39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

DEPARTMENT OF BOTANY LESSON PLAN

Subject: B. Sc. (3-year MDC)/ B.Sc. (4-year Minor) Name of the Paper: Plant Diversity (Theory) Paper Code: BOT-MD-CC1-1-Th Class: Semester I Academic Year: 2023- 24 Total marks 75; Credits 3, Class 45 hours

Teacher: Mrs. Mahasweta Das Banerjee (MD) Guest 1 (G1) Guest 2 (G2)

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
Unit I	Introduction to	1.1 Origin of life and evolution of plant cells,	1	MD
	plant kingdom.	1.2 Importance of plants as source of food, fuel and their role in ecosystem services (as carbon sink, sequestering etc.)	2	MD
Unit II		2.1. Salient features of Cyanophyceae, Chlorophyceae, Charophyceae, Phaeophyceae, Rhodophyceae and Bacillariophyceae	3	G1
	Algae	2.2 Criteria and system of classification (Fritsch, 1935)	1	G1
		2.3. Economic importance of algae in environment, agriculture, biotechnology and industry.	2	G1
Unit III		3.1 Salient features of Myxomycota, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina.	2	G2
	Funci	3.2 System of classification up to Sub-division (Ainsworth, 1973),	1	G2
	Fungi	3.3 Economic importance of fungi (food, medicine and agriculture),	1	G2
		3.4 Fungal symbioses: Mycorrhiza, Lichen and their importance.	2	G2
Unit IV	Bryophytes	4.1 Salient features of Hepaticopsida, Anthocerotopsida and Bryopsida,	3	G2

		4.2. System of classification up to Class (Proskauer 1957),	1	G2
		4.3 Amphibian nature of bryophytes	1	G2
		4.4 Economic and ecological importance.	1	G2
		5.1 Salient features of Psilophyta, Lycophyta, Sphenophyta and Filicophyta	3	G2
Unit V	Pteridophytes	5.2 System of classification up to Division (Gifford & Foster 1989),	1	G2
		5.3 Economic importance (food, medicine & agriculture).	2	G2
		6.1 Salient features of Cycadophyta, Coniferophyta and Gnetophyta,	3	G1
Unit VI	Gymnosperms	6.2 Outline classification up to Division: Progymnospermophyta to Gnetophyta (Gifford & Foster 1989),	1	G1
		6.3 Economic importance (wood, resin, essential oil & drugs).	2	G1
		7.1 Types and morphology of leaf, stem and root,	2	G1
Unit VII		7.2 Inflorescence types with examples,	3	G1
	Angiosperms	7.3 Flower: Different parts and forms of calyx, corolla, androecium and gynoecium; aestivation and placentation,	5	G1
		7.4 Types with examples-fruits and seeds.	2	G1
Total Class:			45	5

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39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

Subject: B. Sc. (3-year MDC)/ B.Sc. (4-year) Name of the Paper: Plant Diversity (Theory) Paper Code: BOT-IDC-Th Class: Semester I, III Academic Year: 2023- 24 Total marks 50; Credits 2, Class 30 hours Teacher: Guest 1 (G1)

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
		1.1 Introduction to plant groups: Algae, Bryophytes, Pteridophytes, Gymnosperms, Angiosperms (Monocot and Dicot);	2	G1
Unit I	Introduction	1.2 Fungi -general characters;	1	G1
		1.3. Contributions of Theophrastus, Charak, Sushruta, Linnaeus, Mendel and J.C. Bose.	2	G1
	Plant Body	2.1- Plant cell and tissue;	1	G1
Unit II	T faile Doug	2.2 Morphology of root, stem, leaf, flower, fruit and seed	4	G1
		3.1 Phytodiversity and conservation;	1	G1
	Plants and	3.2 Biodiversity hotspots of India;	1	G1
Unit III	ecosystem:	3.3 Forest types in India;	1	G1
		3.4 Plant-based adaptations to climate change;	1	G1
		3.5 Concept of 'Carbon footprint'- role of plants in reducing carbon footprint.	1	G1
Unit IV	Plants and society:	 4.1 Plants in day-to-day life (brief general information including uses)- major cereals (rice, wheat and maize); 4.2 pulses (mung and pea); 4.3 Oil (mustard and coconut); 4.4 Sugar (sugarcane and beet root); 4.5 Vegetables (potato, brinjal, ladies finger and spinach); 4.6 Fruits (apple, banana, guava, mango and jackfruit); 4.7 Beverages (tea, coffee, beer and wine); 4.8 Plants as timber (sal and teak); 4.9 Non-timber- energy (fossil and non-fossil), resin, honey and essential oil (lavender and citronella oil); 4.10 Fiber (jute and cotton); 4.11 Ornamental plants (rose, marigold, tuberose, gulmohar, jarul, kalanchoe); 	8	Gl
		4.12 Importance of bacteria (<i>Lactobocillus, E. coli</i> and <i>Rhizobium</i>) and Fungi (<i>Phytophthora, Agaricus</i> and	2	G1

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		Penicillium		
Unit V	Plants and human health:	5.1 Important medicinal plants and their uses- basak (Justicia adhathoda), ghritakumari (Aloe vera), cinchona (Cinchona officinalis, neem (Azadirachta indica), kalmegh (Andrographis paniculata) pudina (Mentha arvensis), tulsi (Ocimum sanctum), sarpagandha (Rauvolfia serpentina);	4	G1
		5.2 Plant-derived medicinal compounds and uses (Quinine, Reserpine, Vincristine, Curcumin, Gingerol)	1	G1
Total Class:			3	0

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39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

Subject: B. Sc. (3-year MDC)/ B.Sc. (4-year Minor) Name of the Paper: Plant Systematics (Theory) Paper Code: BOT-MD-CC2-2-Th Class: Semester II Academic Year: 2023- 24 Total marks 75; Credits 3, Class 45 hours

Teachers:Dr. Priyanka Khanduri (PK)Mrs. Mahasweta Das Banerjee (MD)

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
Unit I		1.1 Components of Systematics: Nomenclature, Identification, Classification;	1	MD
	Introduction	1.2. Taxonomy and its phases Pioneer, Consolidation, Biosystematic and Encyclopaedic; alpha- and omega- taxonomy	3	MD
		1.3 Nomenclature: Type method, Publication, Rank of taxa, Rules of priority, Retention and rejection of names, Author Citation, Effective and valid publication, Elementary knowledge of ICN- Principles	6	MD
		2.1 Broad outline of Bentham & Hooker (1862- 1883) and Takhtajan (1997)- systems of classification with merits and demerits. Brief idea of angiosperm phylogeny group (APG IV classification),	4	РК
		2.2 Systematics in Practice: Herbaria and Botanic Gardens – their role in teaching and research;	2	РК
Unit II	Systems of classification	2.3. Dichotomous keys – indented and bracketed;	4	РК
		2.4 Brief idea on Phenetics and cladistics: Monophyletic, polyphyletic and paraphyletic groups; Plesiomorphy and apomorphy;	3	РК
		2.5 Numerical taxonomy methods and significance;	3	РК
		2.6 Data sources in Taxonomy: Supportive evidences from Phytochemistry, Cytology, Palynology and Molecular biology data (Protein and Nucleic acid homology).	4	РК

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Unit III	Systematic study of	Diagnostic features, systematic position (Bentham & Hooker) and economically important plants (parts used and uses) of the following families: 3.1. Monocotyledons: Alismataceae, Gramineae (Poaceae), Cyperaceae, Palmae (Arecaceae), Liliaceae, Musaceae, Zingiberaceae, Cannaceae, Orchidaceae.	6	MD
	taxa:	3.2. Dicotyledons: Nymphaeaceae, Magnoliaceae, Ranunculaceae, Leguminosae (subfamilies), Euphorbiaceae, Malvaceae, Umbelliferae (Apiaceae), Labiatae (Lamiaceae), Cruciferae (Brassicaceae), Solanaceae, Scrophulariaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Compositae (Asteraceae).	9	РК
Total Cla	Total Class:			

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Signature of Head of the Department

39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

Subject: B. Sc. (3-year MDC)/ B.Sc. (4-year Minor) Name of the Paper: Plant Diversity (Theory) Paper Code: BOT-MD-MN1-Th/ BOT-MN1-1-Th Class: Semester I, III Academic Year: 2024- 25 Total marks 75; Credits 3, Class 45 hours

Teacher: Dr. Priyanka Khanduri (PK)

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
	Introduction to	1.1 Origin of life and evolution of plant cells,	1	РК
Unit I	plant kingdom.	1.2 Importance of plants as source of food, fuel and their role in ecosystem services (as carbon sink, sequestering etc.)	2	РК
Unit II		2.1. Salient features of Cyanophyceae, Chlorophyceae, Charophyceae, Phaeophyceae, Rhodophyceae and Bacillariophyceae	3	РК
	Algae	2.2 Criteria and system of classification (Fritsch, 1935)	No. of PeriodsTeacher1PK2PK3PK1PK2PK1PK1PK1PK1PK3PK3PK1PK3PK1PK	РК
		2.3. Economic importance of algae in environment, agriculture, biotechnology and industry.	2	РК
		3.1 Salient features of Myxomycota, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina.	2	РК
Unit III	Funci	3.2 System of classification up to Sub-division (Ainsworth, 1973),	1	РК РК
Onthi	rungi	3.3 Economic importance of fungi (food, medicine and agriculture),	1	РК
		3.4 Fungal symbioses: Mycorrhiza, Lichen and their importance.	2	РК
		4.1 Salient features of Hepaticopsida, Anthocerotopsida and Bryopsida,	3	РК
Unit IV	Bryophytes	4.2. System of classification up to Class (Proskauer 1957),	1	РК
		4.3 Amphibian nature of bryophytes	1	PK

		4.4 Economic and ecological importance.	1	РК
Unit V		5.1 Salient features of Psilophyta, Lycophyta, Sphenophyta and Filicophyta	3	РК
	Unit V Pteridophytes	5.2 System of classification up to Division (Gifford & Foster 1989),	1	РК
		5.3 Economic importance (food, medicine & agriculture).	2	РК
		6.1 Salient features of Cycadophyta, Coniferophyta and Gnetophyta,	3	РК
Unit VI	Gymnosperms	6.2 Outline classification up to Division: Progymnospermophyta to Gnetophyta (Gifford & Foster 1989),	1	РК
		6.3 Economic importance (wood, resin, essential oil & drugs).	2	РК
		7.1 Types and morphology of leaf, stem and root,	2	РК
		7.2 Inflorescence types with examples,	3	РК
Unit VII	Angiosperms	7.3 Flower: Different parts and forms of calyx, corolla, androecium and gynoecium; aestivation and placentation,	5	РК
		7.4 Types with examples-fruits and seeds.	2	РК
Total Class:			45	5

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39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

Subject: B. Sc. (3-year MDC)/ B.Sc. (4-year Minor) Name of the Paper: Plant Diversity (Theory) Paper Code: BOT-IDC-Th Class: Semester I, III Academic Year: 2024- 25 Total marks 50; Credits 2, Class 30 hours Teacher: Dr. Priyanka Khanduri (PK) Mrs. Mahasweta Das Banerjee

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
		1.1 Introduction to plant groups: Algae, Bryophytes, Pteridophytes, Gymnosperms, Angiosperms (Monocot and Dicot);	2	РК
Unit I	Introduction	1.2 Fungi -general characters;	1	РК
		1.3. Contributions of Theophrastus, Charak, Sushruta, Linnaeus, Mendel and J.C. Bose.	2	РК
	Plant Body	2.1- Plant cell and tissue;	1	РК
Unit II	Thin Dody	2.2 Morphology of root, stem, leaf, flower, fruit and seed	4	РК
		3.1 Phytodiversity and conservation;	1 MD	MD
	Plants and	3.2 Biodiversity hotspots of India;	1	MD
Unit III	ecosystem:	3.3 Forest types in India;	1	MD
		3.4 Plant-based adaptations to climate change;	1	MD
		3.5 Concept of 'Carbon footprint'- role of plants in reducing carbon footprint.	1	MD
Unit IV	Plants and society:	 4.1 Plants in day-to-day life (brief general information including uses)- major cereals (rice, wheat and maize); 4.2 pulses (mung and pea); 4.3 Oil (mustard and coconut); 4.4 Sugar (sugarcane and beet root); 4.5 Vegetables (potato, brinjal, ladies finger and spinach); 4.6 Fruits (apple, banana, guava, mango and jackfruit); 4.7 Beverages (tea, coffee, beer and wine); 4.8 Plants as timber (sal and teak); 4.9 Non-timber- energy (fossil and non-fossil), resin, honey and essential oil (lavender and citronella oil); 4.10 Fiber (jute and cotton); 4.11 Ornamental plants (rose, marigold, tuberose, gulmohar, jarul, kalanchoe); 	8	РК
		4.12 Importance of bacteria (<i>Lactobocillus, E. coli</i> and <i>Rhizobium</i>) and Fungi (<i>Phytophthora, Agaricus</i> and	2	РК

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		Penicillium		
Unit V	Plants and human health:	5.1 Important medicinal plants and their uses- basak (Justicia adhathoda), ghritakumari (Aloe vera), cinchona (Cinchona officinalis, neem (Azadirachta indica), kalmegh (Andrographis paniculata) pudina (Mentha arvensis), tulsi (Ocimum sanctum), sarpagandha (Rauvolfia serpentina);	4	MD
		5.2 Plant-derived medicinal compounds and uses (Quinine, Reserpine, Vincristine, Curcumin, Gingerol)	1	MD
Total Class:		3	30	

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Signature of Head of the Department

39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

Subject: B. Sc. (3-year MDC)/ B.Sc. (4-year Minor) Name of the Paper: Plant Diversity (Theory) Paper Code: BOT-MD-CC1-1-Th Class: Semester I Academic Year: 2024- 25 Total marks 75; Credits 3, Class 45 hours

Teacher: Dr. Priyanka Khanduri (PK)

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
Unit I	Introduction to	1.1 Origin of life and evolution of plant cells,	1	РК
	plant kingdom.	1.2 Importance of plants as source of food, fuel and their role in ecosystem services (as carbon sink, sequestering etc.)	2	РК
Unit II		2.1. Salient features of Cyanophyceae, Chlorophyceae, Charophyceae, Phaeophyceae, Rhodophyceae and Bacillariophyceae	3	Teacher 1 PK 2 PK 3 PK 1 PK 2 PK 3 PK 1 PK 2 PK 1 PK 2 PK 3 PK 3 PK 3 PK 3 PK 3 PK 3 PK 1 PK 3 PK 1 PK 3 PK 1 PK 1 PK 1 PK 1 PK 1 PK
	Algae	2.2 Criteria and system of classification (Fritsch, 1935)	1	PK
		2.3. Economic importance of algae in environment, agriculture, biotechnology and industry.	2	РК
		3.1 Salient features of Myxomycota, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina.	2	РК
Unit III	Fungi	3.2 System of classification up to Sub-division (Ainsworth, 1973),	1 PK 1 PK 2 PK	РК
Olint III	i ungi	3.3 Economic importance of fungi (food, medicine and agriculture),		РК
		3.4 Fungal symbioses: Mycorrhiza, Lichen and their importance.		РК
		4.1 Salient features of Hepaticopsida, Anthocerotopsida and Bryopsida,	3	РК
Unit IV	Bryophytes	4.2. System of classification up to Class (Proskauer 1957),	1	РК
		4.3 Amphibian nature of bryophytes	1	РК
		4.4 Economic and ecological importance.	1	РК
Unit V	Pteridophytes	5.1 Salient features of Psilophyta, Lycophyta, Sphenophyta and Filicophyta	3	РК

		5.2 System of classification up to Division (Gifford & Foster 1989),	1	РК
		5.3 Economic importance (food, medicine & agriculture).	2	РК
		6.1 Salient features of Cycadophyta, Coniferophyta and Gnetophyta,	3	РК
Unit VI	Gymnosperms	6.2 Outline classification up to Division: Progymnospermophyta to Gnetophyta (Gifford & Foster 1989),	1	РК
		6.3 Economic importance (wood, resin, essential oil & drugs).	2	РК
		7.1 Types and morphology of leaf, stem and root,	2	РК
		7.2 Inflorescence types with examples,	3	РК
Unit VII	Angiosperms 7.3 Flo corolla and pl	7.3 Flower: Different parts and forms of calyx, corolla, androecium and gynoecium; aestivation and placentation,	5	РК
		7.4 Types with examples-fruits and seeds.	2	РК
Total Class:			45	5

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Signature of Head of the Department

Subject: B. Sc. (3-year MDC)

39, Sankar Ghosh Lane & 8A, Shibnarayan Das Lane, Kolkata-700006

Name of the Paper: Mushroom Cultivation Technology (Theory) Paper Code: BOT-MD-SEC-1-Th Class: Semester I, Semester III Academic Year: 2024- 25 Total marks 75; Credits 3, Class 45 hours

Teacher:Dr. Priyanka Khanduri (PK)Mrs. Mahasweta Das Banerjee (MD)

Unit No.	Main Topic	Sub Topics	No. of Periods	Teacher
	Introduction	1.1 Introduction, History of mushroom cultivation	1	MD
Unit I		1.2 Current overview of mushroom production in the world	2	MD
		1.3 Mushroom biology-classification of mushrooms, edible mushrooms in India, poisonous mushrooms, mushroom poisoning.	3	MD
Unit II	Infrastructure	2.1 Infrastructure-structural design and layout of mushroom farm, substrates (locally available),	3	РК
		2.2 Appliances- weighing balance, autoclave, laminar air flow, incubator, hot air oven, spirit lamp, Bunsen burner, pH meter, laboratory heater, low- cost stoves, water bath, humidifier, water sprayer, vessels, inoculation hook and inoculation loop, sieves, culture racks, tray, polythene bags,	4	РК
		2.3 Methods of sterilization.	2	РК
Unit III	Cultivation	3.1 Cultivation technology-overview of cultivation strategies, composting technology in mushroom production, mushroom bed preparation, culture media, pure culture, maintenance and preservation of pure culture	5	PK
		3.2 Production of spawn- cultivation of oyster mushroom, paddy-straw mushroom, milky mushroom and white button mushroom,	3	РК
		3.3 Cultivation of medicinal mushroom (<i>Cordyceps</i> and <i>Ganoderma</i>).	4	РК
Unit IV	Post harvest management	4.1 Mushroom diseases and management strategies,	3	MD

	4.2 post-harvest technology-short-term storage (Refrigeration- up to 24 hours), long-term storage (canning, pickles, papads etc.), drying, storage in salt solutions,	4	MD	
	4.3 Food preparations from mushrooms.	2	MD	
	5.1 Uses of spent mushroom substrate,	2	MD	
	5.2 Strain improvements in cultivated mushroom; Nutritional and medicinal value of edible mushrooms,	2	MD	
Unit V	5.3 Research centres- National level and regional level,	1	MD	
	5.4 Cost-benefit ratio,	1	MD	
	5.5 Mushroom based Industry	1	MD	
	5.6 Mushroom market in India and abroad.	2	MD	
Total Class:			45	

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