Semester	Paper	Unit	Topic	JULY-SEPTEMBER/ OCTOBER-DECEMBER	Faculty Name
Semester-I HONOURS	**BOT-A-CC-1-1-TH(PHYCOLOGY & MICROBIOLOGY)** **50 Marks: 4 credits**		Phycology-General account	July-August	SHAMPRIYA CHOWDHURY
			Classification	September-November	SHAMPRIYA CHOWDHURY
			Cyanobacteria	November	SHAMPRIYA CHOWDHURY
			Bacillariophyta	November	SHAMPRIYA CHOWDHURY
			Life History	November-December	SONTU BUGH
	BOT-A-CC-1-1-P(PHYCOLOGY & MICROBIOLOGY) **30 Marks: 2 credits**		Virus	September-November	SONTU BUGH
			Bacteria	November-December	SONTU BUGH
			Work out of the following algae with reproductive structure (Free hand drawing and drawing under drawing prism with magnification): Oedogonium, Chara, Ectocarpus.	September-December	SHAMPRIYA CHOWDHURY
			Study of (a) Permanent slides : Gloeotrichia, Volvox, Vaucheria, Coleochaete, Polysiphonia, Centric and Pennate diatom; (b) Macroscopic specimens: Laminaria, Sargassum.	November	SHAMPRIYA CHOWDHURY
			Preparation of bacterial media – (a) Nutrient agar and nutrient broth, (b) Preparation of slants and pouring Petri-plates	September-November	SONTU BUGH

			Sub-culturing of bacterial culture	November	SONTU BUGH
			Gram staining from bacterial culture	November-December	SONTU BUGH
			Field excursions-2	December	SONTU BUGH & SANGITA DASCHOWDHURY
			Microscopic examination of bacteria from natural habitat (curd) by simple staining.	December	SONTU BUGH
	BOT-A-CC-1-2-TH(MYCOLOGY & PHYTO-PATHOLOGY) **50 Marks: 4 credits**		Mycology-General account	July-August	SANGITA DASCHOWDHURY
			Classification of fungi	September	SANGITA DASCHOWDHURY
			Life history	November-December	SANGITA DASCHOWDHURY
			Mycorrhiza	November-December	SANGITA DASCHOWDHURY
			Lichen	December	SANGITA DASCHOWDHURY
			Phyto-pathology-Terms & Definitions	July-August	AVIK MUKHERJEE
			Host – Parasite Interaction	September	AVIK MUKHERJEE
			Plant Disease Management	November	AVIK MUKHERJEE
			Symptoms, Causal organism, Disease cycle and Control measures of: Late blight of Potato, Brown spot of rice, Black stem rust of wheat, Stem rot of jute.	November-December	AVIK MUKHERJEE

Semester	Paper	Unit	Topic	JULY-SEPTEMBER/ OCTOBER-DECEMBER	Faculty Name
	BOT-A-CC-1-2-P (MYCOLOGY & PHYTO-PATHOLOGY) **30 Marks: 2 credits**		Work out of the following fungi with reproductive structures (including microscopic measurement of Reproductive structures): Rhizopus (asexual), Ascobolus , Agaricus .	September	SONTU BUGH
			Study from permanent slides: Zygospore of Rhizopus, Conidia of Fusarium,Conidiophore of Penicillium.	September-November	SONTU BUGH
			Morphological study of Fungi (fruit body of Polyporus, Cyathus), Lichens (fruticose and foliose).	November	SONTU BUGH
			Preparation of fungal media (PDA).	November	SONTU BUGH
			Sterilization process.	November-December	SONTU BUGH
			Isolation of pathogen from diseased leaf	November-December	SONTU BUGH
			Inoculation of fruit and subculturing.	November-December	SONTU BUGH
			Identification: Pathological specimens of Brown spot of rice, Bacterial blight of rice, Loose smut of wheat, Stem rot of jute, Late blight of potato; Slides of uredial, telial, pycnial & aecial stages of Puccinia graminis.	November-December	SONTU BUGH
			Field study	December	SONTU BUGH & AVIK MUKHERJEE

Semester	Paper	Unit	Topic	JULY-SEPTEMBER/ OCTOBER-DECEMBER	Faculty Name
Semester-III HONOURS	**BOT-A-CC-3-5-TH(PALAEOBOTANY AND PALYNOLOGY) 50 Marks: 4 credits**		Geological time scale with dominant plant groups through ages	July-August	AVIK MUKHERJEE
			Plant Fossil	August-September	AVIK MUKHERJEE
			Fossil Pteridophytes	November-December	AVIK MUKHERJEE
			Fossil gymnosperms	November-December	AVIK MUKHERJEE
			Indian Gondwana System	December	AVIK MUKHERJEE
	BOT-A-CC-3-5 P(PALAEOBOTANY AND PALYNOLOGY) 30 Marks: 2 credits		Palynology	August-November	SHAMPRIYA CHOWDHURY
			Applied Palynology	November-December	SHAMPRIYA CHOWDHURY
			Morphological study: Ptilophyllum and Glossopteris leaf fossils	September	AVIK MUKHERJEE
			Study of Pollen types (colpate, porate and colporate) from permanent slides	November	AVIK MUKHERJEE
	BOT-A-CC-3-6-TH(REPRODUCTIVE BIOLOGY OF ANGIOSPERMS) 50 Marks: 4 credits		Morphology of Angiosperms: Inflorescence types with examples. Flower Induction of flowering, flower development- genetic and molecular aspects	September November November	SANGITA DASCHOWDHURY SANGITA DASCHOWDHURY SHAMPRIYA CHOWDHURY
			Embryology: Pre fertilisation changes	August	SONTU BUGH

			Fertilisation	September-November	SONTU BUGH
	BOT-A-CC-3-6-P(REPRODUCTIVE BIOLOGY OF ANGIOSPERMS) 30 Marks: 2 credits		Post-fertilization changes	November-December	SONTU BUGH
			Apomixis & Polyembryony	December	SONTU BUGH
			Inflorescence types- study from fresh/ preserved specimens	July-August	SANGITA DASCHOWDHURY
			Flowers- study of different types from fresh/ preserved specimens	August-September	SANGITA DASCHOWDHURY
			Fruits- study from different types from fresh/preserved specimens	November	SANGITA DASCHOWDHURY
			Study of ovules (permanent slides/ specimens/photo graphs)- types (anatropous, orthotropous, amphitropous and campylotropous	November	SANGITA DASCHOWDHURY
			Field study	September	SANGITA DASCHOWDHURY & AVIK MUKHERJEE
	BOT-A-CC-3-7-TH(PLANT SYSTEMATICS) 50 Marks: 4 credits		Taxonomy of Angiosperms: Introduction	July-August	SANGITA DASCHOWDHURY
			Nomenclature	August-September	SANGITA DASCHOWDHURY
			Systems of classification	September-November-December	SANGITA DASCHOWDHURY
			Phenetics and Cladistics	November	SANGITA DASCHOWDHURY
			Data sources in Taxonomy	November-December	SANGITA DASCHOWDHURY

			Diagnostic features, Systematic position (Bentham & Hooker and Cronquist), Economically important plants (parts used and uses) of the selected monocot and dicot families	November-December	SANGITA DASCHOWDHURY
	BOT-A-CC-3-7-P(PLANT SYSTEMATICS) 30 Marks: 2 credits		Work out, description, preparation of floral formula and floral diagram, identification up to genus with the help of suitable literature of wild plants and systematic position according to Benthum Hooker system of classification from the following families: Malvaceae, Fabaceae (Papilionaceae), Solanaceae, Scrophulariaceae, Acanthaceae, Labiatae (Lamiaceae), Rubiaceae.	August-September November-December	SANGITA DASCHOWDHURY
			Spot identification (Binomial, Family) of common wild plants from families included in the theoretical syllabus.	December	SANGITA DASCHOWDHURY

	BOT-A-SEC-A-3-1-TH(APPLIED PHYCOLOGY, MYCOLOGY AND MICROBIOLOGY) 80 Marks: 2 credits		Field visit Botanical Garden and two local field visit.	September-December	SANGITA DASCHOWDHURY
			Preparation of Herbarium specimen	September-December	SANGITA DASCHOWDHURY
			Applied Phycology	August-September November-December	SHAMPRIYA CHOWDHURY
			Applied Mycology	August-September November-December	SANGITA DASCHOWDHURY
			Applied Microbiology	August-September November-December	SONTU BUGH

Semester	**Paper**	**Unit**	**Topic**	**JULY-SEPTEMBER/OCTOBER-DECEMBER**	**Faculty Name**
Semester-V HONOURS	**BOT-A-CC-5-11-TH(CELL & MOLECULAR BIOLOGY)** **50 Marks: 4 credits**		Origin & Evolution of cells	July-August	SANGITA DASCHOWDHURY
			Nucleus and Chromosome	September-November	SANGITA DASCHOWDHURY
			Cell cycle and its regulation	November	SHAMPRIYA CHOWDHURY
			DNA Replication, Transcription and Translation (Prokaryotes & Eukaryotes)	August-September-November	SHAMPRIYA CHOWDHURY
			Gene Regulation	November-December	SHAMPRIYA CHOWDHURY

	BOT-A-CC-5-11-P(CELL BIOLOGY) 30 Marks: 2 credits		Genetic Code	November-December	SHAMPRIYA CHOWDHURY
			Recombinant DNA Technology	August-September-November	SONTU BUGH
			Development and causes of Cancer	August-September	SHAMPRIYA CHOWDHURY
			Study of plant cell structure with the help of epidermal peal mount of Onion/Rhoeo/Crinum	August	SONTU BUGH & SANGITA DASCHOWDHURY
			Measurement of cell size by the technique of micrometry.	August-September	SONTU BUGH & SANGITA DASCHOWDHURY
			Counting cells per unit volume with the help of haemocytometer (Yeast/pollengrains)	November	SONTU BUGH & SANGITA DASCHOWDHURY
			Cytochemical staining of DNA-Pyronine-methyl green staining	December	SONTU BUGH & SANGITA DASCHOWDHURY
			Estimation of DNA content through DPA staining.	December	SONTU BUGH & SANGITA DASCHOWDHURY
			Estimation of RNA through orcinol method	December	SONTU BUGH & SANGITA DASCHOWDHURY
			Study of nucleolus through hematoxylin/ orcin staining and determination of nucleolar frequency.	December	SONTU BUGH & SANGITA DASCHOWDHURY
			Preparation of models/ charts: rolling circle, theta replication, semi-discontinuous replication, prokaryotic RNA polymerase and	November-December	SONTU BUGH & SANGITA DASCHOWDHURY

			eukaryotic RNA polymerase II, assembly of spliceosome mechinary, splicing mechanism in group I and group II introns, ribozyme and alternative splicing.		
	BOT-A-CC-5-12-TH(BIOCHEMISTRY) **50 Marks: 4 credits**		Biochemical Foundations	July-August	SONTU BUGH
			Molecules of life	August-September, November-December	SHAMPRIYA CHOWDHURY
			Energy flow and enzymology	August-September, November-December	SONTU BUGH
			Cell membrane	November	SHAMPRIYA CHOWDHURY
			Phosphorylation	December	SHAMPRIYA CHOWDHURY
	BOT-A-CC-5-12-P(BIOCHEMISTRY) **30 Marks: 2 credits**		Detection of organic acids: citric, tartaric, oxalic and malic from laboratory samples. Detection of carbohydrate and protein from plant samples. Detection of the nature of carbohydrate – glucose, fructose, sucrose and starch from laboratory samples. Detection of Ca, Mg, Fe, S from plant ash sample	November-December November-December November-December November-December	SHAMPRIYA CHOWDHURY SHAMPRIYA CHOWDHURY SHAMPRIYA CHOWDHURY SHAMPRIYA CHOWDHURY
			Preparation of solutions and buffers Estimation of amino-nitrogen by formol	August-September August-September	SHAMPRIYA CHOWDHURY SHAMPRIYA CHOWDHURY

			titration method (glycine).		
			Estimation of glucose by Benedicts quantitative reagent	August-September	SHAMPRIYA CHOWDHURY
			Estimation of titratable acidity from lemon.	August-September	SHAMPRIYA CHOWDHURY
			Estimation of catalase activity in plant samples and effect of substrate, enzyme concentration and pH on enzyme activity.	August-September	SHAMPRIYA CHOWDHURY
			Estimation of urease activity in plant samples.	August-September	SHAMPRIYA CHOWDHURY
			Colorimetric estimation of protein by Folin phenol reagent.	August-September	SHAMPRIYA CHOWDHURY
	BOT-A-DSE-A-5-1-TH(BIOSTATISTICS) **50 Marks: 4 credits**		Biostatistics	July-August	SANGITA DASCHOWDHURY
			Biometry	August-September	SANGITA DASCHOWDHURY
			Central tendency	November	SANGITA DASCHOWDHURY
			Test of significance	August-September	SONTU BUGH
			Probability	September-November	SONTU BUGH
			Measurement of gene frequency	November-December	SONTU BUGH

	BOT-A-DSE-A-5-1-P(BIOSTATISTICS) **30 Marks: 2 credits**		Univariate analysis of statistical data: Statistical tables, mean, mode, median, standard deviation and standard error (using seedling population / leaflet size)	August-September	SANGITA DASCHOWDHURY & SONTU BUGH
			Calculation of correlation coefficient values and finding out the probability.	November-December	SANGITA DASCHOWDHURY & SONTU BUGH
			Determination of goodness of fit in Mendellian and modified mono-and dihybrid ratios (3:1, 1:1, 9:3:3:1, 1:1:1:1, 9:7, 13:3, 15:1) by Chi-square analysis and comment on the nature of inheritance.	November	SANGITA DASCHOWDHURY & SONTU BUGH
			Calculation of 'F' value and finding out the probability value for the F value	December	SANGITA DASCHOWDHURY & SONTU BUGH
			Basic idea of computer programme for statistical analysis of correlation coefficient,'t' test, standard error, standard deviation.	December	SANGITA DASCHOWDHURY & SONTU BUGH
	BOT-A-DSE-B-5-5-TH(PLANT BIOTECHNOLOGY) **50 Marks: 4 credits**		Plant tissue culture – Introduction	July-August	AVIK MUKHERJEE
			Callus Culture	August-September	AVIK MUKHERJEE
			Plant Regeneration	September	AVIK MUKHERJEE

	BOT-A-DSE-B-5-5-P(PLANT BIOTECHNOLOGY) **30 Marks: 2 credits**		Haploid Culture	November	AVIK MUKHERJEE
			Protoplast Culture	November-December	AVIK MUKHERJEE
			Plant Genetic Engineering	August-September-November-December	AVIK MUKHERJEE
			Familiarization of basic equipments in plant tissue culture	September	AVIK MUKHERJEE
			Study through photographs/ charts/ models of anther culture, somatic embyogenesis, endosperm and embryo culture, micropropagation.	November-December	AVIK MUKHERJEE
			Preparation of basal media. Sterilization techniques	November-December	AVIK MUKHERJEE
			Demonstration of any tissue culture technique during visit in a plant tissue culture lab	November-December	AVIK MUKHERJEE

Semester	**Paper**	**Unit**	**Topic**	**JULY-SEPTEMBER/ OCTOBER-DECEMBER**	**Faculty Name**
Semester-I General	**(BOT-G-CC-1-1-TH) PLANT DIVERSITY I** (PHYCOLOGY, MYCOLOGY, PHYTOPATHOLOGY, BRYOPHYTES AND ANATOMY) **50 Marks: 4 credits**		Introduction to different plant groups	July-September	Phycology
			Phycology	September-November-December	Phycology
			Mycology	November-December	SANGITA DASCHOWDHURY
			Phytopathology	September-November-December	AVIK MUKHERJEE

			Bryophytes	September-November-December	SANGITA DASCHOWDHURY
	(BOT-G-CC-1-1-P) PLANT DIVERSITY I (PHYCOLOGY, MYCOLOGY, PHYTOPATHOLOGY, BRYOPHYTES AND ANATOMY) **30 Marks: 2 credits**		Anatomy	September-November-December	SHAMPRIYA CHOWDHURY
			Work out: Microscopic preparation, drawing and labeling of Chlamydomonas, Chara, Ectocarpus, Rhizopus and Ascobolus	September-November-December	SONTU BUGH
			Anatomical studies (following double staining method) of: 2a. Stem- Cucurbita, sunflower and maize. 2b. Root- Colocassia, gram and orchid. 2c. Leaf- Nerium	November-December	SONTU BUGH
			Identification with reasons: 3a. Cryptogamic specimens (macroscopic/microscopic as prescribed in the theoretical syllabus. 3b. Pathological specimens (herbarium sheets) of Late blight of potato, Brown spot of rice and stem rot of jute.	November-December	SONTU BUGH
			Local excursion	December	SONTU BUGH, SANGITA DASCHOWDHURY
Semester-III General	**(BOT-G-CC-3-3-TH) CELL BIOLOGY,**		**Cell Biology and Genetics** 1.1 Ultrastructure of	July-August	SANGITA DASCHOWDHURY

	GENETICS AND MICROBIOLOGY 50 Marks: 4 credits		nuclear envelope, nucleolus and their functions, 1.2 Molecular organisation of metaphase chromosome (Nucleosome concept)		
			Chromosomal aberrations- 2.1 deletion, duplication, inversion & translocation, 2.2 Aneuploidy & Polyploidy-types, importance and role in evolution.	September-December	SANGITA DASCHOWDHURY
			Central Dogma, 3.1 Transcription and Translation.	August-September-November	SHAMPRIYA CHOWDHURY
			Genetic Code-properties.	November-December	SHAMPRIYA CHOWDHURY
			Linkage group and Genetic map (three-point test cross).	November-December	SHAMPRIYA CHOWDHURY
			Mutation – 6.1 Point mutation (tautomerisation; transition, transversion and frame shift), 6.2 Mutagen-physical and chemical.	November-December	SANGITA DASCHOWDHURY
			Brief concept of Split gene, Transposons.	December	SHAMPRIYA CHOWDHURY
			Microbes	August-September November-December	SONTU BUGH
	(BOT-G-CC-3-3-P) CELL BIOLOGY, GENETICS AND MICROBIOLOGY 30 Marks: 2 credits		Cell Biology: Staining (Aceto-orcein) and squash preparation of onion root tip: study of mitotic stages.	November-December	SONTU BUGH

			Determination of mitotic index (from onion root tip).		
			Microbiology: Workout gram staining (curd/any natural source	November-December	SONTU BUGH
			Identification with reasons: Cytological slides of different mitotic and meiotic stages. Different forms of bacteria (Coccus, Bacillus, Spiral)	November-December	SONTU BUGH

Semester-V General	**(BOT-G-SEC-A-5-1 PLANT BREEDING AND BIOMETRY 50 Marks: 4 credits**		Plant breeding: 1.1 Introduction and objective, 1.2 Techniques of hybridisation.	July-August	SONTU BUGH
			Mass and Pure line selection: 2.1 Procedure, 2.2 Advantages and limitations.	August-September	SONTU BUGH
			Heterosis and hybrid seed production.	August-September	SANGITA DASCHOWDHURY
			Role of mutation, polyploidy, distant hybridization and role of biotechnology in crop improvement.	November-December	SONTU BUGH
			Biometry	November-December	SANGITA DASCHOWDHURY
	(BOT-G-DSE-A-5-1-TH) PHYTOCHEMISTRY AND MEDICINAL BOTANY		Medicinal botany-History, scope and importance of medicinal plants, a brief idea about indigenous medicinal	August-September November	SANGITA DASCHOWDHURY

			sciences- Ayurveda, Siddha and Unani. Polyherbal formulations.		
			Phramacognosy- 2.1 Scope and its importance, 2.2 Primary metabolites, 2.3 Secondary metabolites- alkaloids, terpenoids, phenolics and their functions	August-September November	SONTU BUGH
			Organoleptic evaluation of crude drugs.	November-December	SANGITA DASCHOWDHURY
			Pharmcologically active constituents:	September	SANGITA DASCHOWDHURY
			Ethnobotany and folk medicine: 5.1 Brief idea, 5.2 Applications of ethnobotany, 5.3 Application of natural product to certain diseases- Jaundice, Cardiac and Diabetics.	August-September November-December	SANGITA DASCHOWDHURY
	(BOT-G-DSE-A-5-1-P) PHYTOCHEMISTRY AND MEDICINAL BOTANY		Preparations of solution and buffers Acquaintance with laboratory instruments- Autoclave, Incubator, Clinical centrifuge, Analytical balance, pH meter, Colorimeter, Water bath,	November November	SONTU BUGH SONTU BUGH

			Distillation plant, Laminar air flow.		
			Qualitative test for proteins and carbohydrates, reducing and non reducing sugar (glucose, fructose and sucrose)	November-December	SONTU BUGH
			Tests (chemical) for tannin and alkaloid	December	SONTU BUGH
			Identification of medicinal plants and Field study (local) for listing of medicinal plants.	September	SONTU BUGH & SANGITA DASCHOWDHURY

Semester	**Paper**	**Unit**	**Topic**	**JANUARY-MARCH/APRIL-JUNE**	**Faculty Name**
Semester-II HONOURS	**BOT-A-CC-2-3-TH (PLANT ANATOMY)** **50 Marks:4 credits**		Cell Wall	January	SONTU BUGH
			Stomata	January	SONTU BUGH
			Stele	February	SONTU BUGH
			Primary Structure of Stem & Root	February	SONTU BUGH
			Secondary growth	February	SHAMPRIYA CHOWDHURY
			Mechanical tissues and the principles governing their distribution in plants.	March	SHAMPRIYA CHOWDHURY
			Developmental Anatomy	April-May	SHAMPRIYA CHOWDHURY
			Ecological Anatomy	April-May	SHAMPRIYA CHOWDHURY
			Scope of plant anatomy: application in systematics, forensics and pharmacognosy	May-June	SHAMPRIYA CHOWDHURY
			Microscopic studies on: Types of stomata, sclereids, raphides (Colocasia), cystolith	February-March	SONTU BUGH

	BOT-A-CC-2-3-P (PLANT ANATOMY) **30 Marks:2 credits**		(Ficus leaf) starch grains, aleurone grains, laticiferous ducts, oil glands.		
			Study of anatomical details through permanent slides/ temporary stained mounts- a) RootMonocot and dicot, b) Stem- Monocot and dicot, c) Leaf- Monocot and dicot	February-March	SONTU BUGH
			Study of anomalous secondary structure in stem of Bignonia, Boerhaavia, Tecoma, Dracaena and root of Tinospora	March-April	SONTU BUGH
			Study of adaptive anatomical features: Hydrophytes (Nymphaea – petiole) and Xerophytes (Nerium – leaf).	April-May	SONTU BUGH
	BOT-A-CC-2-4-TH (ARCHAEGONIATAE) **50 Marks:4 credits**		Bryophytes-General account	January	SANGITA DASCHOWDHURY
			Bryophytes-Life History	January-February	SANGITA DASCHOWDHURY
			Bryophytes-Phylogeny	March	SANGITA DASCHOWDHURY
			Bryophytes-Importance	April	SANGITA DASCHOWDHURY
			Pteridophytes-General account	January	SONTU BUGH
			Pteridophytes-Life History	January-February	SONTU BUGH
			Pteridophytes-Telome concept and its significance in the origin of different groups of Pteridophytes.	March	SONTU BUGH

			Pteridophytes- Heterospory and Origin of Seed habit	April	SONTU BUGH
			Pteridophytes- Economic importance as food, medicine and Agriculture.	April	SONTU BUGH
			Gymnosperms- Classification of vascular plants by Gifford & Foster (1989) upto division (Progymnospermophyta to Gnetophyta) with diagnostic characters and examples.	January-February	SANGITA DASCHOWDHURY
			Progymnosperms- Diagnostic characters of the group, Vegetative and reproductive features of Archeopteris, Phylogenetic importance.	March	SANGITA DASCHOWDHURY
			Gymnosperms- Life History : Distribution in India; Vegetative and Reproductive structure of sporophyte, Development of gametophyte in Cycas , Pinus and Gnetum.	April-May	SANGITA DASCHOWDHURY
	BOT-A-CC-2-4-P (ARCHAEGONIATAE) **30 Marks:2 credits**		Gymnosperms- Economic Importance with reference to Wood, Resins, Essential oils, and Drugs.	May	SANGITA DASCHOWDHURY
			BRYOPHYTES 1. Morphological study of the plant body: Genera as mentioned in theoretical syllabus and Riccia, Porella. 2. Study from	January	SANGITA DASCHOWDHURY

			permanent slides : Riccia (V.S. of thallus with sporophyte), Marchantia (L.S. through gemma cup, antheridiophore , archegoniophore) , Anthoceros (L.S. of sporophyte) , Funaria (L.S. of capsule).		
			PTERIDOPHYTES 1. Morphological study of the sporophytic plant body: Genera as mentioned in the theoretical syllabus and Lycopodium, Ophioglossum and Marsilea. 2. Workout of the reproductive structures: Selaginella, Equisetum, Pteris. 3. Study from permanent slides: Psilotum (T.S. of synangium), Lycopodium (L.S. of strobilus), Ophioglossum (L.S. of spike), Dryopteris (gametophyte), Marsilea (L.S. of sporocarp)	February-March	SANGITA DASCHOWDHURY
			GYMNOSPERMS 1. Morphological study: Cycas (microsporophyll and megasporophyll), Pinus (female and male cone), Gnetum (female and male cone). 2. Study from permanent slides: Cycas (L.S. of ovule), Pinus (L.S. of male and female cone), Ginkgo (L.S. of female strobilus),	February-March	SANGITA DASCHOWDHURY

			Gnetum (L.S. of male cone and ovule)		
			FIELD STUDY Botanical excursion to familiarize the students with the natural habitats of these groups is desirable. No individual collection should be allowed. Students should submit only photographs in their field report.	April	SANGITA DASCHOWDHURY

Semester	Paper	Unit	Topic	JANUARY-MARCH/APRIL-JUNE	Faculty Name
Semester-IV HONOURS	**BOT-A-CC-4-8-TH (PLANT GEOGRAPHY, ECOLOGY & EVOLUTION)** **50 Marks:4 credits**		Phytogeographical regions	January-February	SHAMPRIYA CHOWDHURY
			Endemism	January-February	SHAMPRIYA CHOWDHURY
			Ecology (Preliminary idea)	January	SONTU BUGH
			Community Ecology	January-February	SANGITA DASCHOWDHURY
			Plant Indicators	February	SANGITA DASCHOWDHURY
			Conservation of Biodiversity.	January-February-March	SONTU BUGH
			Evolution (Topic 1)	March-April-May	SHAMPRIYA CHOWDHURY
			Evolution (Topic 2)	April-May	SHAMPRIYA CHOWDHURY
			Evolution (Topic 3)	April-May-June	SHAMPRIYA CHOWDHURY
			Field visit	May	SONTU BUGH
	BOT-A-CC-4-8-P (PLANT GEOGRAPHY, ECOLOGY & EVOLUTION) **30 Marks:2 credits**		Quadrat Study	April	SANGITA DASCHOWDHURY
			Comparative anatomical studies of leaves from polluted and less polluted areas	March-April	SHAMPRIYA CHOWDHURY
			Measurement of dissolved O2 by azide	April-May	SHAMPRIYA CHOWDHURY

			modification of Winkler's method.		
	BOT-A-CC-4-9-TH (ECONOMIC BOTANY) **50 Marks:4 credits** **BOT-A-CC-4-9-TH (ECONOMIC BOTANY)** **50 Marks:4 credits**		Comparison of free CO2 from different sources	April-May	SHAMPRIYA CHOWDHURY
			Origin of Cultivated crops	January-February	SANGITA DASCHOWDHURY
			Cereals	January-February	SANGITA DASCHOWDHURY
			Legumes	March-April	SANGITA DASCHOWDHURY
			Sugar & Starches	March-April	SANGITA DASCHOWDHURY
			Spices	March	SANGITA DASCHOWDHURY
			Beverages	April	SANGITA DASCHOWDHURY SANGITA DASCHOWDHURY
			Oil & Fats	May-June	SANGITA DASCHOWDHURY
			Drug Yielding Plants	May-June	SANGITA DASCHOWDHURY
			Timber	June	SANGITA DASCHOWDHURY
			Fib	June	SANGITA DASCHOWDHURY

Semester	Paper	Unit	Topic	JANUARY-MARCH/APRIL-JUNE	Faculty Name
Semester-IV HONOURS	**BOT-A-CC-4-10-TH (GENETICS)** **50 Marks: 4 credits**		Mendelian Genetics	January	SONTU BUGH
			Linkage, Crossing over and Gene mapping	January-February	SONTU BUGH
			Epistasis & Polygenic inheritance in plants	January	SONTU BUGH
			Aneuploidy & Polyploidy	February-March	SONTU BUGH
			Chromosomal aberration	March-April	SONTU BUGH
	BOT-A-CC-4-10-P(GENETICS) **30 Marks: 2 credits**		Mutation	March-April	SONTU BUGH
			Structural organisation of Gene	May-June	SONTU BUGH
			Introduction to chromosome preparation	January	SONTU BUGH
			Determination of mitotic index and frequency of different mitotic stages in pre-fixed root tips of Allium cepa	January-February	SONTU BUGH
			Study of mitotic chromosome	January-February	SONTU BUGH
			Study of chromosomal aberrations developed due to exposure to any two pollutants/ pesticides etc.	March-April	SONTU BUGH
			Study of meiotic chromosome	March-April	SONTU BUGH
			Identification from permanent slides	March-April	SONTU BUGH

Semester	Paper	Unit	Topic	JANUARY-MARCH/APRIL-JUNE	Faculty Name
Semester-IV HONOURS	**BOT-A-SECB-4-4-TH (MUSHROOM CULTURE TECHNOLOGY)** **80 Marks: 2 credits**		Introduction, nutritional and medicinal value of edible mushrooms; poisonous mushrooms, types of edible mushrooms available in India- *Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus*.	January	SANGITA DASCHOWDHURY
			Cultivation technology	January-February	SANGITA DASCHOWDHURY
			Storage and nutrition	March	SANGITA DASCHOWDHURY
			Food preparation	April	SANGITA DASCHOWDHURY

Semester	Paper	Unit	Topic	JANUARY-MARCH/APRIL-JUNE	Faculty Name
Semester-VI HONOURS	**BOT-A-CC-6-13-TH (PLANT PHYSIOLOGY)** **50 Marks: 4 credits**		Plant water relations	January-February	SHAMPRIYA CHOWDHURY
			Mineral nutrition	January-February	SHAMPRIYA CHOWDHURY
			Organic Translocation	March-April	SHAMPRIYA CHOWDHURY
			Plant Growth Regulators	January-February-March	SANGITA DASCHOWDHURY
			Photomorphogenesis	January-February-March	SONTU BUGH
	BOT-A-CC-6-13-P(PLANT PHYSIOLOGY) **30 Marks: 2 credits**		Seed dormancy	April-May	SONTU BUGH
			Determination of loss of water per stoma per hour.	April	SANGITA DASCHOWDHURY
			Measurement of osmotic pressure of storage tissue by weighing method.	January-February	SHAMPRIYA CHOWDHURY
			Measurement of osmotic pressure of	January-February	SHAMPRIYA CHOWDHURY

			Rhoeo leaf by plasmolytic method.		
			Study of mitotic chromosome	January-February	SHAMPRIYA CHOWDHURY
			Effect of temperature on absorption of water by storage tissue and determination of Q10	March-April	SHAMPRIYA CHOWDHURY
			Rate of imbibition of water by starchy, proteinaceous and fatty seeds and effect of seed coat.	March-April	SHAMPRIYA CHOWDHURY
			To study the phenomenon of seed germination (effect of light)	May-June	SHAMPRIYA CHOWDHURY
			To study the induction of amylase activity in germinating grains	May-June	SHAMPRIYA CHOWDHURY
			To study the effect of different concentrations of IAA on Avena coleopotile elongation (IAA bioassay	May-June	SHAMPRIYA CHOWDHURY
Semester-VI HONOURS	**BOT-A-CC-6-14-TH (PLANT METABOLISM)** **50 Marks: 4 credits**		Concept of metabolism	January	SHAMPRIYA CHOWDHURY
			Photosynthesis	January-February-March	SHAMPRIYA CHOWDHURY
			Respiration	April-May-June	SHAMPRIYA CHOWDHURY
			Nitrogen Metabolism	March-April-May	SONTU BUGH
			Lipid metabolism	April-May-June	SONTU BUGH
			Mechanism of signal transduction	April-May-June	SONTU BUGH

Semester	Paper	Unit	Topic	JANUARY - MARCH/ APRIL-JUNE	Faculty Name
Semester-VI HONOURS	**BOT-A-CC-6-14-P (PLANT METABOLISM)** **30 Marks: 2 credits**		A basic idea of chromatography: Principle, paper chromatography and column chromatography; demonstration of column chromatography.	January-February	SHAMPRIYA CHOWDHURY
			Separation of plastidial pigments by solvent and paper chromatography	January-February	SHAMPRIYA CHOWDHURY
			Estimation of total chlorophyll content from different chronologically aged leaves (young, mature and senescence) by Arnon method	March-April	SHAMPRIYA CHOWDHURY
			Effect of HCO3 concentration on oxygen evolution during photosynthesis in an aquatic plant and to find out the optimum and toxic concentration (either by volume measurement or bubble counting).	March-April	SHAMPRIYA CHOWDHURY
			Measurement of oxygen uptake by respiring tissue (per g/hr.)	April-May	SHAMPRIYA CHOWDHURY
	BOT-A-DSEA-6-3-TH (MEDICINAL & ETHNOBOTANY 50 Marks: 4 credits		Determination of the RQ of germinating seeds	April-May	SHAMPRIYA CHOWDHURY
			Test of seed viability by TTC method Medicinal botany Pharmacognosy	May-June January-February-March January-February-March	SHAMPRIYA CHOWDHURY SANGITA DASCHOWDHURY SONTU BUGH

			Secondary metabolites	April-May-June	SONTU BUGH
			Pharmacologically active constituents	April	SANGITA DASCHOWDHURY
			Ethnobotany & Folk Medicine	March-May-June	SANGITA DASCHOWDHURY
	BOT-A-DSEA-6-3-P (MEDICINAL & ETHNOBOTANY)		Chemical tests for (a) Tannin (Camellia sinensis / Terminalia chebula), (b) Alkaloid (Catharanthus roseus) .	February	SONTU BUGH
	30 Marks: 2 credits		Powder microscopy – Zingiber and Holarrhena	March	SONTU BUGH
			Histochemical tests of (a) Curcumin (Curcuma longa), (b) Starch in non-lignified vessel (Zingiber), (c) Alkaloid (stem of Catharanthus and bark of Holarrhena)	April	SONTU BUGH
	BOT-A-DSEB-6-8-TH (NATURAL RESOURCE MANAGEMENT		Natural resources	Janury	AVIK MUKHERJEE
			Sustainable utilization	January-February	AVIK MUKHERJEE
			Land	February-March	AVIK MUKHERJEE
	50 Marks: 4 credits		Water	March	AVIK MUKHERJEE
			Biological resources	April-May	AVIK MUKHERJEE
			Forests	May	AVIK MUKHERJEE
			Energy	May-June	AVIK MUKHERJEE
			Contemporary practices in resource management	January	AVIK MUKHERJEE
			National and international efforts in resource management and conservation	June	AVIK MUKHERJEE

	BOT-A-DSEB-6-8-P (NATURAL RESOURCE MANAGEMENT **30 Marks: 2 credits**		Estimation of solid waste generated by a domestic system (biodegradable and non-biodegradable) and its impact on land degradation Estimation of foliar dust deposition. Determination of total solid in water (TDS) Determination of chemical properties of soil by rapid spot test (carbonate, iron, nitrate) Estimation of organic carbon percentage present in soil sample. Collection of data on forest cover of specific area	April April	AVIK MUKHERJEE & SONTU BUGH AVIK MUKHERJEE & SONTU BUGH

Semester	**Paper**	**Unit**	**Topic**	**JANUARY-MARCH/APRIL-JUNE**	**Faculty Name**
Semester-II GENERAL	**BOT-G-CC-2-2-TH PLANT DIVERSITY II (**PTERIDOPHYTES, GYMNOSPERMS, PALAEOBOTANY, MORPHOLOGY AND TAXONOMY) **50 Marks:4 credits**		Pteridophytes 1.1 Diagnostic characters and examples of Psilophyta, Lycophyta, Sphenophyta & Filicophyta (Gifford & Foster 1989). 1.2 Life histories of Selaginella and Pteris, 1.3 Economic importance.	January-March-April	SONTU BUGH
			Gymnosperms 2.1 Progymnosperms (brief idea), 2.2 Diagnostic	January-March-April	AVIK MUKHERJEE

			characters and examples of Cycadophyta, Coniferophyta and Gnetophyta (Gifford & Foster 1989), 2.3 Life histories of Cycas and Pinus, 2.4 Williamsonia (reconstructed), 2.5 Economic importance of Gymnosperms.		
			Paleobotany & Palynology 3.1 Fossil, fossilization process and factors of fossilization, 3.2 Importance of fossil study. 3.3 Geological time scale, 3.4 Palynology - Definition, spore & pollen (brief idea), Applications.	April-May	AVIK MUKHERJEE
			Angiosperm Morphology 4.1 Inflorescence types with examples, 4.2 Flower, 4.3 Fruits and seeds- type and examples.	January-February	SANGITA DASCHOWDHURY
			Taxonomy of Angiosperms 5.1 Artificial, Natural and Phylogenetic systems of c1assificaiton with one example each, 5.2 Diagnostic features of following families- Malvaceae, Leguminosae (Fabaceae), Cucurbitaceae, Rubiaceae, Compositae (Asteraceae),	January-March April-May	SANGITA DASCHOWDHURY

			Solanaceae, Acanthaceae, Labiatae (Lamiaceae), Orchidaceae, Gramineae (Poaceae).		
	BOT-G-CC-2-2-P PLANT DIVERSITY II (PTERIDOPHYTES, GYMNOSPERMS, PALAEOBOTANY, MORPHOLOGY AND TAXONOMY) **30 Marks: 2 credits**		Dissection, drawing and labelling, description of angiospermic plants and floral parts, floral formula and floral diagram, identification (family) from the following families: Leguminosae (Fabaceae), Malvaceae, Solanaceae, Labiatea (Lamiaceae), Acanthaceae.	February-March April-May	SANGITA DASCHOWDHURY
			Identification with reasons: Macroscopic specimens of Selaginella and Pteris, male and female strobilus of Cycas and Pinus, Anatomical slides (stellar types, transfusion tissue, sieve tube, sunken stomata, lenticels), inflorescence types.	May	SANGITA DASCHOWDHURY
			Spot identification of the following Angiospermic plants (scientific names and families): Sida rhombifolia (Malvaceae), Abutilon indicum (Malvaceae), Cassia sophera (Fabaceae),	May	SANGITA DASCHOWDHURY

			Tephrosia halimtonii (Fabaceae), Crotolaria palida (Fabaceae), Coccinia grandis (Cucurbitaceae), Solanum indicum (Solanaceae), Nicotiana plumbagenifolia (Solanaceae), Leucas aspera (Lamiaceae), Leonurus sibiricus (Lamiaceae), Parthenium hysterophorus (Asteraceae), Tridax procumbense (Asteraceae), Eclipta prostrate (Asteraceae), Eragrostis tenella (Poaceae), Chrysopogon aciculantus (Poaceae), Eleusine indica (Poaceae), Vanda taesellata (Orchidaceae).		
			Field excursion	April	SANGITA DASCHOWDHURY & AVIK MUKHERJEE
			Field Records	February-March-April	SANGITA DASCHOWDHURY
Semester IV GENERAL	**BOT-G-CC-4-4-TH PLANT PHYSIOLOGY AND METABOLISM** **50 Marks:4 credits**		Proteins 1.1 Primary, secondary and tertiary structure, 1.2 Nucleic acid- DNA structure, RNA types, 1.3 Enzyme- Classifications with examples (IUBMB), Mechanism of action.	January-February	SONTU BUGH
			Transport in plants 2.1 Ascent of sap	January	SHAMPRIYA CHOWDHURY

			and Xylem cavitation, 2.2 Phloem transport and source-sink relation.		
			Transpiration 3.1 Mechanism of stomatal movement, significance.	February	SHAMPRIYA CHOWDHURY
			Photosynthesis 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.	February-March April-May	SHAMPRIYA CHOWDHURY
			Respiration 5.1 Glycolysis & Krebs cycle— Reactions and Significance, 5.2 ETS and oxidative phosphorylation.	April-May	SHAMPRIYA CHOWDHURY
			Nitrogen metabolism 6.1 Biological dinitrogen fixation, 6.2 Amino acid synthesis (reductive amination and transamination).	March-April	SONTU BUGH
			Plant Growth regulators 7.1 Physiological roles of Auxin, Gibberellin, Cytokinin, Ethylene, ABA.	January-February	SANGITA DASCHOWDHURY
			Photoperiodism (Plant types, Role of phytochrome and GA in flowering) and Vernalization.	April-May	SONTU BUGH

			Senescence (brief idea).	March	SANGITA DASCHOWDHURY
	BOT-G-CC-4-4-P PLANT PHYSIOLOGY AND METABOLISM **30 Marks: 2 credits**		Experiment on Plasmolysis	February	SHAMPRIYA CHOWDHURY
			Measurement of leaf area (graphical method) and determination of transpiration rate per unit area by weighing method.	February	SHAMPRIYA CHOWDHURY
			Imbibition of water by dry seeds - proteinaceous and fatty seeds.	March	SHAMPRIYA CHOWDHURY
			Evolution of O2 during photosynthesis (using graduated tube).	March	SHAMPRIYA CHOWDHURY
			Evolution of CO2 during aerobic respiration and measurement of volume.	April	SHAMPRIYA CHOWDHURY
SEMESTER VI GENERAL	**BOT-G-SEC-D-4/6-4 (MUSHROOM CULTURE TECHNOLOGY)** **80 marks: 2 credits**		Mushroom- nutritional and medicinal value of mushrooms. Poisonous mushrooms	January	SANGITA DASCHOWDHURY
			Cultivation techniques/ technology of edible mushrooms in India: Volvarealla volvacea, Pleuretus citrinopyrineatus, Agaricus bisporus.	January-February March	SANGITA DASCHOWDHURY
			Storage- short term and long term, storage, drying.	March	SANGITA DASCHOWDHURY
			Food preparation- types of foods prepared from mushroom. Cost and benefit ratio.	April-May	SANGITA DASCHOWDHURY
			Research centres- national and regional.	May	SANGITA DASCHOWDHURY

	BOT-G-DSE-B-6-3-TH (ECONOMIC BOTANY **50 Marks:4 credits**		Origin of cultivated plants: Concepts of centres of origin and their importance with reference to Vavilov's work.	January-February	SANGITA DASCHOWDHURY
			Rice- origin, morphology and uses.	March	SANGITA DASCHOWDHURY
			Legumes: General account with special reference to Vigna.	March-April	SANGITA DASCHOWDHURY
			Beverages: Tea- morphology, processing and uses.	May	SANGITA DASCHOWDHURY
			Study of the following economically important plants (Scientific names, families, parts used and importance): 5.1 Cereals- Rice, wheat, 5.2 Pulses- Mong, gram, 5.3 SpicesGinger, cumin, 5.4 Beverages- Tea, coffee, 5.5 Medicinal plants- Cinchona, neem, Ipecac, Vasaka, 5.6 Oil yielding plants- Mustard, groundnut, coconut, 5.7 Vegetables- Potato, raddish, bottle groud, cabbage, 5.8 Fibre yielding plants- Cotton, jute, 5.9 Timber yielding plants- Teak, Sal 5.10	January-March April	SONTU BUGH

	BOT-G-DSE-B-6-3-P (ECONOMIC BOTANY **30 Marks:2 credits**		Fruits- Mango, apple, 5.11 Sugar yielding plant- Sugarcane. Study of economically important plants (rice/jute/ tea) through herbarium specimens and field study. Study of cultivation practices in field and submission of report. Study of local economically important plants and submission of report with photographs.	March March February-March	SANGITA DASCHOWDHURY SANGITA DASCHOWDHURY SANGITA DASCHPWDHURY