

**Department of Botany**

**Shyampur Siddheswari Mahavidyalaya**

**Lesson plan for undergraduate General Course**

<b>Dr. Satarupa Dey</b>				
<b>Class</b>	<b>Semester</b>	<b>Topics to be covered</b>	<b>No of lectures</b>	<b>Examination</b>
B.Sc. General (CBCS Syllabus, 2018)	Semester 1 CC 1/ GE 1: Theory	PLANT DIVERSITY I (BOT-G-CC-1-1-TH) <b>1. Introduction to different plant groups</b>	2	Class test, Internal examination University semester examination
		<b>2. Phycology:</b> 2.1. Diagnostic characters and examples of Cyanophyceae, Rhodophyceae, Chlorophyceae, Charophyceae and Phaeophyceae	3	
		2.2 Classification: Criteria and system of Fritsch	1	
		2.3. Life histories of <i>Chlamydomonas</i>	2	
		2.3. Life histories of <i>Chara</i>	3	
		2.3. Life histories of <i>Ectocarpus</i>	3	
		2.4. Role of algae in the environment, agriculture, biotechnology and industry.	2	
	Semester 1 CC 1/ GE 1: Theory	<b>Mycology:</b> 3.1 Diagnostic characters and examples of Oomycotina, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina (Ainsworth, 1973).	3	
		3.2 Life histories of <i>Rhizopus</i>	2	
		3.2 Life histories of <i>Ascobolus</i>	3	
		3.3. Economic importance of fungi	3	

		3.4 Fungal symbioses: Mycorrhiza and their importance.	2	
		3.4 Fungal symbioses: Lichen and their importance.	2	
	Semester 1 CC 1/ GE 1: Practical	PRACTICAL- PLANT DIVERSITY I (BOT-G-CC-1-1-P) 1. Work out: Microscopic preparation, drawing and labelling of <i>Chlamydomonas</i> , <i>Chara</i> , <i>Ectocarpus</i>	4	University semester examination
		Work out: Microscopic preparation, drawing and labelling of <i>Rhizopus</i> and <i>Ascobolus</i>	3	
		3. Identification with reasons: 3a. Cryptogamic specimens (macroscopic/microscopic as prescribed in the theoretical syllabus.	2	
	Semester 2 CC 2/ GE 2: Theory	PLANT DIVERSITY II (BOT-G-CC-2-2-TH) <b>2. Gymnosperms</b> 2.1 Progymnosperms (brief idea)	2	Class test, Internal examination University semester examination
		2.2 Diagnostic characters and examples of Cycadophyta, Coniferophyta and Gnetophyta (Gifford & Foster 1989),	2	
		2.3 Life histories of <i>Cycas</i>	3	
		Life histories of <i>Pinus</i>	3	
		2.4 <i>Williamsonia</i> (reconstructed)	2	
		2.5 Economic importance of Gymnosperms.	1	
		3. <b>Paleobotany &amp; Palynology</b> 3.1 Fossil, fossilization process and factors of fossilization	4	
		3.2 Importance of fossil study.	1	
		3.3 Geological time scale	1	
		3.4 Palynology - Definition, spore & pollen (brief idea), Applications.	3	

	Semester 2 CC 2/ GE 2: Practical	PRACTICAL- PLANT DIVERSITY II (BOT-G-CC-2-2-P) 2. Identification with reasons: male and female strobilus of <i>Cycas</i> and <i>Pinus</i>	2	University semester examination
	Semester 3 CC 3/ GE 3: Theory	CELL BIOLOGY, GENETICS AND MICROBIOLOGY (BOT-G-CC-3-3-TH)  <b>3. Central Dogma,</b> 3.1 Transcription	6	Class test, Internal exam University semester examination
		3.1 Translation.	4	
		4. Genetic Code-properties.	3	
		5. <b>Linkage</b> group and Genetic map (three-point test cross).	4	
		6. <b>Mutation</b> – 6.1 Point mutation (tautomerisation; transition, transversion and frame shift), 6.2 Mutagen-physical and chemical.	6	
		7. Brief concept of Split gene, Transposons.	2	
	Semester 3 CC 3/ GE 3: Practical	PRACTICAL- (BOT-G-CC-3-3-P) 2. Microbiology: Workout gram staining (curd/any natural source)	2	University semester examination
		3. Identification with reasons: Different forms of bacteria (Coccus, Bacillus, Spiral)	1	
	Semester 4 CC 4/ GE 4: Theory	<b>PLANT PHYSIOLOGY AND METABOLISM (BOT-G-CC-4-4-TH)</b> <b>4. Photosynthesis</b> 4.1 Pigments, Action spectra and Enhancement effect, 4.2 Electron transport system and Photophosphorylation, 4.3 C3 and C4 photosynthesis, CAM- Reaction and Significance.	16	Class test, Internal test, University semester examination
		<b>5. Respiration</b> 5.1 Glycolysis & Krebs cycle— Reactions and Significance, 5.2 ETS and oxidative	10	

		phosphorylation.		
		<b>6. Nitrogen Metabolism.</b> 6.1. Biological Di-nitrogen fixation.	4	
		<b>6.2. Amino acid synthesis (Reductive Animation &amp; Transformation</b>	2	
		<b>7. Plant Growth regulators</b> 7.1 Physiological roles of Auxin, Gibberellin, Cytokinin, Ethylene, ABA.	12	
	Semester 4 CC 4/ GE 4: Practical	<b>Plant Physiology:</b> i) Experiment on Plasmolysis.	2	University semester examination
		iii) Imbibition of water by dry seeds - proteinaceous and fatty seeds.	2	
		iv) Evolution of O <sub>2</sub> during photosynthesis (using graduated tube).	2	
		v) Evolution of CO <sub>2</sub> during aerobic respiration and measurement of volume.	2	
	Semester 5 <b>SEC A</b>	<b>PLANT BREEDING AND BIOMETRY (BOT-G-SEC-A-3/5-1)</b> <b>1. Plant breeding:</b> 1.1 Introduction and objective, 1.2 Techniques of hybridisation	2	Class test, Internal exam University semester examination
		<b>2. Mass and Pure line selection:</b> 2.1 Procedure, 2.2 Advantages and limitations.	8	
		3. Heterosis and hybrid seed production.	4	
		4. Role of mutation, polyploidy, distant hybridization and role of biotechnology in crop improvement.	8	
		<b>5. Biometry:</b> 5.1 Measures of central tendency (Mean, Median and Mode), 5.2 Standard error and standard	12	

		deviation, 5.3 Test of significance: Chi-square test for goodness of fit.		
	Semester 5 DSE AI	<b>PRACTICAL- PHYTOCHEMISTRY AND MEDICINAL BOTANY (BOT-G- DSE-A-5-1-P)</b> 3. Qualitative test for proteins and carbohydrates, reducing and non reducing sugar (glucose, fructose and sucrose)	2	University semester examination
		4. Tests (chemical) for tannin and alkaloid	2	
	Semester 6 <b>SEC B</b>	<b>MUSHROOM CULTURE TECHNOLOGY (BOT- G-SEC-D-4/6-4)</b> 1. Mushroom- nutritional and medicinal value of mushrooms. Poisonous mushrooms	4	Class test, Internal exam University semester examination
		3. Storage- short term and long term, storage, drying	6	

## Ms Sathi Seth

Class	Semester	Topics to be covered	No of lectures	Examination
B.Sc. General (CBCS Syllabus, 2018)	Semester 1 CC 1/ GE 1: Theory	PLANT DIVERSITY I (BOT-G-CC-1-1-TH)  <b>4. PHYTOPATHOLOGY</b>  4.1. Symptoms- Necrotic, Hypoplastic, Hyperplastic	2	Class test, Internal examination University semester examination
		4.2. Koch's Postulates, Biotroph, Necrotroph	1	
		4.3. Disease Triangle, Pathotoxin, Phytoalexin	1	
		4.4. Symptoms, causal organism, disease cycle and control measures of plant disease- Late Blight Of Potato	1	
		4.5. Symptoms, causal organism, disease cycle and control measures of plant disease- Late Blight Of Potato	1	
		4.6. Symptoms, causal organism, disease cycle and control measures of plant disease- Stem Rot of Jute	1	
	Semester 1 CC 1/ GE 1: Theory	<b>5. BRYOPHYTE</b> 5.1.Unifying Features of Archaeogniates and transiton to land plants, Amphibian nature of Bryophytes	1	
		5.2. Diagnostic character and examples of Hepaticopsida, Anthocerotopsida and Bryopsida( Proskauer-1957)	1	
		5.3. Life histories of <i>Marchantia</i>	2	
		5.4 Life histories of <i>Funaria</i>	2	
		5.5.Ecological and Economical importance	2	
	Semester 1 CC 1/ GE 1: Practical	3b. Pathological specimens (Herbarium Sheets) of Late Blight of Potato, Brown Spot of Rice and Stem rot of Jute	2	University semester examination

	Semester 2 CC 2/ GE 2: Theory	PLANT DIVERSITY II (BOT-G-CC-2-2-TH)  <b>4. Angiosperm Morphology</b>  4.1 Inflorescence types with examples	4	Class test, Internal examination University semester examination
		4.2 Flowers	3	
		4.3 Fruits and types and example	3	
		4.4 Seeds- types and example	1	
		<b>5. TAXONOMY OF ANGIOSPERMS</b> 5.1. Artificia, Natural, and Phylogenetic system of Classification with one example each	7	
		5.2. Diagnostic Features of Following Families- Malvaceae, Leguminosae, Cucurbitaceae, Rubiaceae, Asteraceae, Solanaceae, Acanthaceae, Lamiaceae, Orchidaceae, Poaceae	7	
	Semester 2 CC 2/ GE 2: Practical	PRACTICAL- PLANT DIVERSITY II (BOT-G-CC-2-2-P) 1. Dissect, Drawing and labelling, Description of Angiospermic Plants and floral Parts, floral formula, floral diagram ,identification (family) from the following families: Leguminosae, Malvaceae, Solanaceae, Labiate, Acanthaceae	12	University semester examination
		3. Spot identification of the Angiospermic plant	5	
	Semester 3 CC 3/ GE 3: Theory	CELL BIOLOGY, GENETICS AND MICROBIOLOGY (BOT-G-CC-3-3-TH) <b>2. MICROBES</b> 2.1.1 Viruses- Discovery, General Structure, Replication( General account)	2	Class test, Internal exam University semester examination

		2.1.2. DNA Virus (T-Phage); RNA Virus (TMV)	1	
		2.1.3. Lytic and Lysogenic Cycle	2	
		2.1.4. Economic Importance	1	
		2.2.1. Bacteria-Discovery, General Characteristics, and Cell Structure	2	
		2.2.2. Reproduction - Vegetative, Asexual, Recombination (Conjugation)	4	
		2.2.3. Transformation and Transduction	3	
		2.2.4. Economic Importance	1	
	Semester 4 CC 4/ GE 4: Theory	<b>PLANT PHYSIOLOGY AND METABOLISM (BOT-G-CC-4-4-TH)</b>  <b>1. PROTEINS</b>  1.1.Primary, Secondary, and Tertiary Structure	2	Class test, Internal test, University semester examination
		1.2. Nucleic Acid- DNA structure	1	
		1.2. RNA- Types	3	
		1.3..1 Enzymes Classifications with examples( IUBMB)	1	
		1.3.2. Enzyme-Mechanism of Action	2	
	Semester 4 CC 4/ GE 4: Practical	<b>Plant Physiology:</b> i. Measurement of leaf area ( graphical method) and determination of transpiration rate per unit area by weighing method	1	University semester examination
	Semester 5 <b>DSE A</b>	<b>PHYTOCHEMISTRY AND MEDICINAL BOTANY</b>  <b>3. Organoleptic evaluation of Crude Drugs</b>	1	Class test, Internal test, University semester examination



		<b>4. PHARMACOLOGICALLY ACTIVE CONSTITUENTS</b> Source Plants, parts used and uses of- 4.1 Steroids( Diosgenin, Digitoxin)	1	
		4.2 Tanin( Catechin).	1	
		4.3. Resins(Gingerol, Curcumnoids)	1	
		4.4 Alkaloids(Strychnine, Reserpine, Vinblastine)	1	
		4.5 Phenols(Capsaicin)	1	
		<b>5. ETHNOBOTANY AND FOLK MEDICINES</b> 5.1 Brief idea	1	
		5.2 Application of Ethnobotany	1	
		5.3. Application of natural product to certain disease- Jaundice, Cardiac and Diabetics	3	
	Semester 5 <b>DSE A Practical</b>	<b>PHYTOCHEMISTRY AND MEDICINAL BOTANY</b>  5. Identification of Medicinal plants	7	University semester examination
	Semester 6 <b>SEC B</b>	<b>SKILL ENHANCEMENT COURSES (BOT-G-SEC-B-4/6-3)</b> <b>MUSHROOM CULTURE TECHNOLOG(SEC-B)</b>  1. Mushroom-Nutritional and Medicinal value of Mushroom	2	Class test, Internal test, University semester examination
		<b>1.1. Poisonous mushroom</b>	1	
		2. Cultivation technique /technology of edible mushroom in India: <i>Volvarealla volvacea</i>	1	
		2. Cultivation technique /technology of edible mushroom in India: <i>Pleuretus citrinopyrineatus</i>	1	

		2. Cultivation technique /technology of edible mushroom in India: <i>Agaricus bisporus</i>	1	
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## Ms. Rituparna Roy Chowdhury

Class	Semester	Topics to be covered	No of lectures	Examination
B.Sc. General (CBCS Syllabus, 2018)	Semester 1 CC 1/ GE 1: Theory	<b>Core Course – 1</b> <b>Plant Diversity</b> <b>(Phycology, Mycology</b> <b>phytopathology,</b> <b>Bryophytes and</b> <b>Anatomy)</b> (BOT-G-CC-1-1-TH)		University Exam of Semester -I
		6. Anatomy 6.1. Stomata: Types (Metcalfe & Chalk)	2	
		6.2. Anatomy of root, stem and leaf of monocots and dicots.	6	
		6.3. Stele types and evolution	2	
		6.4. Secondary growth normal dicot stem and anomaly in stem of <i>Tecoma</i> and <i>Dracaena</i>	4	
	Semester 1 CC 1 / GE 1: Practical	Anatomical Slides (Following double staining method) of: A. Stem-Cucurbita, Sunflower and Maize. B. Root- Colocassia, Gram and Orchid. C. Leaf- Nerium.	7	University Exam of Semester -I
	Semester 2 CC 2/ GE 2: Theory	<b>PLANT DIVERSITY</b> <b>II(BOT-G-CC-2-2-TH)</b> <b>1. Pteridophytes</b> 1.1. Diagnostic characters and examples of Psilophyta, Lycophyta, Spenophyta and Fillicophyta (Gifford& Foster 1989)	8	University Exam of Semester -2
		1.2. Life histories of <i>Selaginella</i> and <i>Pteris</i> .	2	
		1.3.Economic Importance	1	

	Semester 2 CC 2/ GE 2: Practical	Plant Diversity -II Pteridophyte and Morphology. BOT-G- CC-2-2-P. 1. Macroscopic specimens of Selaginella and Pteris. 2. Anatomical Slides Identification- Stellar types, Transfusion Tissue, Sieve tube, Sunken Stomata, Lenticels	2	University Exam of Semester-2
	Semester 3 CC 3/ GE 3: Theory	<b>CELL BIOLOGY, GENETICS AND MICROBIOLOGY (BOT-G-CC-3-3-TH)</b> 1. Cell Biology and Genetics 1.1. Ultrastructure of nuclear envelop. Nucleolus and their functions.	4	University Exam of Semester -3
		1.2. Molecular organization of Metaphase Chromosome (Nucleosome Concept)	2	
		2. Chromosomal Aberrations. 2.1. Deletion, Duplication, Inversion and Translocation	2	
		2.2. Aneuploidy and Polyploidy- Types, Importance, and Role in Evolutions.	4	

	Semesters 3 CC3/GE3: Practical	Cell Biology, Genetics and Microbiology. BOT- G-CC-3-3-P. 1. Cell Biology- Staining (Aceto- orcein) and Squash preparation of Onion Root Tips: Study of mitotic stages. 2. Determination of Mitotic Index from Onion root tips.	6	University Exam of Semester-3
	Semester 4 CC 4/ GE 4: Theory	<b>PLANT PHYSIOLOGY AND METABOLISM (BOT- G-CC-4-4-TH)</b> 2. Transport in Plants. 2.1. Ascent of sap and xylem cavitation.	2	University Exam of Semester -4
		2.2. Phloem transport and source- sink reaction.	2	
		3. Transpiration 3.1. Mechanism of stomatal movement. Significance.	2	
		8. Photoperiodism Plant types. Role of Phytochrome. G.A in Flowering. Vernalization. Senescence	4	
	Semester 5 Theory	<b>DISCIPLINE SPECIFIC ELECTIVE COURSES-A PHYTOCHEMISTRY AND MEDICINAL BOTANY</b> 1. Medicinal Botany. History, scope & importance of medicinal plants. A brief idea about indigenous medicinal science, Ayurveda, Siddha, Unani. Polyherbal Formulation.	6	University Exam of Semester -5
		3. Organoleptic Evolution of crude drugs.	2	

	Semester 5 Practical	DSE-A: Phytochemistry and Medicinal Botany. BOTG-DSE-A-5-1-P. Acquaintance with Laboratory instrument- Autoclave, Incubator, Clinical Centrifuge, Analytical Balance, PH meter. Colorimeter. Water bath, Distillation plan, Laminar air flow.	2	University Exam of Semester-5
	Semester 6. Theory	<b>DISCIPLINE SPECIFIC ELECTIVE COURSES – B HORTICULTURAL PRACTICES AND POST HARVEST. (BOT-G-DSE-B-6-4- TH</b> 1. Horticulture Role in rural economy and employment of generation. Urban horticulture and its scope and importance.	12	University Exam of Semester -6
		2 Ornamental Plants Identification and salient features of some ornamental plants. (Rose, Marigold, Gladiolus, Gerberas, Tuberose, Carnations, Cacti and Succulents). Ornamental flowering trees (Gulmohor, Lagerstroemia, Shimul, Coral tree and Jacaranda).	12	
		3. Identifications of some Fruits and Vegetable plants Citrus, Banana, Papaya, Mango, Jackfruit, Chillies and Cucurbits. Fruits processing- Scope and Benefits.	15	

		5 Post-harvest technology.- Importance of Post-harvest technology in horticultural practices. Harvesting and handling of fruit, vegetables and cut flower. Methods of preservation and processing.		
		6.Disease Control & Management:- Field and Post-Harvest disease of common Crops. Crop Sanitation. Quarantine Practices. Identification of common disease and pest of fruits and vegetable corps.	12	
	Semester 6 Practical	Horticulture practices and post-harvest technology. BOT-G-DSE-B-6-4-P. Field trips to Garden, standing crops site, nurseries, vegetable gardens, horticulture fields and Cold storages.		University Exam of Semester-6