



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 1ST; Paper: HC- 1016; - Outline

Department:	BOTANY	Semester	FIRST
Course:	HONOURS	Paper No:	HC-1016 (Theory)
Credit:	Theory - 04	Lecture	60
	Practical -02		

BOTANY (Hon.); Semester: 1ST; Paper: HC- 1016; 1.1: Theory – Detailed

Paper: HC- 1016; 1.1 THEORY <i>(Phycology and Microbiology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction to microbial world: Scope of microbes in industry and environment; Microbial nutrition, growth and metabolism	Dr. Kamal Choudhury	04	August
2	Viruses: Discovery, physiochemical and biological characteristics; classification, general structure - viroids and prions; replication, T-phage, TMV. Economic importance of viruses	Dr. Kamal Choudhury	06	Aug -Sept
3	Bacteria: Discovery, general account; Types-archaebacteria, eubacteria, actinomycetes, mycoplasma, rickettsia, chlamydiae and sphaeroplasts; Cell structure; Nutritional types; Reproduction,. Economic importance.	Dr. Kamal Choudhury	06	September
4	Algae: General characteristics; Ecology and distribution; range of thallus organization; Cell structure and components; cell wall, pigment system, reserve food, flagella; methods of reproduction; Classification – Fritsch, Lee; Role of algae in the environment, agriculture, biotechnology and industry, Economic importance of Diatoms	Dr. Rupak Sarma	08	August
5	Cyanophyta and Xanthophyta: Ecology and occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of Nostoc and <i>Vaucheria</i> .	Dr. Rupak Sarma	04	Sept. –Oct.

6	Chlorophyta, Charophyta & Bacillariophyta General characteristics; Occurrence; Range of thallus organization; Cell structure; Reproduction. Morphology and life-cycles of Volvox, Oedogonium, Coleochaete, Chara. General Account of Bacillariophyta., Agaricus, Cercospora, Colletotrichum	Dr. Rupak Sarma	06	Aug. –Sept.
7	Phaeophyta and Rhodophyta: Characteristics; Occurrence; Range of thallus organization; Cell structure; Reproduction. Morphology and life-cycles of Ectocarpus, Fucus and Polysiphonia.	Dr. Kamal Choudhury	06	October

BOTANY (Hon.); Semester: 1ST; Paper: HC- 1016; 1.2: Practical - Detailed

Paper: HC- 1016; 1.2 - PRACTICAL <i>(Phycology and Microbiology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Microbiology: Electron micrographs/Models of viruses – T-Phage and TMV/ Line drawings/ Photographs of Lytic and Lysogenic Cycle.	Dr. Kamal Choudhury	02	August
2	Microbiology: Types of Bacteria to be observed from temporary/permanent Slides/ photographs. Electron micrographs of bacteria, binary fission, endospore, conjugation, root Nodule.	Dr. Kamal Choudhury	04	August
3	Microbiology: Gram staining.	Dr. Kamal Choudhury	02	August
4	Microbiology: Isolation of soil microflora.	Dr. Kamal Choudhury	04	September
5	Microbiology: Endospore staining with malachite green using the (endospores taken from soil bacteria).	Dr. Kamal Choudhury	04	September
6	Phycology: Study of vegetative and reproductive structures of <i>Nostoc</i> , <i>Volvox</i> , <i>Oedogonium</i> , <i>Chara</i> , <i>Vaucheria</i> , <i>Ectocarpus</i> , <i>Fucus</i> and <i>Polysiphonia</i> , <i>Prochloron</i> through electron micrographs/ permanent slides.	Dr. Rupak Sarma	06	August



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 1ST; Paper: HC- 1026; - Outline

Department:	BOTANY	Semester	FIRST
Course:	HONOURS	Paper No:	HC-1016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 1ST; Paper: HC- 1026; 2.1: Theory – Detailed

Paper: HC- 1026 - 2.1 - THEORY <i>(Biomolecules and Cell Biology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	<p>Biomolecules: Types and significance of chemical bonds; Structure and properties of water; pH and buffers.</p> <p>Carbohydrates: Mono and Disaccharides; Oligosaccharides and polysaccharides.</p> <p>Lipids: Definition and major classes of storage and structural lipids</p> <p>Proteins: Structure of amino acids; Levels of protein structure-primary, secondary, tertiary and quaternary;</p> <p>Nucleic acid: Structure, Types of nucleic acids; Structure of A, B, C, D, Z types of DNA; Types of RNA.</p>	Dr. Chunamoni Das	12	August
2I	<p>Bioenergetics: Laws of thermodynamics, concept of free energy, endergonic and exergonic reactions, coupled reactions, redox reactions. ATP: structure, its role as a energy currency molecule.</p>	Dr. Chunamoni Das	04	September
3	<p>Enzymes: Structure: holoenzyme, apoenzyme, cofactors, coenzymes and prosthetic group; Classification; Mechanism of action Michaelis – Menten equation, enzyme inhibition and factors affecting enzyme activity.</p>	Dr. Rupak Sarma	06	September

4	The cell: Cell as a unit of structure and function; Characteristics of prokaryotic and eukaryotic cells; Origin of eukaryotic cell.	Dr. Chunamoni Das	04	Sept. -Oct
5	Cell wall and plasma membrane: Chemistry, structure and function. membrane function; fluid mosaic model; Membrane, endocytosis and exocytosis.	Dr. Chunamoni Das	04	October
6	Cell organelles: Nucleus; Cytoskeleton; Chloroplast; Mitochondria and Peroxisomes. Endomembrane systems: Endoplasmic Reticulum, Golgi Apparatus, Lysosome.	Dr. Rupak Sarma	08	Sept. –Oct
7	Cell division: Phases of eukaryotic cell cycle, mitosis and meiosis; Regulation of cell cycle-checkpoints, role of protein kinases.	Dr. Chunamoni Das	06	Oct. –Nov.

BOTANY (Hon.); Semester: 1ST; Paper: HC- 1026; 2.2: Practical - Detailed

Paper: HC- 1026; 2.2 - PRACTICAL <i>(Biomolecules and Cell Biology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Qualitative tests for carbohydrates, reducing sugars, non-reducing sugars, lipids and proteins.	Dr. Chunamoni Das	04	August
2	Study of plant cell structure with the help of epidermal peel mount of Onion/ <i>Rhoeo/Crinum</i> .	Dr. Chunamoni Das	02	August
3	Demonstration of the phenomenon of protoplasmic streaming in <i>Hydrilla</i> and <i>Vallisneria</i> leaf.	Dr. Chunamoni Das	02	August
4	Counting the cells per unit volume with the help of haemocytometer. (Yeast/pollen grains).	Dr. Chunamoni Das	02	September
5	Cytochemical staining of : DNA- Feulgen and cell wall in the epidermal peel of onion using Periodic Schiff's (PAS) staining technique.	Dr. Rupak Sarma	04	September
6	Study the phenomenon of plasmolysis and deplasmolysis.	Dr. Rupak Sarma	02	August
7	Study different stages of mitosis and meiosis (Demonstration).	Dr. Rupak Sarma	02	August



TEACHING PLAN
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Session: 2022 - 2023

Botany (Hon.); Semester: 1st; Paper: HG-RC- 1016; - Outline

Department:	BOTANY	Semester	FIRST
Course:	REGULAR	Paper No:	HG-RC-1016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

BOTANY (Gen.); Semester: 1st; Paper: HG-RC- 1016; 1.1: Theory – Detailed

Paper: HG-RC: 1016; 1.1 THEORY <i>(Biodiversity –Microbes, Algae Fungi and Archegoniate)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Microbes: Viruses – Discovery, general structure, replication, DNA virus, RNA virus, Lytic and lysogenic cycle, Economic importance. Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and sexual. Economic importance.	Dr. Kamal Choudhury	08	August
2	Algae: General characteristics; Ecology and distribution; Range of thallus and reproduction; Classification; Morphology and life-cycles of the following: Nostoc, Chlamydomonas, Oedogonium, Vaucheria, Fucus, Polysiphonia. Economic importance of	Dr. Rupak Sarma	08	August
3	Fungi: Introduction- General characteristics, ecology, range of thallus organization, cell wall composition, nutrition, reproduction and classification. Ecology life cycle of Rhizopus, Penicillium, Alternaria, Puccinia, Agaricus; Symbiotic Associations- Lichens: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance	Dr. Rupak Sarma	08	Aug -Sept
4	Archegoniate: Unifying characters, Transition to land habit, Alternation of generations	Dr. Kamal Choudhury	03	Aug -Sept

5	Bryophytes: General account, Classification, Range of thallus organization, morphology and reproduction of Marchantia and Funaria. Economic importance with special reference to Sphagnum	Dr. Chunamoni Das	08	August.
6	Pteridophytes: General account, classification, Early land plantv(Cppksonia and Rhynia). Morphology and reproduction of Selaginella, Equisetum and Pteris. Heterospory & Seed Habit. Ecological and Economic importance.	Dr. Kamal Choudhury	08	Sept. -Oct
7	Gymnosperms: General characteristics, classification. Classification morphology, and reproduction of Cycas and Pinus. Ecological and economical importance.	Dr. Chunamoni Das	06	Aug- Sept

BOTANY (Hon.); Semester: 1ST; Paper: HG-RC: 1016; 1.2: Practical - Detailed

Paper: HG-RC: 1016; 1.2 - PRACTICAL <i>(Biodiversity –Microbes, Algae Fungi and Archegoniate)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Microbes: 1. T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic Cycle. 2 Types of Bacteria from temporary/permanent slides/photographs; Binary Fission; Conjugation; Structure of root nodule. 3 Gram staining	Dr. Kamal Choudhury	03	Septembert
2	Algae: Study of vegetative and reproductive structures of Nostoc, Chlamydomonas Oedogonium, Vaucheria, Fucus and Polysiphonia	Dr. Rupak Sarma	04	August
3	Fungi: i) Rhizopus and Penicillium: ii) Puccinia iii) <i>Agaricus</i>	Dr. Rupak Sarma	04	September
4	Licchens: Crustose and Foliose Michorrhiza: Endo and ecto micorrhizae	Dr. Kamal Choudhury	02	September
5	Bryophytes: Marchantia and Funaria	Dr. Chunamoni Das	02	September
6	Pteridophytes: Selaginella, Equisetum, Pteris.	Dr. Chunamoni Das	03	Sept -Oct
7	Gymnosperms: Cycas, Pinus	Dr. Chunamoni Das	02	October



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 3RD; Paper: HC- 3016; - Outline

Department:	BOTANY	Semester	THIRD
Course:	HONOURS	Paper No:	HC-1016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 3RD; Paper: HC- 3016; 5.1: Theory – Detailed

Paper: HC- 3016 - 5.1 - THEORY <i>(Morphology and Anatomy of Angiosperms)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Morphology: Morphology of inflorescence, stamens and carpel, fruit; Telome theory, phyllode theory; Role of morphology in plant classification.	Dr. Rupak Sarma	04	August
2I	Introduction and scope of plant Anatomy: Application in systematics, forensics and pharmacognosy	Dr. Rupak Sarma	04	August
3	Structure and Development of Plant Body: Internal organization of plant body: The three tissue systems, types of cells and tissues. Development of plant body: Polarity, Cytodifferentiation and organogenesis during embryogenic development..	Dr. Rupak Sarma	06	Aug. Sept.
4	Tissues: Classification of tissues; Simple and complex tissues; cytodifferentiation of tracheary elements and sieve elements; Pits and plasmodesmata; Wall ingrowths and transfer cells, adcrustation and incrustation, Ergastic substances. Hydathodes, cavities, lithocysts and laticifers.	Dr. Rupak Sarma	06	September
5	Apical Meristems: Evolutionary concept of organization of shoot apex, Types of vascular bundles; Structure dicot & monocot stem, leaves. Organization of root apex; Quiescent centre; Root cap; Structure of dicot and monocot root; Endodermis, exodermis, origin of lateral root.	Dr. Rupak Sarma	08	Sept. –Oct.

6	Vascular Cambium and Wood: Structure, function of cambium; Secondary growth in root and stem. Axially and radially oriented elements; Types of rays and axial parenchyma; Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses;.	Dr. Rupak Sarma	08	Sept. –Oct
7	Adaptive and Protective Systems: Epidermal tissue system, cuticle, epicuticular waxes, trichomes, stomata; Adcrustation and incrustation; Anatomical adaptations of xerophytes and hydrophytes.	Dr. Rupak Sarma	04	Oct. –Nov.

Botany (Hon.); Semester: 3RD; Paper: HC- 3016; 5.2: Practical - Detailed

Paper: HC- 3016; 5.2 - PRACTICAL <i>(Morphology and Anatomy of Angiosperms)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Study of special types of inflorescence – Cyathium, Hypanthodium, Verticillaster, Hypanthium.	Dr. Rupak Sarma	02	August
2	Study of special types of fruits- Superior fruits (<i>Dillenia</i>); Aggregate fruits (Custard apple, <i>Michelia</i> , Periwinkles, <i>Polyalthia</i>); Multiple fruits (Pine apple, Jack fruits).	Dr. Rupak Sarma	02	August
3	Study of anatomical details through permanent slides/temporary stain mounts / macerations / museum specimens with the help of suitable examples.	Dr. Rupak Sarma	02	August
4	Apical meristem of root, shoot and vascular cambium.	Dr. Rupak Sarma	02	September
5	Epidermal system: cell types, stomata types; trichomes: non-glandular and glandular.	Dr. Rupak Sarma	02	September
6	. Root: monocot, dicot, secondary growth..	Dr. Rupak Sarma	02	September
7	Stem: monocot, dicot - primary and secondary growth; periderm; lenticels.	Dr. Rupak Sarma	02	October
8	Leaf: isobilateral, dorsiventral, C4 leaves (Kranz anatomy).	Dr. Rupak Sarma	02	October
9	Adaptive Anatomy: xerophytes, hydrophytes.	Dr. Rupak Sarma	02	November
10	Secretory tissues: cavities, lithocysts and laticifers	Dr. Rupak Sarma	02	November



TEACHING PLAN
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Botany (Hon.); Semester: 3RD; Paper: HC- 3026; - Outline

Department:	BOTANY	Semester	THIRD
Course:		Paper No:	HC-1016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 3RD; Paper: HC- 3026; 6.1: Theory – Detailed

Paper: HC- 3026 - 6.1 - THEORY <i>(Economic Botany)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Origin of Cultivated Plants: Centres of Origin, their importance with reference to Vavilov's work. Introductions, domestication and loss of crop genetic diversity; evolution of new crops/varieties, importance of germplasm diversity.	Dr. Kamal Choudhury	04	August
2	Cereals: Wheat and Rice (origin, morphology, processing & uses); Brief account of millets.	Dr. Kamal Choudhury	04	August
3	Legumes: Origin, morphology and uses of Chick pea, Pigeon pea and fodder legumes. Importance to man and ecosystem.	Dr. Kamal Choudhury	04	August
4	Sources of sugars and starches: Morphology and processing of sugarcane, products and by-products of sugarcane industry. Potato – morphology, propagation & uses.	Dr. Kamal Choudhury	04	Aug. Sept.
5	Spices: Listing of important spices, their family and part used. Economic importance with special reference to fennel, saffron, clove and black pepper.	Dr. Kamal Choudhury	04	September
6	Beverages: Tea, Coffee (morphology, processing & uses).	Dr. Kamal Choudhury	03	September
7	Sources of oils and fats: Description, classification, extraction, their uses and health implications groundnut, coconut, linseed, soybean, mustard and coconut. Essential Oils: Extraction methods, comparison, their uses.	Dr. Kamal Choudhury	04	September

8	Natural Rubber: Para-rubber: tapping, processing and uses.	Dr. Kamal Choudhury	03	Sept. –Oct
9	Drug-yielding plants: Therapeutic and habit-forming drugs with special reference to Cinchona, Digitalis, Papaver and Cannabis; Tobacco (Morphology, processing, uses and health hazards).	Dr. Kamal Choudhury	04	October
10	Timber plants: General account with special reference to teak and pine.	Dr. Kamal Choudhury	03	October
11	Fibers: Classification based on the origin of fibers; Cotton, Coir and Jute (morphology, extraction and uses).	Dr. Kamal Choudhury	03	Oct – Nov.

Botany (Hon.); Semester: 3RD; Paper: HC- 3026; 6.2: Practical - Detailed

Paper: HC- 3026; 6.2 - PRACTICAL <i>(Economic Botany)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Cereals: Study of useful parts: Rice/Bean (habit sketch, study of paddy and grain, starch grain, micro-chemical test).	Dr. Kamal Choudhury	02	August
2	Legumes: Bean, Groundnut, (habit, fruit, seed structure, micro-chemical tests).	Dr. Kamal Choudhury	02	August
3	Beverages: Tea (plant specimen, tea leaves), Coffee (plant specimen, beans).	Dr. Kamal Choudhury	02	August
4	Sources of oils and fats: Coconut and Mustard.	Dr. Kamal Choudhury	02	September
5	Rubber: Specimen, photograph/model of tapping, samples of rubber products.	Dr. Kamal Choudhury	02	September
6	Test for alkaloids: Neem, <i>Vinca rosea</i> .	Dr. Kamal Choudhury	02	September
7	Fiber-yielding plants: Cotton, Jute (specimen, transverse section of stem, test for lignin).	Dr. Kamal Choudhury	02	October



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 3RD; Paper: HC- 3036; - Outline

Department:	BOTANY	Semester	THIRD
Course:	HONOURS	Paper No:	HC-3036 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 3RD; Paper: HC- 3036; 7.1: Theory – Detailed

Paper: HC- 3036 - 7.1 - THEORY (Genetics)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Mendelian genetics and its extension: Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes; Probability and pedigree analysis; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant traits, Penetrance and Expressivity, Numericals; Polygenic inheritance.	Dr. Chunamoni Das	16	August
2	Extrachromosomal Inheritance: Chloroplast inheritance: Variegation in Four o'clock plant; Mitochondrial in yeast; Maternal effects-shell coiling in snail; Kappa particles in Paramecium. inheritance	Dr. Chunamoni Das	06	Aug - Sept
3	Linkage, crossing over and chromosome mapping: Linkage and crossing over-Cytological basis of crossing over; Recombination frequency, Interference and coincidence; Numericals based on gene mapping; Sex Linkage.	Dr. Chunamoni Das	08	September
4	Variation in chromosome number and structure: Deletion, Duplication, Inversion, Translocation, Position effect, Euploidy and Aneuploidy	Dr. Chunamoni Das	06	Sept. –Oct

5	Gene mutations: Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: CIB method. Role of Transposons in mutation. DNA repair mechanisms.	Dr. Chunamoni Das	06	October
6	Fine structure of gene: Classical vs molecular concepts of gene; Ciston, Racon, Muton, rII locus	Dr. Chunamoni Das	04	Oct - Nov
7	Population and Evolutionary Genetics: Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection, mutation, genetic drift. Genetic variation and Speciation.	Dr. Chunamoni Das	05	November

Botany (Hon.); Semester: 3RD; Paper: HC- 3036; 7.2: Practical - Detailed

Paper: HC- 3036; 7.2 - PRACTICAL <i>(Genetica)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Meiosis through temporary squash preparation.	Dr. Chunamoni Das	04	August
2	Mendel's laws through seed ratios.	Dr. Chunamoni Das	02	August
3	Chromosome mapping using point test cross data.	Dr. Chunamoni Das	04	August
4	Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1, 9:3:4).	Dr. Chunamoni Das	06	September
5	Permanent Slides showing Translocation Ring, Photograph showing Laggards and Inversion Bridge.	Dr. Chunamoni Das	02	September



TEACHING PLAN
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Botany (Hon.); Semester: 3RD; Paper: HG-RC- 3016; - Outline

Department:	BOTANY	Semester	THIRD
Course:	REGULAR	Paper No:	HG-RC-3016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 3RD; Paper: HG-RC- 3016; 3.1: Theory – Detailed

Paper: HG-RC- 3016 - 3.1 - THEORY <i>(Plant Physiology and Metabolism)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Plant-water relations: Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation.	Dr. Kamal Choudhury	08	August
2	Mineral nutrition: Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.	Dr. Rupak Sarma	06	August
3	Translocation in phloem: Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading.	Dr. Rupak Sarma	06	Aug - Sept
4	Photosynthesis: Photosynthetic Pigments; Photosystem I and II, reaction center, antenna molecules; Electron transport and mechanism of ATP synthesis; C3, C4 and CAM pathways of carbon fixation; Photorespiration.	Dr. Kamal Choudhury	05	Sept. –Oct
5	Respiration: Glycolysis, respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway.	Dr. Chunamoni Das	05	October
6	Enzymes: Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition.	Dr. Chunamoni Das	03	Oct - Nov
7	Nitrogen metabolism: Biological nitrogen fixation; Nitrate and ammonia assimilation	Dr. Chunamoni Das	05	Aug - Sept
8	Plant growth regulators: Discovery and physiological roles of auxins, gibberellins, cytokinins, ABA, ethylene.	Dr. Kamal Choudhury	06	Sept. Oct.

9	Plant response to light and temperature: Photoperiodism (SDP, LDP, Day neutral plants); Phytochrome, red and far red light responses on photomorphogenesis; Vernalization.	Dr. Rupak Sarma	06	Sept.-Oct.
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Botany (Hon.); Semester: 3RD; Paper: HG-RC- 3016; 3.2: Practical - Detailed

Paper: HC- 3036; 3.2 - PRACTICAL <i>(Genetics)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Determination of osmotic potential of palnt cell-sap by palmolytic methos.	Dr. Kamal Choudhury	03	August
2	To study the effect of light on transpiration by excised twig.	Dr. Kamal Choudhury	02	August
3	Calculation of stomatal index and stomatal frequency	Dr. Chunamoni Das	03	August
4	Demonstrate the activity of catalase and study the effect of pH and enzyme concentration.	Dr. Chunamoni Das	02	September
5	To study the effect of bicarbonate concentration on O ₂ evolution in photosynthesis.	Dr. Rupak Sarma	03	September
6	Demonstration experiments 1. Bolting. 2. Effect of auxins on rooting. 3. Suction due to transpiration. 4. R.Q. 5. Respiration in roots.	Dr. Rupak Sarma	03	Oct - Nov



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (SE -3); Semester: 3RD; Paper: SE- 3014 - Outline

Department:	BOTANY	Semester	FOURTH
Course:	REGULAR	Paper No:	SE -3014
Credit:	04	Total Lectures	60

Botany (RSE -1); Semester: 3rd; Paper: SE- 3014- Detailed

Paper: SE- 3014 <i>(Biofertilizer)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis.	Dr. Chunamoni Das	08	August
2	Azospirillum: isolation and mass multiplication – carrier based inoculant, associative effect of different microorganisms. Azotobacter: classification, characteristics – crop response to Azotobacter inoculum, maintenance and mass multiplication.	Dr. Rupak Sarma	16	Aug -Sept
3	Cyanobacteria (blue green algae), Azolla and Anabaena azollae association, nitrogen fixation, factors affecting growth, blue green algae and Azolla in rice cultivation.	Dr. Kamal Choudhury	08	Aug -Sept
4	Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.	Dr. Chunamoni Das	16	Aug
5	Organic farming – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – biocompost making methods, types and method of vermicomposting – field Application.	Dr. Kamal Choudhury	12	Sept -Oct



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Botany (Hon.); Semester: 5TH; Paper: HC- 5016; - Outline

Department:	BOTANY	Semester	FIFTH
Course:	HONOURS	Paper No:	HC-5016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 5TH; Paper: HC- 5016; 11.1: Theory - Detailed

Paper: HC- 5016 - 11.1 - THEORY <i>(Reproductive Biology of Angiosperms)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction: History and scope.	Dr. Chunamoni Das	04	August
2	Reproductive development: Induction of flowering; flower as a modified determinate shoot. Flower development: genetic and molecular aspects.	Dr. Chunamoni Das	06	August
3	Anther and pollen biology: Anther wall, microsporogenesis, callose deposition. Pollen wall structure, MGU structure, NPC system; Palynology and scope; Pollen wall proteins; Pollen viability, storage and germination; Abnormal features: Pseudomonads, polyads, massulae, pollinia.	Dr. Chunamoni Das	06	Aug - Sept
4	Ovule: Structure; Types; Special structures—endothelium, obturator, aril, caruncle and hypostase; Megasporogenesis and megagametogenesis;	Dr. Chunamoni Das	06	September
5	Pollination and fertilization: Pollination types; adaptations; structure of stigma and style; path of pollen tube in pistil; double fertilization.	Dr. Chunamoni Das	06	Sept. –Oct
6	Self incompatibility: Basic concepts (interspecific, intraspecific, homomorphic, heteromorphic, GSI and SSI); Methods to overcome self- incompatibility: mixed pollination, bud pollination, stub pollination; Intra-ovarian and in vitro pollination; Modification of stigma surface, parasexual hybridization; Cybrids, in vitro fertilization.	Dr. Chunamoni Das	06	October

7	Embryo, Endosperm and Seed: Structure and types; General pattern of development of dicot and monocot embryo and endosperm; Suspensor: structure and functions; Embryo-endosperm relationship; Nutrition of embryo; Unusual features; Embryo development in Paeonia. Seed structure, importance and dispersal mechanisms	Dr. Chunamoni Das	06	Oct - Nov
8	Polyembryony and apomixes: Introduction; Classification; Causes and applications	Dr. Chunamoni Das	04	November

Botany (Hon.); Semester: 5TH; Paper: HC- 5016; 11.2: Practical - Detailed

Paper: HC- 5016; 11.2 - PRACTICAL <i>(Reproductive Biology of Angiosperms)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Anther: Wall and its ontogeny; Tapetum; MMC, spore tetrads, uninucleate, bicelled and dehisced anther stages through slides/micrographs, male germ unit through photographs and schematic representation.	Dr. Chunamoni Das	02	August
2	Pollen grains: Fresh and acetolyzed showing ornamentation and aperture, pseudomonads, polyads, pollinia, ultrastructure of pollen wall; Pollen viability: Tetrazolium test. germination: Calculation of percentage germination in different media using hanging drop method.	Dr. Chunamoni Das	02	August
3	Ovule: Types-anatropous, orthotropous, amphitropous/campylotropous, circinotropous, unitegmic, bitegmic; Tenuinucellate and crassinucellate; Special structures: Endothelium, obturator, hypostase, caruncle and aril (permanent slides/specimens/photographs).	Dr. Chunamoni Das	02	August
4	Female gametophyte through permanent slides/ photographs: Types, ultrastructure of mature egg apparatus.	Dr. Chunamoni Das	02	September
5	Permanent Slides showing Translocation Ring, Photograph showing Laggards and Inversion Bridge.	Dr. Chunamoni Das	02	September
6	Intra-ovarian pollination; Test tube pollination through photographs.	Dr. Chunamoni Das	02	September
7	Endosperm: Dissections of developing seeds for endosperm with free-nuclear haustoria.	Dr. Chunamoni Das	02	October
8	Embryogenesis: Study of development of dicot embryo through permanent slides; dissection of developing seeds for embryos at various developmental stages.	Dr. Chunamoni Das	02	October



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 5TH; Paper: HC- 5026; - Outline

Department:	BOTANY	Semester	FIFTH
Course:	HONOURS	Paper No:	HC-5026 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 5TH; Paper: HC- 5026; 12.1: Theory - Detailed

Paper: HC- 5026 - 11.1 - THEORY <i>(Plant Physiology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Plant-water relations: Water Potential and its components, aquaporins, pathway, symplast, apoplast, transmembrane pathways, root pressure, guttation. Ascent of sap– cohesion-tension theory. Transpiration and factors affecting transpiration, antitranspirants, mechanism of stomatal movement. Plant and water stress.	Dr. Kamal Choudhury	08	August
2	Mineral nutrition: Essential and beneficial elements, macro and micronutrients, criteria for essentiality, mineral deficiency symptoms, roles of essential elements, chelating agents, Ion antagonism and toxicity.	Dr. Kamal Choudhury	05	August
3	Nutrient Uptake: Soil as a nutrient reservoir, transport of ions across cell membrane, passive absorption, electrochemical gradient, facilitated diffusion, active absorption, role of ATP, carrier systems, uniport, co-transport, symport, antiport.	Dr. Kamal Choudhury	05	August
4	Translocation in the phloem: Experimental evidence in support of phloem as the site of sugar translocation. Pressure–Flow Model; Phloem loading and unloading; Source–sink relationship.	Dr. Kamal Choudhury	05	September
5	Plant growth regulators: Discovery, chemical nature, bioassay and physiological roles of Auxin, Gibberellins, Cytokinin, Abscisic acid, Ethylene, Brassinosteroids and Jasmonic acid.	Dr. Kamal Choudhury	08	September
6	Physiology of flowering: Photoperiodism, flowering stimulus, florigen concept, vernalization, seed dormancy.	Dr. Kamal Choudhury	05	September

7	Phytochrome, crytochromes and phototropins: Discovery, chemical nature, role in photomorphogenesis, low energy responses (LER) and high irradiance responses (HIR), mode of action.	Dr. Kamal Choudhury	06	October
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Botany (Hon.); Semester: 5TH; Paper: HC- 5026; 12.2: Practical - Detailed

Paper: HC- 5026; 12.2 - PRACTICAL <i>(Plant Physiology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Determination of osmotic potential of plant cell sap by plasmolytic method.	Dr. Kamal Choudhury	02	August
2	Determination of water potential of given tissue (potato tuber) by weight method.	Dr. Kamal Choudhury	02	August
3	Study of the effect of light on the rate of transpiration in excised twig/leaf.	Dr. Kamal Choudhury	02	Aug - Sept
4	4. Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of a mesophyte and xerophyte.	Dr. Kamal Choudhury	02	September
5	To study the effect of different concentrations of IAA on Gram/Pea/Moong root (IAA Bioassay).	Dr. Kamal Choudhury	04	September
6	To study the induction of amylase activity in germinating Maize/Bean grains.	Dr. Kamal Choudhury	04	Sept – Oct.
7	Effect of carbon dioxide concentration on the rate of photosynthesis	Dr. Kamal Choudhury	02	October



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 5TH; Paper: HE- 5016; - Outline

Department:	BOTANY	Semester	FIFTH
Course:	HONOURS	Paper No:	HE-5016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 5TH; Paper: HE- 5016; 1.1: Theory - Detailed

Paper: HC- 5026 - 1.1 - THEORY <i>(Natural Resource Management)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Natural resources: Definition and types.	Dr. Kamal Choudhury	04	September
2	Sustainable utilization: Concept approaches (economic, ecological and socio-cultural).	Dr. Kamal Choudhury	05	September
3	Land: Utilization (agricultural, pastoral, horticultural, silvicultural); Soil degradation and management.	Dr. Chunamoni Das	04	Sept. Oct
4	Water: Fresh water (rivers, lakes, groundwater, aquifers, watershed); Marine; Estuarine; Wetlands; Threats and management strategies.	Dr. Chunamoni Das	04	September
5	Biological Resources: Biodiversity-definition and types; Significance; Threats; Management strategies; Bioprospecting; IPR; CBD; National Biodiversity Action Plan).	Dr. Chunamoni Das	05	Sept -Oct
6	Forests: Definition, Cover and its significance (with special reference to India); Major and minor forestproducts; Depletion; Management.	Dr. Rupak Sarma	05	August
7	Energy: Renewable and non-renewable sources of energy.	Dr. Kamal Choudhury	06	Sept -Oct
8	Contemporary practices in resource management: EIA, GIS, Participatory Resource	Dr. Rupak Sarma	08	August

	Appraisal, Ecological Footprint with emphasis on carbon footprint, Resource Accounting; Waste management.			
9	National and international efforts in resource management and conservation	Dr. Rupak Sarma	04	Aug -Sept

Botany (Hon.); Semester: 5TH; Paper: HE- 5016; 1.2: Practical - Detailed

Paper: HC- 5026; 12.2 - PRACTICAL <i>(Natural Resource Management)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Estimation of solid waste generated by a domestic system (biodegradable and non-biodegradable) and its impact on land degradation.	Dr. Chunamoni Das	04	August
2	Collections of data on forest cover of specific area.	Dr. Kamal Choudhury	04	August
3	Measurement of dominance of woody species by DBH (diameter at breast height) method.	Dr. Kamal Choudhury	06	Aug - Sept
4	Calculation and analysis of ecological footprint.	Dr. Rupak Sarma	04	September
5	Uses of GPS and GIS (Mapping of an area).	Dr. Rupak Sarma	02	September



Botany (Hon.); Semester: 5TH; Paper: HE- 5026; - Outline

Department:	BOTANY	Semester	FIFTH
Course:	HONOURS	Paper No:	HE-5026 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 5TH; Paper: HE- 5026; 2.1: Theory – Detailed

Paper: HE- 5026 - 2.1 - THEORY <i>(Horticultural Practices and Post-Harvest Technology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction: Scope and importance, Branches of horticulture; Role in rural economy and employment generation; Importance in food and nutritional security; Urban horticulture and ecotourism..	Dr. Rupak Sarma	04	August
2	Ornamental plants: Types, classification; Identification and salient features of some ornamental plants Ornamental flowering trees.	Dr. Rupak Sarma	04	August
3	Fruit and vegetable crops: Production, origin and distribution; Description of plants and their economic products; Management and marketing of vegetable and fruit crops; Identification of some fruits and vegetable varieties	Dr. Rupak Sarma	04	August
4	Horticultural techniques: Application of manure, fertilizers, nutrients and PGRs; Weed control; Biofertilizers, biopesticides; Irrigation methods; Hydroponics; Propagation Methods:	Dr. Rupak Sarma	08	Aug. –Sept.
5	Landscaping and garden design: Planning and layout (parks and avenues); gardening traditions - Ancient Indian, European, Mughal and Japanese Gardens; Urban forestry; policies and practices.	Dr. Rupak Sarma	06	September
6	Floriculture: Cut flowers, bonsai, commerce Importance of flower shows and exhibitions.	Dr. Rupak Sarma	06	September
7	Post-harvest technology: Post harvest technology in horticultural crops; Evaluation of quality traits; Harvesting and handling of fruits, vegetables and cut flowers; Preservation and processing; Methods of minimizing loses during	Dr. Rupak Sarma	10	Sept. –Oct.

	storage and transportation; Food irradiation - advantages and disadvantages; food safety.			
8	Disease control and management: Field and post-harvest diseases; Identification of deficiency symptoms; remedial measures and nutritional management practices; Crop sanitation; IPM strategies; Quarantine practices; Identification of common diseases and pests of ornamentals, fruits and vegetable crops.	Dr. Rupak Sarma	08	October
9	Horticultural crops - conservation and management: Documentation and conservation of germplasm; Role of micropropagation and tissue culture techniques; Varieties and cultivars of various horticultural crops; IPR issues; National, international and professional societies and sources of information on horticulture.	Dr. Rupak Sarma	10	Oct. -Nov
10	Field trip: Field visits to gardens, standing crop sites, nurseries, vegetable gardens and horticultural fields at suitable locations.	Teachers of the department		October



TEACHING PLAN
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Botany (Regular.); Semester: 5TH; Paper: RE- 5026; - Outline

Department:	BOTANY	Semester	FIFTH
Course:	REGULAR	Paper No:	RE-5026 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Regular.); Semester: 5TH; Paper: RE- 5026; 2.1: Theory - Detailed

Paper: RE- 5026 - 1.1 - THEORY <i>(Economic Botany and Biotechnology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Origin of Cultivated Plants: Concept of centres of origin, their importance with reference to Vavilov's work	Dr. Kamal Choudhury	02	August
2	Cereals: Wheat -Origin, morphology, uses	Dr. Kamal Choudhury	02	August
3	Legumes: General account with special reference to Gram and soybean	Dr. Kamal Choudhury	02	August
4	Spices: General account with special reference to clove and black pepper (Botanical name, family, part used, morphology and uses)	Dr. Kamal Choudhury	02	Aug -Sept
5	Beverages: Tea (morphology, processing, uses)	Dr. Kamal Choudhury	02	September
6	Oils and Fats: General description with special reference to groundnut	Dr. Kamal Choudhury	02	September
7	Fiber Yielding Plants: General description with special reference to Cotton	Dr. Kamal Choudhury	02	Sept -Oct
8	Introduction to biotechnology:	Dr. Chunamoni Das	02	August
9	Plant tissue culture: Micro propagation ; haploid production, brief account of embryo & endosperm culture with their applications	Dr. Chunamoni Das	08	Aug-Sept

10	Recombinant DNA Techniques: Blotting techniques: Northern, Southern and Western Blotting, DNA Fingerprinting; Molecular DNA markers; DNA sequencing, PCR and Reverse Transcriptase-PCR. Hybridoma and monoclonal antibodies, ELISA and Immunodetection. Molecular diagnosis of human disease,	Dr. Chunamoni Das	11	Sept -Oct
11	Bioinformatics: Introduction, branches, Aim, Scope and research areas, Biological data base and the retrieval system.	Dr. Rupak Sarma	05	August
12	Applications of Bioinformatics: Molecular Phylogeny; Basics in Proteomics and Genomics and their applications in crop improvement, Drug Discovery.	Dr. Rupak Sarma	05	Aug -Sept

Botany (Regular.); Semester: 5TH; Paper: RE- 5026; 2.2: Practical - Detailed

Paper: RE- 5026; 12.2 - PRACTICAL <i>(Economic Botany and Biotechnology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Study of economically important plants : Rice, Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut, Curcuma, through specimens, sections and microchemical tests	Dr. Kamal Choudhury	06	October
2	Familiarization with basic equipments in tissue culture.	Dr. Chunamoni Das	02	September
3	Study through photographs: Anther culture, somatic embryogenesis, endosperm and embryo culture; micropropagation.	Dr. Chunamoni Das	02	Sept -Oct
4	Study of molecular techniques: PCR, Blotting techniques, AGE and PAGE.	Dr. Chunamoni Das	04	Oct -Nov
5	Data base searching, and retrieval of Sequence from databases.	Dr. Rupak Sarma	04	September
6	Sequence alignment, Homology and construction of Phylogenetic tree.	Dr. Rupak Sarma	02	Sept -Oct



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (SEC -3); Semester: 5TH; Paper: SE- 5014 - Outline

Department:	BOTANY	Semester	FOURTH
Course:	REGULAR	Paper No:	SE -5014
Credit:	04	Total Lectures	60

Botany (RSE -3); Semester: 5th; Paper: SE- 5014- Detailed

Paper: SE- 5014 <i>(Medicinal Botany)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	History, Scope and Importance of Medicinal Plants. Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept: Umooor-e- tabiya, tumors treatments/ therapy, polyherbal formulations.	Dr. Kamal Choudhury	20	Aug- Sept Sept -Oct
2	Conservation of endangered and endemic medicinal plants. Red list criteria; In situ conservation: Biosphere reserves, sacred groves, National Parks; Ex situ conservation: Botanic Gardens, Ethno medicinal plant Gardens. Propagation of Medicinal Plants: Objectives of the nursery, its classification, use of green house for nursery production, propagation through cuttings, layering, grafting and budding.	Dr. Rupak Sarma	20	Aug- Sept Sept -Oct
3	Ethnobotany and Folk medicines. Definition; Ethnobotany in India: Methods to study ethnobotany; Applications of Ethnobotany: National interacts, Palaeo-ethnobotany. Folk medicines of ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India. Application of natural products to certain diseases- Jaundice, cardiac, infertility, diabetics, Blood pressure and skin diseases.	Dr. Chunamoni Das	20	Aug- Sept Sept -Oct



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (Hon.); Semester: 2nd; Paper: HC- 2016; - Outline

Department:	BOTANY	Semester	SECOND
Course:	HONOURS	Paper No:	HC-2016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 2nd; Paper: HC- 2016; 3.1: Theory - Detailed

Paper: HC- 2016 - 3.1 - THEORY <i>(Mycology and Phytopathology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction to Fungi: General characteristics; Thallus organization, Cell and Cell wall composition; Nutrition, flagella, septum, homothallism and heterothallism, cell division. Classification of Fungi General account of Myxomycota, Oomycota, Zygomycota, Ascomycota, Basidiomycota and Deuteromycota.	Dr. Rupak Sarma	08	August
2	Mastigomycotina (Chytridiomycetes and Oomycetes): Characteristic features; Reproduction; Life cycle with reference to <i>Synchytrium</i> , <i>Phytophthora</i> and <i>Albugo</i> .	Dr. Rupak Sarma	04	August
3	Zygomycotina: Characteristics; Reproduction; Life cycle with reference to <i>Rhizopus</i> ..	Dr. Rupak Sarma	04	August
4	Ascomycotina: General characteristics Life cycle, Heterokaryosis and parasexuality; Life cycle and classification with reference to <i>Saccharomyces</i> , <i>Aspergillus</i> , <i>Penicillium</i> , <i>Neurospora</i> and <i>Peziza</i> .	Dr. Rupak Sarma	04	September
5	Basidiomycotina: General characteristics; Life cycle and Classification with reference to black stem rust on wheat <i>Puccinia</i> , loose and covered smut, <i>Agaricus</i> ; Bioluminescence, Fairy Rings and Mushroom Cultivation.	Dr. Rupak Sarma	05	September
6	Deuteromycotina (Fungi Imperfecti): General characteristics; Thallus organization; reproduction; Classification with special reference to <i>Alternaria</i> and <i>Colletotrichum</i> .	Dr. Rupak Sarma	04	September

7	Allied Fungi- Myxomycota: General characteristics; Status of Slime molds, Classification; Occurrence; Types of plasmodia; Types of fruiting bodies.	Dr. Rupak Sarma	04	October
8	Symbiotic associations: Lichen – Occurrence; General characteristics; Range of thallus organization; Internal structure and nature of associations of algal and fungal partners; Reproduction. Mycorrhiza- Ectomycorrhiza, Endomycorrhiza and their significance.	Dr. Kamal Choudhury	03	
9	Applied Mycology: Role of fungi in biotechnology; food; Pharmaceutical (Secondary metabolites); Agriculture; Mycotoxins; Biological control, Medical mycology.	Dr. Kamal Choudhury	05	
10	Phytopathology: General symptoms; distribution of diseases; Etiology; Symptomology; Host-Pathogen relationships; Disease cycle and environmental relation; prevention and control of plant diseases, role of quarantine. Citrus canker and angular leaf spot of cotton; TMV, vein clearing. Fungal diseases – Early blight of potato, Black stem rust of wheat, White rust of crucifers.	Dr. Rupak Sarma	06	

Botany (Hon.); Semester: 2nd; Paper: HC- 2016; 3.2: Practical - Detailed

Paper: HC- 2016; 3.2 - PRACTICAL <i>(Mycology and Phytopathology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	1. Rhizopus: study of asexual stage from temporary mounts and sexual structures through permanent slides. 2. Aspergillus & Penicillium: study of asexual stage from temporary mounts. Sexual stage from permanent slides/ photographs. 3. Peziza: sectioning through ascocarp. 4. Alternaria: Specimens/photographs and temporary mounts.	Dr. Rupak Sarma	06	August
2	5. Puccinia: Black Stem Rust of Wheat and infected Barberry leaves; sections/ mounts. Agaricus: Sectioning of gills of Agaricus, 7. Albugo: Study of symptoms of plants infected with Albugo; asexual phase - section/ temporary mounts; sexual structures through permanent slides.	Dr. Rupak Sarma	04	August
3	Lichens: Study of growth forms of lichens. Study of thallus and reproductive structures through permanent slides. Mycorrhizae: ectomycorrhiza and endomycorrhiza (Photographs)	Dr. Kamal Choudhury	05	Aug - Sept
4	Phytopathology: Bottle specimens, Herbarium specimens should be made of bacterial diseases, Viral diseases, Fungal diseases Applied mycology:	Dr. Kamal Choudhury	05	September



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (Hon.); Semester: 2nd; Paper: HC- 2026; - Outline

Department:	BOTANY	Semester	SECOND
Course:	HONOURS	Paper No:	HC-2016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 2nd; Paper: HC- 2026; 4.1: Theory - Detailed

Paper: HC- 2016 - 4.1 - THEORY (Archegoniate)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction: Unifying features of archegoniate; Transition to land habit; Alternation of generations.	Dr. Kamal Choudhury	03	September
2	Bryophytes: General characteristics; Adaptations to land habit; Classification; Range of thallus organization.	Dr. Chunamoni Das	04	August
3	Bryophytes: Classification, morphology, anatomy and reproduction of Riccia, Marchantia, Anthoceros, Sphagnum and Polytrichum; Reproduction and evolutionary trends in Riccia, Marchantia, Anthoceros, Sphagnum and Polytrichum. Ecological and economic importance of bryophytes.	Dr. Chunamoni Das	10	Aug- Sept
4	Pteridophytes: General characteristics; Classification; Early land plants	Dr. Kamal Choudhury	05	Sept -Oct
5	Pteridophytes: Classification, morphology, anatomy and reproduction of Psilotum, Lycopodium, Selaginella, Equisetum, Pteris and Marsilea. Apogamy and apospory, heterospory and seed habit, telome theory, stelar evolution; Ecological and economic importance.	Dr. Kamal Choudhury	12	Oct -Nov
6	Gymnosperms: General characteristics, classification, morphology, anatomy and reproduction of Cycas, Pinus, Ginkgo and Gnetum; Ecological and economic importance.	Dr. Chunamoni Das	10	Sept- Oct

Botany (Hon.); Semester: 2nd; Paper: HC- 2026; 4.2: Practical - Detailed

Paper: HC- 2016; 4.2 - PRACTICAL <i>(Archegoniate)</i>				
S. No.	Course Content	Allotted to	Hours/ Lecture	Month
1	<p>Riccia – Morphology of thallus.</p> <p>Marchantia- Morphology of thallus and reproductive parts; section of thallus & reproductive parts.</p> <p>Sphagnum- Morphology of plant;</p> <p>Polytrichum- Morphology of vegetative and reproductive parts; T S of Vegetative parts, LS of reproductive parts.</p>	Dr. Kamal Choudhury	06	October
2	<p>Lycopodium, Selaginella, Equisetum, Marsilea - Morphology of plant, transverse section of stem; Longitudinal Section of strobilus; morphology of sporophyll.</p> <p>Pteris- Morphology of plant, transverse section of rachis, vertical section of leaflet through sorus</p> <p>Marsilea- Morphology, TS of rhizome and petiole; section of sporocarp.</p>	Dr. Kamal Choudhury	06	Oct -Nov
3	<p>Cycas- Morphology of plant; morphology and transverse section of coralloid roots; transverse section of leaflets; Longitudinal Section of male and female cone.</p> <p>Pinus- Morphology of plant; transverse section of Needle; longitudinal section of male cone and female cone;</p> <p>Ginkgo- Morphology of plants and reproductive structures (only photographs).</p> <p>Gnetum- Morphology of plant; Morphology of male and female strobilus; vertical section of ovule (permanent slide).</p>	Dr. Chunamoni Das	06	Sept -Oct



TEACHING PLAN
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Botany (Hon.); Semester: 2nd; Paper: HG-RC- 2016; - Outline

Department:	BOTANY	Semester	SECOND
Course:	REGULAR	Paper No:	HG-RC -2016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 2nd; Paper: HG-RC- 2016; 2.1: Theory - Detailed

Paper: HG-RC- 2016 - 2.1 - THEORY <i>(Plant Ecology and Taxonomy)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction	Dr. Chunamoni Das	02	August
2	Ecological factors: Soil: Origin, formation, composition, soil profile. Water: States of water. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes.	Dr. Chunamoni Das	06	August
3	Plant communities: Characters; Ecotone and edge effect; Succession; Processes and types.	Dr. Chunamoni Das	04	Aug-Sept
4	Ecosystem: Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon, nitrogen and Phosphorous	Dr. Chunamoni Das	06	Sept -Oct
5	Phytogeography: Principal biogeographical zones; Endemism	Dr. Rupak Sarma	04	August
6	Introduction to plant taxonomy: Identification, Classification, Nomenclature.	Dr. Kamal Choudhury	03	September
7	Identification: Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access	Dr. Kamal Choudhury	05	October
8	Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.	Dr. Rupak Sarma	06	Aug -Sept
9	Taxonomic hierarchy: Ranks, categories and taxonomic groups	Dr. Kamal Choudhury	02	September

10	Botanical nomenclature: Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.	Dr. Kamal Choudhury	04	Sept -Oct
11	Classification: Types of classification-artificial, natural and phylogenetic. Bentham and Hooker, Engler and Prantl (upto series).	Dr. Kamal Choudhury	03	November
12	Biometrics, numerical taxonomy and cladistics Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms	Dr. Rupak Sarma	04	October

Botany (Hon.); Semester: 2ND; Paper: HG-RC- 2016; 2.2: Practical - Detailed

Paper: HC- 2016; 4.2 - PRACTICAL <i>(Plant Ecology and Taxonomy)</i>				
S. No.	Course Content	Allotted to	Hours/ Lecture	Month
1	Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.	Dr. Rupak Sarma	02	August
2	Study of morphological adaptations of hydrophytes and xerophytes (four each).	Dr. Rupak Sarma	02	August
3	Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method.	Dr. Chunamoni Das	02	Aug - Sept
4	Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law.	Dr. Chunamoni Das	02	September
5	Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Brassicaceae, Solanaceae, Lamiaceae.	Dr. Kamal Choudhury	06	September
6	Mounting of a properly dried and pressed specimen of any wild plant with herbarium label	Dr. Kamal Choudhury	02	October



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (Hon.); Semester: 4TH; Paper: HC- 4016; - Outline

Department:	BOTANY	Semester	FOURTH
Course:	HONOURS	Paper No:	HC -4016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 4TH; Paper: HC- 4016; 8.1: Theory - Detailed

Paper: HC- 4016 - 8.1 - THEORY (Molecular Biology)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Nucleic acids : Carriers of genetic information Historical perspective; DNA as the carrier of genetic information (Griffith's, Hershey & Chase, Avery, McLeod & McCarty, Fraenkel-Conrat's experiment.	Dr. Chunamoni Das	04	August
2	The Structures of DNA and RNA: DNA Structure: Miescher to Watson and Crick- historic perspective, DNA structure, Salient features of double helix, denaturation and renaturation, cot curves; Organization of DNA Prokaryotes, Viruses, Eukaryotes. Organelle DNA -- mitochondria and chloroplast DNA. The Nucleosome Chromatin structure- Euchromatin, Heterochromatin- Constitutive and Facultative heterochromatin.	Dr. Chunamoni Das	10	August
3	The replication of DNA: Chemistry of DNA synthesis; General principles – bidirectional, semiconservative and semi discontinuous replication, RNA priming; Various models of DNA replication, including rolling circle, θ (theta) mode of replication, replication of linear ds-DNA; Enzymes involved in DNA replication.	Dr. Chunamoni Das	10	September
4	Central dogma and genetic code: Key experiments establishing-The Central Dogma (Adaptor hypothesis and discovery of mRNA template), Genetic code	Dr. Chunamoni Das	02	September

5	Transcription: Transcription in prokaryotes and eukaryotes. Principles of transcriptional regulation; Prokaryotes: Regulation of lactose metabolism and tryptophan synthesis in <i>E.coli</i> . Eukaryotes: transcription factors, heat shock proteins, steroids and peptide hormones; Gene silencing.	Dr. Chunamoni Das	12	October
6	Processing and modification of RNA: Split genes-concept of introns and exons, removal of introns, spliceosome machinery, splicing pathways, group I and group II intron splicing, alternative splicing eukaryotic mRNA processing; Ribozymes; RNA editing and mRNA transport.	Dr. Chunamoni Das	06	Oct - Nov
7	Translation: Ribosome structure and assembly, mRNA; Charging of tRNA, aminoacyl tRNA synthetases; Various steps in protein synthesis, proteins involved in initiation, elongation and termination of polypeptides; Fidelity of translation; Inhibitors of protein synthesis; Post-translational modifications of proteins.	Dr. Chunamoni Das	06	November

Botany (Hon.); Semester: 4TH; Paper: HC- 4016; 8.2: Practical - Detailed

Paper: HC- 4016; 8.2 - PRACTICAL (<i>Molecular Biology</i>)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	DNA isolation from any plant material. DNA estimation by diphenylamine reagent/UV Spectrophotometry (Demonstration).	Dr. Chunamoni Das	04	August
2	Study of DNA replication mechanisms through photographs (Rolling circle, Theta replication and semi-discontinuous replication).	Dr. Chunamoni Das	04	August
3	Study of structures of prokaryotic RNA polymerase and eukaryotic RNA polymerase II through photographs	Dr. Chunamoni Das	04	Aug - Sept
4	Study of the following through photographs: Assembly of Spliceosome machinery; Splicing mechanism in group I & group II introns; Ribozyme and Alternative splicing.	Dr. Chunamoni Das	04	September



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 4TH; Paper: HC- 4026; - Outline

Department:	BOTANY	Semester	FOURTH
Course:	HONOURS	Paper No:	HC -4026 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 4TH; Paper: HC- 4026; 9.1: Theory - Detailed

Paper: HC- 4026 - 9.1 - THEORY <i>(Plant Ecology and Phytogeography)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction: Basic concepts; Levels of organization. living world and the environment, the components and dynamism, homeostasis.	Dr. Rupak Sarma	04	August
2	Soil: Importance; Origin; Formation; composition; Physical; Chemical and Biological components; Soil profile; Role of climate in soil development.	Dr. Rupak Sarma	04	August
3	Water States of water in the environment; Atmospheric moisture; Precipitation types; Hydrological Cycle; Water in soil; Water table.	Dr. Rupak Sarma	04	August
4	Adoptation of plants to various environmental factors: Light, temperature, wind and fire	Dr. Rupak Sarma	04	August
5	Biotic interactions: Trophic organization, basic source of energy, autotrophy, heterotrophy; symbiosis, commensalism, parasitism; food chains and webs; ecological pyramids; biomass, standing crop.	Dr. Rupak Sarma	02	Aug -Sept
6	Population ecology: Population characteristics, Growth curve, population regulation, r and k selection. Ecological speciation: Allopatric/ Sympatric and Parapatric speciation.	Dr. Rupak Sarma	04	September
7	Plant communities: Ecological amplitude; Habitat and niche; Characters: analytical and synthetic; Ecotone and edge effect; Dynamics: succession – processes, types; climax concepts.	Dr. Rupak Sarma	04	September
8	Ecosystems: Structure; Processes; Trophic organisation; Food chains and Food webs; Ecological pyramids.	Dr. Rupak Sarma	04	Sept. -Oct

9	Functional aspects of ecosystem: Principles and models of energy flow; Production and productivity; Ecological efficiencies; Biogeochemical cycles; Cycling of Carbon, Nitrogen and Phosphorus.	Dr. Rupak Sarma	04	Oct - Nov
10	Phytogeography: Principles; Continental drift; Theory of tolerance; Endemism; Brief description of major terrestrial biomes; Phytogeographical division of India; Vegetation types of NE India with special reference to Assam.	Dr. Rupak Sarma	06	November

Botany (Hon.); Semester: 4TH; Paper: HC- 4026; 9.1: Practical - Detailed

Paper: HC- 4026; 9.2 - PRACTICAL <i>(Plant Ecology and Phytogeography)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter. Determination of pH of various soil and water samples using pH meter.	Dr. Rupak Sarma	02	August
2	Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid field tests. Determination of organic matter of different soil samples by Walkley & Black rapid titration method.	Dr. Rupak Sarma	03	August
3	Determination of dissolved oxygen of water samples from polluted and unpolluted sources.	Dr. Rupak Sarma	02	Aug - Sept
4	(a). Study of morphological adaptations of hydrophytes and xerophytes. (b). Study of biotic interactions of the following: Stem parasite (<i>Cuscuta</i>), Root parasite (<i>Orobanche</i>) Epiphytes, Predation (Insectivorous plants).	Dr. Rupak Sarma	03	September
5	(a) Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus, by species area curve method (species to be listed). (b) Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law. (c) Quantitative analysis of herbaceous vegetation for density and abundance in the college campus.	Dr. Rupak Sarma	06	October
	Field visit to familiarise students with ecology of different sites	All Teachers		October



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 4TH; Paper: HC- 4036; - Outline

Department:	BOTANY	Semester	FOURTH
Course:	HONOURS	Paper No:	HC -4036 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 4TH; Paper: HC- 4036; 9.1: Theory - Detailed

Paper: HC- 4036 -10.1 - THEORY <i>(Plant Systematics)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Significance of Plant systematic: Introduction to systematics; Plant identification, Classification, Nomenclature. Evidences - palynology, cytology, phytochemistry and molecular data. Functions and importance of Herbarium; Important herbaria and botanical gardens of the world and India; Virtual herbarium; E-flora; Concept of taxa; Categories and taxonomic hierarchy.	Dr. Kamal Choudhury	08	August
2	Botanical nomenclature: Principles and rules (ICN); Ranks and names; Typification, author citation, Effective and valid publication, rejection of names, principle of priority and its limitations; Names of hybrids.	Dr. Kamal Choudhury	06	August
3	Systems of classification: Major contributions of Theophrastus, Bauhin, Tournefort, Linnaeus, Adanson, de Candolle, Bessey, Hutchinson, Takhtajan and Cronquist; Classification systems of Bentham and Hooker and Engler and Prantl; Brief reference of APG classification.	Dr. Kamal Choudhury	08	September
4	Numerical taxonomy and cladistics: Characters; Variations; OTUs, character weighting and coding; Cluster analysis; Phenograms, cladograms.	Dr. Kamal Choudhury	05	September
5	Phylogeny of Angiosperms: Terms and concepts Origin and evolution of angiosperms; Co-evolution of angiosperms and animals; Methods of illustrating evolutionary relationship	Dr. Kamal Choudhury	08	Sept -Oct

6	Angiospermic Families: Detail study of the following families: Magnoliaceae, Fabaceae, Asteraceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Orchidaceae, Musaceae, Zingiberaceae, Poaceae.	Dr. Kamal Choudhury	10	Oct -Nov
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Botany (Hon.); Semester: 4TH; Paper: HC- 4036; 10.2: Practical - Detailed

Paper: HC- 4036; 10.2- PRACTICAL <i>(Plant Systematics)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Study of vegetative and floral characters of locally available angiospermic plants belonging to the following families - Fabaceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Musaceae, Orchidaceae.	Dr. Kamal Choudhury	12	August
2	Field visit to familiarise students with vegetation of an area and identification of plant species / Visit to Academic or Research Institutions. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label.	Dr. Kamal Choudhury		August



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2022 - 2023

Botany (Hon.); Semester: 4TH; Paper: HG-RC- 4016; - Outline

Department:	BOTANY	Semester	FOURTH
Course:	REGULAR	Paper No:	HG-RC -4016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 4TH; Paper: HG-RC- 4016; 4.1: Theory - Detailed

Paper: HG-RC- 4016 -5.1 - THEORY <i>(Plant Anatomy and Embryology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Meristematic and permanent tissues: Root and shoot apical meristems; Simple and complex tissues.	Dr. Kamal Choudhury	06	August
2	Organs: Structure of dicot and monocot root stem and leaf.	Dr. Kamal Choudhury	04	August
3	Secondary Growth: Vascular cambium – structure and function, seasonal activity. Secondary growth in root and stem, Wood.	Dr. Kamal Choudhury	06	August
4	Adaptive and protective systems: Epidermis, cuticle, stomata; General account of adaptations in xerophytes and hydrophytes.	Dr. Rupak Sarma	06	September
5	Structural organization of flower: Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultrastructure of mature embryo sac.	Dr. Rupak Sarma	06	September
6	Pollination and fertilization: Pollination mechanisms and adaptations; Double fertilization; Seed-structure appendages and dispersal mechanisms.	Dr. Chunamoni Das	05	August
7	Embryo and endosperm: Endosperm types, structure and functions; Dicot and monocot embryo; Embryo- endosperm relationship.	Dr. Chunamoni Das	05	Aug -Sept
8	Apomixis and polyembryony: Definition, types and practical applications.	Dr. Chunamoni Das	05	Sept -Oct

Botany (Hon.); Semester: 4TH; Paper: HG-RC- 4016; 5.2: Practical – Detailed

Paper: HG-RC; 5.2- PRACTICAL <i>(Plant Anatomy and Embryology)</i>				
S. No.	Course Content	Allotted to	Hours/ Lecture	Month
1	(a) Study of meristems through permanent slides and photographs. (b) Tissues (parenchyma, collenchyma and sclerenchyma); Macerated xylary elements, Phloem (Permanent slides, photographs) (c) Stem: Monocot: Zea mays; Dicot: Helianthus; Secondary: Helianthus (only Permanent slides). (d) Root: Monocot: Zea mays; Dicot: Helianthus; Secondary: Helianthus (only Permanent slides). (e) Leaf: Dicot and Monocot leaf (only Permanent slides).	Dr. Kamal Choudhury	04	Sept -Oct
2	Adaptive anatomy: Xerophyte (Nerium leaf); Hydrophyte (Hydrilla stem).	Chunamoni Das	04	
3	(a) Structure of anther (young and mature), tapetum (amoeboid and secretory) (Permanent slides). (b) Types of ovules: anatropous, orthotropous, circinotropous, amphitropous/ campylotropous (permanent slides) (c) Female gametophyte: Polygonum type of Embryo sac Development (Permanent slides/photographs). (d) Ultrastructure of mature egg apparatus cells through electron micrographs. (e) Pollination types and seed dispersal mechanisms (Photographs and specimens).	Dr. Kamal Choudhury	06	Aug -Sept
4	Dissection of embryo/endosperm from developing seeds.	Dr. Rupak Sarma	04	Sept -Oct



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (RSE -2); Semester: 4th; Paper: SE- 4014 - Outline

Department:	BOTANY	Semester	FOURTH
Course:	HONOURS/ REGULAR	Paper No:	RE -6016 (Theory)
Credit:	04	Total Lectures	60

Botany (RSE -4); Semester: 6th; Paper: SE- 6024- Detailed

Paper: RE- 6016; 4.1 - THEORY (Mushroom Culture Technology)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Nursery: definition, objectives and scope and building up of infrastructure for nursery, planning and seasonal activities - Planting - direct seeding and transplants.	Dr. Kamal Choudhury	08	August
2	Seed: Structure and types - Seed dormancy; causes and methods of breaking dormancy - Seed storage: Seed banks, factors affecting seed viability, genetic erosion – Seed production technology - seed testing and certification.	Dr. Kamal Choudhury	12	August
3	Vegetative propagation: air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants – green house - mist chamber, shed root, shade house and glass house.	Dr. Rupak Sarma	12	August
4	Gardening: definition, objectives and scope - different types of gardening -landscape and home gardening - parks and its components - plant materials and design - computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting.	Dr. Chunamoni Das	16	September
5	Sowing/raising of seeds and seedlings - Transplanting of seedlings - Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots - Storage and marketing procedures.	Dr. Rupak Sarma	12	



TEACHING PLAN
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Botany (Hon.); Semester: 6th; Paper: HC- 6016; - Outline

Department:	BOTANY	Semester	SIXTH
Course:	HONOURS	Paper No:	HC -6016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 6th; Paper: HC- 6016; 13.1: Theory - Detailed

Paper: HC- 6016; 13- THEORY <i>(Plant Metabolism)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Concept of metabolism: Introduction, anabolic and catabolic pathways, regulation of metabolism, role of regulatory enzymes; classification, nomenclature and importance of enzyme; concept of coenzyme, apoenzyme and prosthetic group; enzyme inhibition.	Dr. Cunamoni Das	06	August
2	Carbon assimilation: Historical background, photosynthetic pigments, role of photosynthetic pigments, antenna molecules and reaction centres, photochemical reactions, photosynthetic electron transport, PSI, PSII, Q cycle, CO ₂ reduction, photorespiration, C ₄ -pathways; Crassulacean acid metabolism; Factors affecting CO ₂ reduction.	Dr. Cunamoni Das	10	August
3	Carbohydrate metabolism: Synthesis and catabolism of sucrose and starch.	Dr. Cunamoni Das	02	August
4	Carbon Oxidation: Glycolysis, fate of pyruvate, regulation of glycolysis, oxidative pentose phosphate pathway, oxidative decarboxylation of pyruvate, regulation of PDH, NADH shuttle; TCA cycle, amphibolic role, anaplerotic reactions, regulation of the cycle, mitochondrial electron transport, oxidative phosphorylation, cyanide-resistant respiration, factors affecting respiration.	Dr. Cunamoni Das	08	September
5	ATP-Synthesis: Mechanism of ATP synthesis, substrate level phosphorylation, chemiosmotic	Dr. Cunamoni Das	06	September

	Mechanism, ATP synthase, Boyers conformational model, Racker's experiment, Jagendorf's experiment; role of uncouplers.			
6	Lipid metabolism: Synthesis and breakdown of triglycerides, β -oxidation, glyoxylate cycle, gluconeogenesis and its role in mobilisation of lipids during seed germination, α oxidation.	Dr. Cunamoni Das	04	September
7	Nitrogen metabolism: Nitrate assimilation, biological nitrogen fixation (examples of legumes and non-legumes); Physiology and biochemistry of nitrogen fixation; Ammonia assimilation and transamination.	Dr. Cunamoni Das	04	
8	Mechanisms of signal transduction: Receptor-ligand interactions; Second messenger concept, Calcium calmodulin, MAP kinase cascade.	Dr. Cunamoni Das	06	

Botany (Hon.); Semester: 6TH; Paper: HC- 6016; 13.2: Practical – Detailed

Paper: HC- 6016; 13.2- PRACTICAL

(Plant Metabolism)

S. No.	Course Content	Allotted to	Hours/ Lecture	Month
1	(a) Chemical separation of photosynthetic pigments. (b) Quantitative analysis of absorption spectrum of photosynthetic pigments.	Dr. Cunamoni Das	04	August
2	(a) Estimation of sugar content by Somogyi method. (b) Determination of TAN in plant materials.	Dr. Cunamoni Das		
3	To compare the rate of respiration in different parts of a plant (Demonstration).	Dr. Cunamoni Das	02	August
4	Estimation of protein in a sample by Biuret method.	Dr. Cunamoni Das	02	
	(a) Separation of amino acids by paper chromatography. (b) Demonstration of Thin layer chromatography (TLC).	Dr. Cunamoni Das	04	



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (Hon.); Semester: 6th; Paper: HC- 6026; - Outline

Department:	BOTANY	Semester	SIXTH
Course:	HONOURS	Paper No:	HG-RC -6026 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 6th; Paper: HC- 6026; 14.1: Theory - Detailed

Paper: HC- 6026; 14.1 - THEORY <i>(Plant Biotechnology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Plant Tissue Culture: Historical perspective; Composition of media; Nutrient and hormone requirements; Totipotency; Organogenesis; Embryogenesis; Protoplast isolation, culture and fusion; Tissue culture applications.	Dr. Rupak Sarma	12	August
2	Recombinant DNA technology: Restriction Endonucleases; Restriction Mapping; Cloning Vectors: Prokaryotic (pUC 18 and pUC19, pBR322, Ti plasmid, BAC); Lambda phage, M13 phagemid, Cosmid, Shuttle vector; Eukaryotic Vectors (YAC).	Dr. Rupak Sarma	10	August
3	Gene Cloning: Recombinant DNA, Bacterial Transformation and selection of recombinant clones, PC Rmediated gene cloning; Gene Construct; construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by genetic selection; complementation, colony hybridization; PCR	Dr. Rupak Sarma	08	September
4	Methods of gene transfer: Agrobacterium-mediated, Direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment; Selection of transgenics–selectable marker and reporter genes.	Dr. Rupak Sarma	06	September
5	Applications of Biotechnology: Pest resistant, herbicide resistant plants; Transgenic crops with improved quality traits; Improved horticultural varieties; edible vaccines; Industrial enzymes. Human Growth Hormone; Humulin; Biosafety.	Dr. Rupak Sarma	10	Sept -Oct

Botany (Hon.); Semester: 6TH; Paper: HC- 6026; 14.2: Practical – Detailed

Paper: HC- 6026; 14.2- PRACTICAL (Plant Biotechnology)				
1	(a) Preparation of MS medium. (b) Demonstration of <i>in vitro</i> sterilization and inoculation methods using leaf and nodal explants of tobacco, <i>Datura</i> , <i>Brassica</i> etc.	Dr. Rupak Sarma	04	Aug -Sept
2	Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs.	Dr. Rupak Sarma	02	September
3	(a) Isolation of protoplasts. (b) Construction of restriction map of circular and linear DNA from the data provided.	Dr. Rupak Sarma	04	September
4	(a) Study of methods of gene transfer through photographs: <i>Agrobacterium</i> -mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment. (b) Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato through photographs.	Dr. Rupak Sarma	04	October
5	(a) Isolation of plasmid DNA. (b) Restriction digestion and gel electrophoresis of plasmid DNA.	Dr. Rupak Sarma	04	October



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Botany (Hon.); Semester: 6th; Paper: HE- 6016; - Outline

Department:	BOTANY	Semester	SIXTH
Course:	HONOURS	Paper No:	HE -6016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Hon.); Semester: 6th; Paper: HE- 6016; 3.1: Theory - Detailed

Paper: HE- 6016; 3.1 - THEORY <i>(Industrial and Environmental Microbiology)</i>				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Scope of microbes in industry and environment:	Dr. Kamal Choudhury	04	August
2	Fermenters and fermentation processes: Solid-state and liquid-state fermentations; Batch and continuous fermentations. Components of a typical bioreactor, Types of bioreactors-laboratory, pilotscale and production fermenters; Constantly stirred tank fermenter, tower fermenter, fixed bed and fluidized bed bioreactors and air-lift fermenter. A visit to any educational institute/ industry to see an industrial fermenter, and other downstream processing operations.	Dr. Kamal Choudhury All teachers	10	August
3	Microbial production of industrial products: Microorganisms involved, media, fermentation conditions, downstream processing and uses; Filtration, centrifugation, cell disruption, solvent extraction, precipitation and ultrafiltration, lyophilization, spray drying; Hands on microbial fermentations for the production and estimation of Enzyme: amylase or lipase activity, Organic acid, alcohol and antibiotic.	Dr. Kamal Choudhury	10	Aug -Sept

4	Microbial enzymes of industrial interest and enzyme immobilization: Microorganisms for industrial applications and hands on screening microorganisms for casein hydrolysis; starch hydrolysis; cellulose hydrolysis. Methods of immobilization, advantages and applications, large scale applications of immobilized enzymes.	Dr. Kamal Choudhury	08	September
5	Microbes and quality of environment: Distribution of microbes in air; Isolation of microorganisms from soil, air and water.	Dr. Kamal Choudhury	04	Sept-Oct
6	Microbial flora of water: Water pollution, role of microbes in sewage and domestic waste water treatment systems. Determination of BOD, COD, TDS and TOC of water samples; Microorganisms as indicators of water quality, check coliform and fecal coliform in water samples.	Dr. Kamal Choudhury	08	October
7	Microbes in agriculture and remediation of contaminated soils: Biological fixation; Mycorrhizae; Bioremediation of contaminated soils. Isolation of root nodulating bacteria, arbuscular mycorrhizal colonization in plant roots.	Dr. Kamal Choudhury	06	November

Botany (Hon.); Semester: 6TH; Paper: HE- 6016; 3.2: Practical – Detailed

Paper: HE- 6016; 14.2- PRACTICAL <i>(Industrial and Environmental Microbiology)</i>				
1	Principles and functioning of instruments in microbiology laboratory	Dr. Kamal Choudhury	04	Aug -Sept
2	Hands on sterilization techniques and preparation of culture media.	Dr. Kamal Choudhury	04	September
3	Pure culture techniques.	Dr. Kamal Choudhury	04	Sept -Oct



TEACHING PLAN
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Botany (Hon.); Semester: 6th; Paper: HE- 6036

Department:	BOTANY	Semester	SIXTH
Course:	HONOURS	Credit	06
Paper No.	HE -6036 (Project Work/Dissertation)		
Plan of Project Work	The Project Work will done under the supervision of Teachers (3) in three groups.		



TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
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Botany (Gen.); Semester: 6th; Paper: RE- 6016; - Outline

Department:	BOTANY	Semester	SIXTH
Course:	REGULAR	Paper No:	RE -6016 (Theory)
Credit:	Theory - 04	Total Lectures	60
	Practical -02		

Botany (Gen.); Semester: 6th; Paper: RE- 6016; 4.1: Theory - Detailed

Paper: RE- 6016; 4.1 - THEORY (Analytical Techniques in Plant Sciences)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Imaging and related techniques: Principles of microscopy; Light microscopy; Fluorescence microscopy; Confocal microscopy; Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching.	Dr. Kamal Choudhury	12	Aug –Sept.
2	Cell fractionation: Centrifugation: Differential and density gradient centrifugation, sucrose density gradient, CsCl ₂ gradient, analytical centrifugation, ultracentrifugation, marker enzymes. A visit to any educational institute/ industry to see an industrial fermenter, and other downstream processing operations.	Dr. Chunamoni Das	05	August
3	Radioisotopes: Use in biological research, autoradiography, pulse chase experiment.	Dr. Rupak Sarma	05	August
4	Spectrophotometry: Principle and its application in biological research.	Dr. Rupak Sarma	05	Aug -Sept
5	Chromatography: Principle; Paper chromatography; Column chromatography, TLC, GLC, HPLC, Ionexchange chromatography; Molecular sieve chromatography; Affinity chromatography	Dr. Kamal Choudhury	06	Sept- Oct

6	Characterization of proteins and nucleic acids: Mass spectrometry; X-ray diffraction; X-ray crystallography; Characterization of proteins and nucleic acids; Electrophoresis: AGE, PAGE, SDS-PAGE	Dr. Rupak Sarma	04	September
7	Biostatistics: Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical; Measures of central tendency: Arithmetic mean, mode, median; Measures of dispersion: Range, mean deviation, variation, standard deviation; Chi-square test for goodness of fit.	Dr. Chunamoni Das	10	Aug. Sept

Botany (Hon.); Semester: 6TH; Paper: RE- 6016; 4.2: Practical – Detailed

Paper: RE- 6016; 4.2- PRACTICAL <i>(Analytical Techniques in Plant Sciences)</i>				
1	(a) Study of Blotting techniques: Southern, Northern and Western, DNA fingerprinting, DNA sequencing, PCR through photographs. (b) Demonstration of ELISA.	Dr. Chunamoni Das	04	September
2	(a) To separate sugars by thin layer chromatography. (b) Isolation of chloroplasts by differential centrifugation. (c) To separate chloroplast pigments by column chromatography.	Dr. Kamal Choudhury	06	Sept -Oct
	To estimate protein concentration through Lowry's methods.	Dr. Rupak Sarma	02	Aug -Sept
	(a) To separate proteins using PAGE. (b) To separate DNA (marker) using AGE.	Dr. Rupak Sarma	04	September
	Study of different microscopic techniques using photographs/micrographs (freezefracture, freeze etching, negative staining, positive staining, fluorescence and FISH).	Dr. Rupak Sarma	04	October


Botany (RSE -4); Semester: 6th; Paper: SE- 6024 - Outline

Department:	BOTANY	Semester	SIXTH
Course:	REGULAR	Paper No:	RE -6016 (Theory)
Credit:	04	Total Lectures	60

Botany (SE -4); Semester: 6th; Paper: SE- 6024- Detailed

Paper: RE- 6016; 4.1 - THEORY (Mushroom Culture Technology)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	Introduction, history. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms. Edible mushrooms available in India - Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus.	Dr. Kamal Choudhury	10	August
2	Cultivation Technology: Infrastructure: substrates, Polythene bag, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit) water sprayer, tray, small polythene bag. Pure culture: Medium, sterilization, preparation of spawn, multiplication. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroombed preparation - Low cost technology, Composting technology in mushroom production	Dr. Rupak Sarma	24	Aug –Sept Sept Oct
3	Storage and nutrition: Short-term storage Long term Storage, drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content - Vitamins.	Dr. Chunamoni Das	16	Aug -Sept
4	Food Preparation : Types of foods prepared from mushroom. Research Centres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.	Dr. Kamal Choudhury	10	September
