

LESSON PLAN
SUBJECT: BOTANY (Theory)
SEMESTER – 1, PAPER: BOTN1011 – Botany (Theo): Plant Diversity and Evolution

Unit	TOPIC	Teacher
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).	Dr. Jiban Kumar Pal
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.	Dr. Sk. Aftabul Alam
Unit 3: Viruses	Characteristic features, replication, RNA virus (structure of TMV), DNA virus (structure of T2-phage), Lytic and Lysogenic life cycle (Lambda phage).	Dr. Sk. Aftabul Alam
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 <i>Nostoc</i> , <i>Spirogyra</i> , <i>Sargassum</i> , <i>Polysiphonia</i> ; economic significance (brief account)	Mr. Subir Kumar Samanta
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 <i>Mucor</i> , <i>Saccharomyces</i> , <i>Ascobolus</i> , <i>Neorospora</i> , <i>Agaricus Helminthosporium</i> (= <i>Cochiliobolus</i>) Fungal symbiosis-lichen and mycorrhizae (characteristics and significance), economic importance of fungi.	Mr. Subir Kumar Samanta
Unit 6: Bryophytes	Characteristic features and reproduction, adaptation to land habit, outline classification of Schuster (1958) up to orders, evolutionary trends in Bryophytes. Brief account of <i>Marchantia</i> , <i>Anthoceros</i> and <i>Funaria</i> . Ecological significance.	Dr. Sayani Biswas
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 <i>Psilotum</i> , <i>Selaginella</i> , <i>Equisetum</i> , <i>Pteris</i> and <i>Marsilea</i> .	Dr. Jiban Kumar Pal
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 <i>Cycas</i> , <i>Ginkgo</i> and <i>Gnetum</i> . Economic significance.	Mr. Sujit Pal
Unit 9: Angiosperms	Gross morphology and reproduction, Concept of natural, artificial and phylogenetic system of classification.	Dr. Manjusha Sarkar

LESSON PLAN
SUBJECT: BOTANY (Practical)
SEMESTER- 1, PAPER: BOTN1011 - Botany: Plant Diversity and Evolution

Sl. No.	TOPIC	Teacher
1.	To study different strains of <i>Bacillus</i> and <i>E. coli</i> (Gram staining).	Dr. SK Aftabul Alam
2.	To study structure of TMV and T2 phage (electronmicrographs/models).	Dr. Manjusha Sarkar
3.	To study morphology of <i>Nostoc</i> , <i>Spirogyra</i> , <i>Sargassum</i> , <i>Polysiphonia</i> etc. from permanent slides.	Sujit Pal
4.	To study <i>Mucor</i> , <i>Saccharomyces</i> , <i>Ascobolus</i> , <i>Agaricus</i> and <i>Fusarium</i> from permanent slides, dry preserved specimens or museum specimen. Lichens from dry or preserved specimens.	Sujit Pal
5.	To study <i>Marchantia</i> , <i>Anthoceros</i> and <i>Funaria</i> (vegetative and reproductive morphology from permanent slides).	Dr. Jiban Kumar Pal
6.	To study the vegetative and reproductive morphology of <i>Psilotum</i> , <i>Selaginella</i> , <i>Equisetum</i> and <i>Pteris</i> from permanent slides.	Dr. Sayani Biswas
7.	To study the vegetative and reproductive morphology of <i>Cycas</i> , <i>Ginkgo</i> and <i>Gnetum</i> from permanent slides	Subir Samanta
8.	To study morphology of angiosperm leaf, stem, flower, inflorescence and fruits from locally available plant species (Both monocot and dicot).	Dr. Manjusha Sarkar
9	Temporary anatomical slide preparation of <i>Pteris</i> leaflet and <i>Cycas</i> leaflet.	

LESSON PLAN
SUBJECT: BOTANY (Theory)
SEMESTER- 1, PAPER: BOTN1021 – Botany (Theo): Plant Diversity and Evolution

Unit	TOPIC	Teacher
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).	Dr. Jiban Kumar Pal
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.	Dr. Sk. Aftabul Alam
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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 <i>Nostoc</i> , <i>Spirogyra</i> , <i>Sargassum</i> , <i>Polysiphonia</i> ; economic significance (brief account)	Mr. Subir Kumar Samanta
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 <i>Mucor</i> , <i>Saccharomyces</i> , <i>Ascobolus</i> , <i>Neorospora</i> , <i>Agaricus Helminthosporium</i> (= <i>Cochiliobolus</i>) Fungal symbiosis-lichen and mycorrhizae (characteristics and significance), economic importance of fungi.	Mr. Subir Kumar Samanta
Unit 6: Bryophytes	Characteristic features and reproduction, adaptation to land habit, outline classification of Schuster (1958) up to orders, evolutionary trends in Bryophytes. Brief account of <i>Marchantia</i> , <i>Anthoceros</i> and <i>Funaria</i> . Ecological significance.	Mr. Subir Kumar Samanta
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 <i>Psilotum</i> , <i>Selaginella</i> , <i>Equisetum</i> , <i>Pteris</i> and <i>Marsilea</i> .	Mr. Subir Kumar Samanta
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 <i>Cycas</i> , <i>Ginkgo</i> and <i>Gnetum</i> . Economic significance.	Dr. Sayani Biswas
Unit 9: Angiosperms	Gross morphology and reproduction, Concept of natural, artificial and phylogenetic system of classification.	Dr. Jiban Kumar Pal

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4.	To study <i>Mucor</i> , <i>Saccharomyces</i> , <i>Ascobolus</i> , <i>Agaricus</i> and <i>Fusarium</i> from permanent slides, dry preserved specimens or museum specimen. Lichens from dry or preserved specimens.	Mr. Sujit Pal
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7.	To study the vegetative and reproductive morphology of <i>Cycas</i> , <i>Ginkgo</i> and <i>Gnetum</i> from permanent slides	Subir Samanta
8.	To study morphology of angiosperm leaf, stem, flower, inflorescence and fruits from locally available plant species (Both monocot and dicot).	Dr. Manjusha Sarkar
9	Temporary anatomical slide preparation of <i>Pteris</i> leaflet and <i>Cycas</i> leaflet.	Dr. Jiban Kumar Pal & Mr. Sujit Pal

LESSON PLAN
SUBJECT: BOTANY (Theory)
SEMESTER- 1, PAPER: BOTN1051, SEC – BIOFERTILIZER

Unit	TOPIC	Teacher
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	Dr. SK Aftabul Alam
Unit 2: Microinnoculants	Micro inoculants: Study of important microbial inoculants: Rhizobium, <i>Azospirillum</i> , <i>Azotobacter</i> and PGPR. <i>Actinorhizae</i> ; Characteristics, and crop response.	Dr. Jiban Kumar Pal
Unit 3: Role of Cyanobacteria	Role of Cyanobacteria: Cyanobacteria (blue-green algae) in Agriculture: Cyanobacteria in rice cultivation; <i>Azolla</i> and <i>Anabaena</i> association, nitrogen fixation, and factors affecting growth	Dr. Sayani Biswas
Unit 4: Mycorrhizal association	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)	Dr. Jiban Kumar Pal
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.	Dr. Jiban Kumar Pal