structure of TMV), DNA virus (structure of T2-phage), Lytic and Lysogenic life cycle (Lambda phage).

Name of the teacher : Dr. Quazi Taheruzzaman

Unit 4: Algae : Characteristic features, cell structure, range of thallus, methods of reproduction and evolutionary classification of Lee (2015) up to orders. A brief account of Nostoc, Spirogyra, Sargassum, Polysiphonia;economic significance
Unit 5: Fungi : Characteristics features, affinities with plants and animals, structural features, reproduction and life cycle pattern. Outline classification of Ainsworth (1973) up to orders. Myxomycetes- characteristics and their similarities with fungi. General characteristics and life cycles of Mucor, Saccharomyces, Ascobolus, Neurospora, Agaricus Helminthosporium (= Cochiliobolus) and Fusarium. Fungal symbiosis- lichen and mycorrhizae (characteristics and significance), economic importance of fungi

Name of the teacher : Dr. K. M. Hasib & Dr. Quazi Taheruzzaman

Practical
1. To study different strains of Bacillus and E. coli (Gram staining). 2. To study structure of TMV and T2 Bacteriophage (electronmicrographs/models). 3. To study morphology of Nostoc, Spirogyra, Sargassum, Polysiphonia etc. from permanent slides. 4. To study Mucor, Saccharomyces, Ascobolus, Agaricus and Fusarium from permanent slides, dry preserved specimens or museum specimen. Lichens from dry or preserved specimens. 5. To study Marchantia, Anthoceros and Funaria (vegetative and reproductive morphology from permanent slides).

SEC: (BOTN 1051) - Biofertilizer
Credits: Theory-3, Marks – 50

Name of the teacher : Dr. Quazi Taheruzzaman

Unit 1: Introduction to microbial inoculants or biofertilizers, Plant nutrition, advantages of using biofertilizers over chemical fertilizers; Methods and steps in mass production of biofertilizers: stock culture, broth culture, growth medium, fermentation, blending with the carrier, packaging, quality check, longevity, ISI standard specification for biofertilizers; scope of biofertilizers in India.

Unit 2: Microinnoculants: Study of important microbial inoculants: Rhizobium, Azospirillum, Azotobacter and PGPR. Actinorhizae; Characteristics, and crop response.
Unit 3: Role of Cyanobacteria: Cyanobacteria (blue-green algae) in Agriculture: Cyanobacteria in rice cultivation; Azolla and Anabaena association, nitrogen fixation, and factors affecting growth.

2nd Module (October to December)

Major: (BOTN 1011) - Plant Diversity and Evolution
Credits: Theory-3, Practical-1, Marks – 75, Theory – 40, Practical – 20, Internal Assessment – 15

Name of the teacher Dr. Quazi Taheruzzaman

Unit 6: Bryophytes : Characteristic features and reproduction, adaptation to land habit, outline classification of Schuster (1958) upto orders, evolutionary trends in Bryophytes. Brief account of Marchantia, Anthoceros and Funaria. Ecological significance.
Unit 7: Pteridophytes : Characteristic features and reproduction, Outline classification of Gifford & Foster (1989) up to order,evolutionary trends in Pteridophytes, affinities with Bryophytes. Brief account of Psilotum, Selaginella, Equisetum, Pteris and Marsilea

Name of the teacher : Dr. K. M. Hasib

Unit 8: Gymnosperms : Characteristic features and reproduction, Outline classification of Bhatnagar & Moitra (1996) up to orders evolutionary trends in Gymnosperm, affinities with Pteridophytes. Brief account of Cycas, Ginkgo and Gnetum. Economic significance
Unit 9: Angiosperms : Gross morphology and reproduction, Basic idea of natural, artificial and phylogenetic system of classification.

Name of the teacher : Dr. K. M. Hasib & Dr. Quazi Taheruzzaman

Practical
6. To study the vegetative and reproductive morphology of Psilotum, Selaginella, Equisetum and Pteris from permanent slides. 7. To study the vegetative and reproductive morphology of Cycas, Ginkgo and Gnetum from permanent slides. 8. To study morphology of angiosperm leaf, stem, flower, inflorescence and fruits from locally available plant species. 9. Temporary anatomical slide preparation of Pteris leaflet and Cycas leaflet

Internal Assessment : 1st Week of December

Theory and Practical Examination : as per notification of B.U. (Tentatively on December)

SEC: (BOTN 1051) - Biofertilizer
Credits: Theory-3, Marks – 50

Name of the teacher : Dr. K. M. Hasib

Unit 4: Mycorrhizal association : Types of mycorrhizal association, occurrence and distribution; Role of Arbuscular mycorrhizal fungi in phosphorus nutrition, growth and yield of crop plants; VAM and AMF – methods in isolation (wet sieving and decanting), identification (morphological and molecular methods)
Unit 5: Biofertilizer and Organic farming: Introduction to organic farming, recycling of biodegradable municipal (domestic), agricultural and industrial waste; green manuring, bio-composting, vermicomposting and the infield application.

Internal Assessment : 1st Week of December
Theory and Practical Examination : as per notification of B.U. (Tentatively on December)

SEMESTER-II

Ist Module (January to March)

Major: (BOTN2011)- Biomolecules & Cell Biology

Credits: Theory-3, Practical-1, Marks – 75, Theory – 40, Practical – 20, Internal Assessment – 15

Name of the teacher : Dr. K. M. Hasib

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.

Name of the teacher : Dr. Quazi Taheruzzaman

Unit 2: Cell architecture : Prokaryotic and eukaryotic cells; Origin of eukaryotic cell (endosymbiotic theory).
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.

Name of the teacher : Dr. K. M. Hasib & Dr. Quazi Taheruzzaman

Practical
1. Microchemical tests for proteins, reducing and non reducing carbohydrates, starch and lipid. 2. Separation of chloroplast pigments by paper chromatography. 3. Study the effect of organic solvent and temperature on membrane permeability. 4. Study of cell and its organelles with the help of electron micrographs and other digital resources.

SEC: (BOTN 2051) - Organic Cultivation And Protected Agriculture
Credits: Theory-3, Marks – 50

Name of the teacher : Dr. K. M. Hasib

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.
Unit 2: Marketing and Policies : Marketing of the produce and government institutes and policies related to protected farming (hydroponics and organic farming).

2nd Module (April to June)

Major: (BOTN 2011)- Biomolecules & Cell Biology
Credits: Theory-3, Practical-1, Marks – 75, Theory – 40, Practical – 20, Internal Assessment – 15

Name of the teacher : Dr. K. M. Hasib & Dr. Quazi Taheruzzaman

Unit 4: Cell Organelles : Structure and function of the following Organelles Nucleus: Nuclear envelope, nuclear pore complex, nuclear lamina; types of chromatins; nucleolus. Chloroplast and Mitochondria: Structural organization; Function; chloroplast and mitochondrial genomes. 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). Cytoskeleton: Role and structure of microtubules, microfilaments, intermediary filament and motor proteins.
Unit 5: Cell division : Cell cycle; mitosis and meiosis.

Name of the teacher : Dr. K. M. Hasib & Dr. Quazi Taheruzzaman

Practical
5. Study of plant cell structure with the help of epidermal peel mount of Allium/Rhoeo 6. Demonstration of the phenomenon of protoplasmic streaming in Hydrilla leaf. 7. Demonstration of the phenomenon of plasmolysis and deplasmolysis. 8. Demonstration of separation of biomolecules by dialysis

Internal Assessment : 4th Week of May
Theory and Practical Examination : as per notification of B.U. (Tentatively on June)

SEC: (BOTN 2051)- Organic Cultivation And Protected Agriculture
Credits: Theory-3, Marks – 50

Name of the teacher : Dr. Quazi Taheruzzaman

Unit 3 : Protected Agriculture: Protected Agriculture types (hydroponics, aquaponics and organic farming), definition, history, terminology, importance and advantages over traditional agriculture, limitations and challenges. **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, cytokinins and abscisic acids); Growth media-types, properties, uses, nutrient formulae, preparation of solutions, solid Media and nutrient film.

Internal Assessment : 4th Week of May
Theory and Practical Examination : as per notification of B.U. (Tentatively on June)

Counselling Programme – Final week of June- General outline on the admission and scope of higher education and related jobs