TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2019 - 20

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

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

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

Paper: HC- 1016; 1.1 THEORY (*Phycology and Microbiology*)				
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. Nandini Kakoti	08	August
5	**Cyanophyta and Xanthophyta:** Ecology and occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of Nostoc and *Vaucheria*.	Dr. Nandini Kakoti	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. Nandini Kakoti	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 (*Phycology and Microbiology*)				
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 *Nostoc*, *Volvox*, *Oedogonium*, *Chara*,*Vaucheria*, *Ectocarpus*, *Fucus* and *Polysiphonia*,*Procholoron* through electron micrographs/ permanent slides.	Dr. Nandini Kakoti	06	August

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 (*Biomolecules and Cell Biology)*				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	**Biomolecules:** Types and significance of chemical bonds; Structure and properties of water; pH and buffers**.** **Carbohydrates:** Mono and Disaccharides; Oligosaccharides and polysaccharides. **Lipids:** Definition and major classes of storage and structural lipids **Proteins:** Structure of amino acids; Levels of protein structure-primary, secondary, tertiary and quarternary; **Neuclic acid:** Structure, Types of nucleic acids; Structure of A, B, C, D, Z types of DNA; Types of RNA.	Dr. Chunamoni Das	12	August
2I	**Bioenergenetics:** Laws of thermodynamics, concept of free energy, endergonic and exergonic reactions, coupled reactions, redox reactions. ATP: structure, its role as a energy currency molecule.	Dr. Chunamoni Das	04	September
3	**Enzymes:** Structure: holoenzyme, apoenzyme, cofactors, coenzymes and prosthetic group; Classification; Mechanism of action Michaelis – Menten equation, enzyme inhibition and factors affecting enzyme activity.	Miss. Mridusmita Das	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. Nandini Kakoti	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 (*Biomolecules and Cell Biology*)				
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/*Rhoeo/Crinum*.	Dr. Chunamoni Das	02	August
3	Demonstration of the phenomenon of protoplasmic streaming in *Hydrilla* and *Vallisnaria* 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. Nandini Kakoti	04	September
6	Study the phenomenon of plasmolysis and deplasmolysis.	Dr. Nandini Kakoti	02	August
7	Study different stages of mitosis and meiosis (Demostration).	Dr. Nandini Kakoti	02	August

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

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

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

Paper: HG-RC: 1016; 1.1 THEORY (*Biodiversity –Microbes, Algae ,Fungi and Archegoniate*)				
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. Nandini Kakoti	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. Nandini Kakoti	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 (*Biodiversity –Microbes, Algae Fungi and Archegoniate*)				
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. Nandini Kakoti	04	August
3	**Fungi:** **i)** Rhizopus and Penicillium: ii) Puccinia iii) *Agaricus*	Dr. Nandini Kakoti	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**:** **2019-2020**
Semester: **Third Semester**
Course: **Major**

OUTLINE OF THE COURSE:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
M 301 (Theory)	60	15	75	06
M 302 (Theory)	60	15	75	06
M 303 (Practical)	40	10	50	04
Total	**160**	**40**	**200**	**16**

BOTANY (Major); Semester: 3RD; Paper: M 301 (Theory) - Detailed

Paper: M 301 (Theory) **(*Ecology, Plant Geography, Evolution*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Ecology:** Introduction, Ecosystem structure, Plant adaptations in response to water, temperature and light.	Dr. Kamal Choudhury	10	August
II	**Ecology:** Population ecology, characteristics; Ecotypes; Ecads. Community ecology: Frequency; Density; Cover; IVI; Life forms, Biological spectrum and its significance.	Dr. Nandini Kakoti	10	August
III	**Ecology:** Ecosystem ecology: food chain, food web, ecological pyramids; Ecosystem function, Ecosystem services, Ecosystem resilience; Ecological succession.	Dr. Nandini Kakoti	10	Aug. – Sept
IV	**Ecology:** Environmental pollution: Water pollution, Air pollution, Soil pollution; Acid rain; Its impact on plants and ecosystems.	Dr. Nandini Kakoti	10	Sept. – Oct.
V	**Plant Geography:** Phyto-geographical regions of India; Factors regulating distribution of plants, endemism, isolation and speciation; Vegetation of India - North Eastern Regions; Major biomes of the world.	Dr. Nandini Kakoti	10	Oct. –Nov.
VI	**Evolution:** Evidences, theories and mechanism of evolution; Origin of new species. Gene pool; Genetic drift; Changes in gene frequencies in population	Dr. Chunamoni Das	10	August

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major); Semester: 3RD; Paper: M 302 (Theory) - Detailed

Paper: M 302 (Theory) **(*Instrumentation and Laboratory Techniques*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Instrumentation:** Microscopy: Electron, Phase contrast and fluorescence microscopy; Image documentation: Camera lucida; microphotography, digital imaging- advantages of digital camera and digitization.	Dr. Kamal Choudhury	10	Aug. – Sept.
II	**Instrumentation:** Micro technique, Principles and applications of hot air oven, incubators, autoclave, laminar air flow chamber, centrifuge, lux meter, pH meter	Dr. Kamal Choudhury	10	Sept. – Oct.
III	**Instrumentation:** Chromatography: Paper Chromatography, TLC, Column Chromatography; concept of partition coefficient, Beer and Lambert's law, mechanics of measurement; Spectrophotometer- working principle and applications.	Dr. Chunamoni Das	10	Aug. – Sept.
IV	**Lab. Techniques:** Fixatives and stains: principles, types, procedures and applications; Methods of sterilization and culture media; Mounting media	Dr. Chunamoni Das	10	Sept. – Oct.
V	**Field Techniques:** Field and herbarium techniques, preservation of museum and herbarium specimens, preservation techniques for special types of plants (submerged aquatic plants, succulent and xerophytes, palm, canes and bamboos)	Dr. Kamal Choudhury	10	Oct. – Nov.
VI	**Lab. Techniques -**Preparation of normal, molal, molar, ppm and percent solutions; Somogyi's reagent, Biuret reagent, Nessler's reagent, different indicators	Dr. Chunamoni Das	10	Oct. – Nov.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major); Semester: 3RD; Paper: M 303 (Practical) - Detailed

Paper: M 303 (Practical) **(*Instrumentation and Laboratory Techniques*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Ecology:** Determination of abundance and frequency of species by quadrate method.	Dr. Kamal Choudhury	04	August
II	**Ecology:** Measure the dissolved oxygen in polluted and unpolluted water samples.	Mrs. Chunamoni Das	04	August
III	**Ecological Adaptation** of Hydrophytes and Xerophytes	Dr. Nandini Kakoti	04	August
IV	**Soil testing** for presence of P, K, HNO_3	Dr. Nandini Kakoti	06	Aug. – Sept.
V	**Image Documentation** by using Camera Lucida	Dr. Kamal Choudhury	04	September
VI	**Microtome –** Preparation & processing of suitable material up to block preparation, staining & permanent slide preparation	Dr. Chunamoni Das	06	Aug. – Sept
VII	**TLC Chromatogram** - Demonstration	Dr. Kamal Choudhury	04	Sept. – Oct.
VIII	**Demonstration of instruments** as per theory syllabus	Dr. Nandini Kakoti	04	Sept. – Oct.
IX	**Solution & Reagent preparation** as per theory paper	Dr. Chunamoni Das	04	Sept. –Oct.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi

Session**:** **2019-2020**
Semester: THIRD SEMESTER
Course: GENERAL

OUTLINE OF THE COURSE:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
E 301 (Theory)	40	10	50	04
M 303 (Practical)	40	10	50	04
Total	**80**	**20**	**100**	**08**

BOTANY (General); Semester: 3RD; Paper: E 301 (Theory) **- Detailed**

Paper: E 301 (Theory) **(Diversity of Seed Plants and Systematics)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Gymnosperms:** Introduction, general characters, classification, Origin & Evolution of seed habit.	Dr. Chunamoni Das	06	August
II	**Gymnosperms:** Morphology of vegetative and reproductive structures, anatomy of stem & leaf, and life cycle of the following types: *Cycas, Pinus, Gnetum*	Dr. Chunamoni Das	10	Aug. -Sept
III	**Fossils:** Fossilization processes, General characteristics of Cycadofilicales, Bennettitales.	Dr. Kamal Choudhury	06	August
IV	**Taxonomy of angiosperms:** Binomial Nomenclature, Taxanomic Ranks, Systems of classification – artificial, natural, phylogenetic. Classification systems with merits and demerits of Bentham and Hooker; Engler and Prantl.	Dr. Kamal Choudhury	08	Aug. – Sept.
V	**Taxonomy of angiosperms:** Diversity of flowering plants, economically important plants under the families.- Magnoliaceae, Malvaceae, Papilionaceae, Caesalpinaceae, Mimosaceae, Apiaceae, Euphorbiaceae, Lamiaceae, Solanaceae, Verbenaceae, Asteraceae, Poaceae, Orchidaceae	Dr. Nandini Kakoti	10	Aug.-Sept.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (General); **Semester: 3RD; Paper: E 301** (Practical) **- Detailed**

Paper: E 301 (Theory) **(*Diversity of Seed Plants and Systematics*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	Study of vegetative, reproductive bodies of genera included under Algae, Fungi of theory syllabus.	Dr. Nandini Kakoti	06	Sept. –Oct.
II	Study of morphology, anatomy and reproductive structures of Bryophyta and Pterydophytes included under theory syllabus.	Dr. Chunamoni Das	10	Aug. - Sept
III	Gram staining of Bacteria.	Dr. Kamal Choudhury	02	September
IV	Examination of stages of Mitotic and Meiotic cell divisions.	Dr. Chunamoni Das	04	
V	**Gymnosperms:** Study morphology and anatomy of leaf/stem, detailed reproductive structures of *Cycas*, *Pinus*, *Gnetum*.	Dr. Chunamoni Das	08	Sept. – Oct.
VI	**Fossils:** Study of fossil specimens and slides.	Dr. Kamal Choudhury	02	September
VII	**Angiosperms:** Angiosperms: Description of specimen from representative of locally available plants belongs to the families included in theory syllabus.	Dr. Kamal Choudhury	08	Sept. – Oct.
VIII	**Field Study**	All teachers		October

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi

Session**:** **2019-2020**
Semester: **Fifth Semester**
Course: **Major**

OUTLINE OF THE COURSE:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
M 501 (Theory)	60	15	75	06
M 502 (Theory)	60	15	75	06
M 503 (Theory)	60	15	75	06
M 504 (Theory)	60	15	75	06
M 505 (Practical)	60	15	75	06
M 506 (Practical)	60	15	75	06
Total	**360**	**90**	**450**	**36**

BOTANY (Major); Semester: 5TH; Paper: M 501 (Theory) - Detailed

Paper: M 501 (Theory) **(*Microbiology and Immunology*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**General Microbiology:** History and development, scope of Microbiology, introduction to microbial world, microbial taxonomy and its modern trends	Dr. Kamal Choudhury	10	August
II	**Microbial nutrition,** growth and metabolism, microbiology of soil, air, water, biogeochemical cycles, biological nitrogen fixation	Dr. Kamal Choudhury	10	Aug. –Sept.
III	Distinguishing features of Actinomycetes, Archaebacteria and Mycoplasma	Dr. Kamal Choudhury	10	September
IV	**Bacteria:** General account; Classification Bacterial cell structure, Reproduction and Growth; General account of Rickettsiae, Chlamydeae and diseases caused by them	Dr. Kamal Choudhury	10	Sept. –Oct.
V	**Virus:** General characteristics; Classification Nature; Replication, Transmission Viroids, Virusoides, Prions, Transmission of viruses	Dr. Kamal Choudhury	10	Oct. –Nov.
VI	**Immunology**, types of immunity, cell mediated and humoral immunity, primary and secondary immune responses, antigen and antibody.	Dr. Kamal Choudhury	10	November

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major); Semester: 5TH; Paper: M 502 (Theory) - Detailed

Paper: M 502 (Theory) **(Plant Pathology and Lichen)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	General account and historical development; Common symptoms of plant disease; Types of plant diseases according to major causal agents; Disease resistance; Physiology of parasitism; Host-parasite interaction.	Dr. Nandini Kakoti	10	August
II	Concept of disease cycle, mechanism of disease development, dissemination and transmission of plant pathogens, Epidemiology and Disease forecasting	Dr. Nandini Kakoti	10	Aug. –Sept.
III	Defence mechanism: concept and definition; structural, chemical and biochemical mechanisms	Dr. Nandini Kakoti	10	September
IV	Study of following diseases Late blight of potato, Rust of wheat, Grey blight of tea, White rust of crucifers, Powdery mildew of pea, Leaf spot disease of cabbage, Citrus canker, Yellow mosaic of bhindi, , papaya and Tobacco mosaic virus (TMV) disease	Dr. Nandini Kakoti	10	Sept. –Oct.
V	Plant disease management- chemical control, biological control and development of transgenic for controlling plant diseases	Dr. Nandini Kakoti	10	Oct. –Nov.
VI	**Lichens:** General account, classification, structure and reproduction	Dr. Nandini Kakoti	10	November

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major); Semester: 5TH; Paper: M 503 (Theory) - Detailed

Paper: M 503 (Theory) **(Cytogenetics, Plant Breeding and Biometrics)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Principles of inheritance-** Mendel's Laws, deviations to Mendel's law-Incomplete dominance, Co-dominance, Quantitative and polymeric gene interaction, sex linked inheritance, Non-mendelian inheritance, extra chromosomal inheritance	Dr. Chunamoni Das	10	August
II	**Polyploidy:** Structural and numerical changes of chromosome: Structural changes- Chromosomal aberrations and evolutionary significance; Numerical changes- Euploidy (Polyploidy) and evolutionary significance	Dr. Chunamoni Das	10	Aug. –Sept.
III	Linkage and crossing over, recombination and cytological basis of crossing over, linkage map.	Dr. Chunamoni Das	10	September
IV	**Plant Breeding:** Principles of plant breeding- Introduction, selection, hybridization and back cross method	Dr. Chunamoni Das	10	Sept. –Oct.
V	**Plant Breeding:** Heterosis and inbreeding depression- genetic basis; male sterility	Dr. Chunamoni Das	10	Oct. –Nov.
VI	**Biometrics:** Mean, mode, median, standard deviation, t-test, chi-square test, measurement of gene frequency, Hardy-Weinberg equilibrium	Dr. Chunamoni Das	10	November

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major)**; Semester: 5TH; Paper: M 504** (Theory) **- Detailed**

Paper: M 504 (Theory) **(Applied Botany)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Algae** as food, feed, medicine and commercial products, role of algae in soil fertility	Dr. Nandini Kakoti	10	Sept. –Oct.
II	**Fungi-** Role of fungi in agriculture, fungi as food, medicine and commercial products (Antibiotics, alcohols), mycotoxins and mycotoxicosis, **Lichens** as indicator plants, **Mycorrhiza** and its role in plant development, Allergy and allergens.	Dr. Nandini Kakoti	10	Sept. –Oct.
III	**Bacteria**- useful and harmful effects, role of bacteria in agriculture, medicine, bioremediation, serology.	Dr. Kamal Choudhury	10	Oct. –Nov.
IV	**Plant Breeding:** Breeding for disease resistance, induced mutation and crop improvement, induction of polyploidy and crop evolution.	Dr. Chunamoni Das	10	Sept. –Oct.
V	**Deforestation** and its effect on environment, impact of climate change.	Dr. Kamal Choudhury	10	November
VI	**Plant growth regulators:** Application in agriculture, methods of plant propagation- grafting, layering and budding; bonsai, indoor gardening.	Dr. Chunamoni Das	10	Oct. –Nov.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major); Semester: 5TH; Paper: M 505 (Practical) - Detailed

Paper: M 505 (Practical) **(Microbiology, Plant Pathology and Lichen)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Microbiology:** Gram staining of Bacteria	Dr. Kamal Choudhury	04	September
II	**Microbiology:** Preparation, Sterilization of culture media: Basic liquid media (Broth) for cultivation of bacteria; Basic solid media for routine cultivation of fungi.	Dr. Kamal Choudhury	06	Sept. –Oct.
III	**Microbiology:** Isolation of soil microorganisms by the serial dilution and agar plating method. Isolation of microorganisms from air	Dr. Kamal Choudhury	04	Sept. –Oct
IV	**Microbiology:** Isolation of fungal pathogens from diseased plant parts.	Dr. Kamal Choudhury	04	Oct. –Nov.
V	**Microbiology:** Pure culture technique: Streak-plate methods; Pour-plate method..	Dr. Kamal Choudhury	04	Oct. –Nov.
VI	**Microbiology:** Counting of bacterial cells using haemocytometer	Dr. Chunamoni Das	04	November
VII	**Plant Pathology:** Isolation and culture of plant pathogen and establishment of Koch's postulates and their pathogenicity.	Dr. Nandini Kakoti	04	September
VIII	**Plant diseases** - Late blight of potato; Black rust of *Justicia* and wheat*;* Leaf spot of cabbage; Grey blight of tea; Citrus canker; Yellow mosaic of papaya and bhindi; Tobacco mosaic virus and Viral diseases studying their symptoms and by making permanent slides.	Dr. Nandini Kakoti	06	Sept. –Oct.
IX	**Lichen:** Study the thallus morphology of Foliose; Crustose; Fruticose Lichens.	Dr. Kamal Choudhury	04	November

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (Major); Semester: 5TH; Paper: M 506 (Practical) - Detailed

Paper: M 506 (Practical) **(Cytogenetics, Plant Breeding, Biometrics and Applied Botany)**				
S. No.	Course Content	Allotted to	Hours/ Lecture	Month
1	Karyotype study in onion, garlic and Aloe vera	Dr. Chunamoni Das	04	August
2	Study of chromosomal aberration in *Tradescantia* / Rhoeo	Dr. Chunamoni Das	04	Aug.- Sept.
3	Study of gene interaction	Dr. Chunamoni Das	04	September
4	Study of emasculation process in any plant.	Dr. Chunamoni Das	02	October
5	To work out mean, mode, standard deviation and standard error	Dr. Chunamoni Das	06	Oct. –Nov.
6	Isolation of *Rhizobium* from root nodules	Dr. Kamal Choudhury	04	November
7	Counting of pollen grains in honey samples	Dr. Nandini Kakoti	02	November

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi

Session**:** **2019-2020**
Semester: **Fifth Semester**
Course: **General**

OUTLINE OF THE COURSE:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
E 501 (Theory)	80	20	100	08
E 502 (Theory)	80	20	100	08
Total	**160**	**40**	**200**	**16**

BOTANY (General); Semester: 5TH; Paper: E 501 (Theory) - Detailed

Paper: M 501 (Theory)
(Structure, Development and Reproduction of Flowering Plants)

Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	Basic body plan of flowering plant, modular type of growth, diversity in plant forms – annuals, biennials and perennials, Histological organization of root and shoot apices, various theories of cellular organization	Dr. Chunamoni Das	10	August
II	Types of tissue: Meristematic tissue –structure and types based on origin and position, Permanent tissue: Simple, Complex and Secretary, Trichomes and Stomata.	Dr. Kamal Choudhury	10	August
III	Anatomy: Primary structure of root, stem and leaf, Secondary growth, Wood anatomy: Growth rings, heart wood and sap wood, Periderm, Floral biology	Dr. Kamal Choudhury	10	Aug -Sept
IV	Embryology: Microsporogenesis and development of male gametophyte, megasporogenesis and development of female gametophyte, Double fertilization	Dr. Nandini Kakoti	10	August
V	Development of dicot embryo, Structure, development and types of endosperms, Fruit**:** Development, types and parts of fruits, fruit dispersal strategies, Vegetative propagation: Grafting, layering and budding.	Dr. Nandini Kakoti	10	Aug –Sept.
VI	**Seed:** Types of seed, germination of seeds-types and nature and dispersal of seeds, factors affecting germination	Dr. Chunamoni Das	10	Aug –Sept.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

BOTANY (General)**; Semester: 5TH; Paper: E 502** (Practical) **- Detailed**

Paper: E 502 (Practical) **(*Structure, Development and Reproduction of Flowering Plants*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	Study of non-living cell inclusion (ergastic maters): Starch grains, Aleurone grains, Raphides, Cystolith.	Dr. Kamal Choudhury	04	Aug. –Sept.
II	Study of types of stomata.	Dr. Chunamoni Das	04	Aug. –Sept.
III	Study of Epidermal Hairs	Dr. Nandini Kakoti	04	Aug. –Sept.
IV	Study of secondary growth in thickness by permanent preparation of differentially stained slide: *Amaranthus*, *Boerhavia*, *Mirabilis*, *Bougainvillea*, *Dracaena*, *Tinospora*.	Dr. Kamal Choudhury	08	Sept. – Oct.
V	Study from permanent slide: T.S. through young and mature anther; Male gametophyte; L.S. of ovule showing different nuclear stages of embryo sac; L.S. of ovule showing types of Endosperm; L.S. of Embryo – Dicotyledonous, Monocotyledonous.	Dr. Nandini Kakoti	06	Sept. – Oct.
VI	Study of spurious fruits, aggregate fruits, composite fruits	Dr. Kamal Choudhury	06	October
VII	Study the adaptation in fruits and seeds for dispersal through air	Dr. Chunamoni Das	04	Sept. – Oct.
VIII	Demonstrate the process of: Budding; Air layering; Scion grafting	Dr. Chunamoni Das	04	October

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

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
(*Mycology and Phytopathology)*

Unit	Course Content	Allotted to	Hours/ Lecture	Month
1	**Introduction to Fungi:** General characteristics; Status; Thallus organization, Cell and Cell wall composition; Nutrition, flagella, septum, homothallism and heterothallism, cell division. History of Classification; Classification of Fungi General characteristics of Myxomycota, Oomycota, Zygomycota, Ascomycota, Basidiomycota and Deuteromycota.	Dr. Nandini Kakoti	08	August
2	**Mastigomycotina (Chytridiomycetes and Oomycetes):** Characteristic features; Reproduction; Life cycle with reference to *Synchytrium, Phytophthora* and *Albugo*.	Dr. Nandini Kakoti	04	August
3	**Zygomycotina:** Characteristic features; Reproduction; Life cycle with reference to Rhizophus..	Dr. Nandini Kakoti	04	August
4	**Ascomycotina:** General characteristics (asexual and sexual fruiting bodies); Life cycle, Heterokaryosis and parasexuality; Life cycle and classification with reference to *Saccharomyces*, *Aspergillus*, *Penicillium*, *Neurospora* and *Peziza*.	Dr. Nandini Kakoti	04	September
5	**Basidiomycotina:** General characteristics; Life cycle and Classification with reference to black stem rust on wheat *Puccinia*, loose and covered smut, *Agaricus*; Bioluminescence, Fairy Rings and Mushroom Cultivation.	Dr. Nandini Kakoti	05	September
6	**Deuteromycotina (Fungi Imperfecti):** General characteristics; Thallus organization; reproduction; Classification with special reference to Alternaria and Colletotrichum.	Dr. Nandini Kakoti	04	September

7	**Allied Fungi- Myxomycota:** General characteristics; Status of Slime molds, Classification; Occurrence; Types of plasmodia; Types of fruiting bodies.	Dr. Nandini Kakoti	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:** Terms and concepts; General symptoms; Geographical distribution of diseases; Etiology; Symptomology; Host-Pathogen relationships; Disease cycle and environmental relation; prevention and control of plant diseases, and role of quarantine. Bacterial diseases – Citrus canker and angular leaf spot of cotton. Viral diseases – Tobacco Mosaic viruses, 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 (*Mycology and Phytopathology*)				
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	02	August
2	5. **Puccinia:** Black Stem Rust of Wheat and infected Barberry leaves; sections/ mounts. **Agaricus:** Sectioning of gills of Agaricus, fairy rings and bioluminescent mushrooms to be shown. **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	02	Aug - Sept
4	**Phytopathology:** Bottle specimens, Herbarium specimens should be made of bacterial diseases, Viral diseases, Fungal diseases **Applied mycology:**	Dr. Kamal Choudhury	02	September

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

Botany (Hon.); Semester**: 2nd; Paper: HC- 2026; -** Outline

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

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 archegoniates; 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 (Cooksonia and Rhynia).	Dr. Kamal Choudhury	05	Sept -Oct
5	**Pteridophytes: 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 (up to family), 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- 2016; 4**.2: Practical - Detailed

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

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

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

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

Botany (Hon.); Semester**: 2nd; Paper: HG-RC- 2016; 2**.1: **Theory -** Detailed

Paper: HG-RC- 2016 - 2.1 - THEORY (*Plant Ecology and Taxonomy)*				
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	04	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	04	Sept -Oct
5	**Phytogeography:** Principal biogeographical zones; Endemism	Dr. Nandini Kakoti	04	August
6	**Introduction to plant taxonomy:** Identification, Classification, Nomenclature.	Dr. Kamal Choudhury	03	September
7	**Identification:** Functions, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access	Dr. Kamal Choudhury	04	October
8	Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.	Dr. Nandini Kakoti	06	Aug -Sept
9	**Taxonomic hierarchy:** Ranks, categories and taxonomic groups	Dr. Kamal Choudhury	02	September
10	**Botanical nomenclature:** Principles and rules; 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. Nandini Kakoti	04	October

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

Paper: HC- 2016; 4.2 - PRACTICAL (*Plant Ecology and Taxonomy)*				
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. Nandini Kakoti	02	August
2	Study of morphological adaptations of hydrophytes and xerophytes (four each).	Dr. Nandini Kakoti	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

Session**:** **2019-2020**
Semester: **Forth Semester**
Course: **Major**

OUTLINE OF THE COURSE:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
M 401 (Theory)	60	15	75	06
M 402 (Theory)	60	15	75	06
M 403 (Practical)	40	10	50	04
Total	**160**	**40**	**200**	**16**

Botany (Major); Semester: 4TH; Paper: M- 401 (Theory) **- Detailed**

Paper: M 401 (Theory) **(*Morphology, Palynology, Embryology of Angiosperms*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Morphology:** Origin and evolution of Angiosperms; Inflorescence and flowers. Morphology of stamens and carpel.	Dr. Chunamoni Das	12	Jan. – Feb.
II	**Morphology:**Telome theory, Phyllode theory, Carpel polymorphism, Inferior ovary. Role of morphology in plant classification.	Dr. Chunamoni Das	12	February
III	**Palynology:** Aspects and prospects of Palynology, historical perspective, pollen morphology, methods of studying pollen, pollen production and sterility	Dr. Kamal Choudhury	12	Jan. – Feb.
IV	**Embryology:** Basics of embryology, microsporogenesis and megasporogenesis, development of male and female gametophytes, Types of embryosacs and evolutionary significance	Dr. Nandini Kakoti	12	Jan. – Feb.
V	**Embryology:** Fertilization, embryo development, polyembryony, apomixes, endosperm development, types, hautorial structure, experimental embryology: role in crop improvement	Dr. Nandini Kakoti	12	February

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2019-2020

Botany (Major); Semester: 4TH; Paper: M- 402 (Theory) - Detailed

Paper: M 402 (Theory) **(*Plant Taxonomy*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	Objectives, Principles and Evolutionary Trends in Taxonomy	Dr. Nandini Kakoti	06	Feb. - Mar
II	History of plant classification; Concept of species, genus and family, Classificatory systems i.e. Artificial, natural, Phylogenetic, phenetic, cladistic, and APG; Detail study of Bentham and Hooker, and Takhtajan system.	Dr. Kamal Choudhury	10	February
III	Principles and rules of binomial nomenclature; ICBN- Historical developments, rules and recommendations; Rules of priority, Type concepts; concept of biocode	Dr. Kamal Choudhury	10	March
IV	Modern Trend in Plant Taxonomy and classification; Role of anatomy, embryology, palynology in plant classification, Numerical Taxonomy, Chemotaxonomy, Cytotaxonomy, and Serotaxonomy	Dr. Kamal Choudhury	10	Mar. –Apr.
V	Affinities, phylogeny, economic importance and comparative studies of the families: Magnoliaceae, Ranunculaceae, Fabaceae, Mimosaceae, Caesalpinaceae, Malvaceae, Apiaceae, Euphorbiaceae, Solanaceae, Verbenaceae, Lamiaceae, Acanthaceae, Rubiaceae, Cucurbitaceae, Asteraceae.	Miss. Chunamoni Das	14	Mar. –Apr.
VI	Affinities, phylogeny, economic importance and comparative studies of the following families: Arecaceae, Poaceae, Musaceae, Zingiberaceae, Liliaceae, Orchidaceae	Miss. Chunamoni Das	10	Mar. Apr.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2019-2020

BOTANY (Major); Semester: 4TH; Paper: M 403 (Practical) - Detailed

Paper: M 403 (Practical) **(*Morphology, Palynology, Embryology, Plant Taxonomy*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	Study of special types of inflorescences – Cyathium, Hypanthodium, Verticillaster, Hypanthium	Dr. Kamal Choudhury	06	Mar. –Apr.
II	Study of special types of Fruits – Spurious fruits (Dillenia); Aggregate fruits (Custard apple, Michelia, Periwinkles, Polyalthia); Multiple fruits (Pine apple, Jack fruit).	Dr. Chunamoni Das	06	March
III	Study the morphological nature of pollen grains by permanent preparation of pollen slides from the plant materials available in the locality.	Dr. Chunamoni Das	06	March
IV	**Embryology: P**ermanent slides - T.S. of Anther; Male gametophyte; L.S. of different types of Ovules; L.S. of Endosperm; L.S. of Embryo – Dicotyledonous, Monocotyledonous	Dr. Nandini Kakoti	06	March
V	**Plant Taxonomy:** 1. Description of specimen locally available Dicotyledonous and Monocotyledonous families included in the theory. 2. Description of specimens with preparation of keys up to generic level of locally available plants.	Dr. Kamal Choudhury	08	April
VI	Study of vegetation, local and different localities in the country through Academic excursions.	All teachers		October

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi

Session**:** **2019-2020**
Semester: **Forth Semester**
Course: **Major**

OUTLINE OF THE COURSE:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
E 401 (Theory)	40	10	50	04
E 402 (Practical)	40	10	50	04
Total	**80**	**40**	**100**	**08**

Botany (General); Semester: 4TH; Paper: E- 401 (Theory) **- Detailed**

Paper: E 401 (Theory) **(*Plant Physiology and Biochemistry*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Plant water relations**: **Plant-water relations:** Different bio-physio-Chemical phenomenon: definition, phenomenon and Importance of permeability, diffusion, osmosis, Plasmolysis, imbibition, Absorption of water-Introduction, mechanism of water absorption, Ascent of sap: Definition, mechanism- Transpiration: Definition, types, structure of stomata. Mechanism of opening and closing of stomata	Dr. Kamal Choudhury	12	Jan. –Feb.
II	**Mineral nutrition:** Essential macro and micro elements and their role in plants**,** Translocation of organic solutes: Introduction, direction of translocation, Mechanism: Mass flow or munch hypothesis, protoplasmic streaming theory	Dr. Nandini Kakoti	12	Jan. –Feb.
III	**Plant metabolism:** Photosynthesis: introduction, structure of chloroplast, photosynthetic pigments, concepts of two Photo systems, Light phase: cyclic and non cyclic photophoshorylation**,** Dark phase: calvin cycle Hatch and Slack cycle and crassulacean acid metabolism, significance of photosynthesis**,** Respiration: Intorduction, Types of respiration - Aerobic: Glycolysis, TCA cycle ETS	Dr. Chunamoni Das	12	Jan. –Feb.

IV	**Growth and Development:** Growth and growth hormones: Phases of growth, factors affecting growth, Plant growth substances, hormones and their Practical applications; Seed dormancy: Introduction, methods of breaking Seed Dormancy, factors affecting seed dormancy; Physiology of flowering: Photoperiodism Vernalization and Devernalization; Plants movements: Classification of movements, Movements of curvature. Movements of variation	Dr. Kamal Choudhury	12	Feb. -Mar
V	**Biochemistry:** Introduction, different organic constituents of the cell, Functions of carbohydrates starch, Cellulose, Hemicellulose, proteins and nucleic acids, lipid, alkaloids, gums, mucilage and organic acids; Nitrogen metabolism: Introduction, physical and biological nitrogen fixation, nitrogen in soil, ammonification and nitrification, denitrification; Enzymes: Introduction, nomenclature and classification, mechanism and mode of action. Concept of holoenzymes, apoenzymes, coenzymes and cofactors.	Dr. Chunamoni Das	12	Feb. -Mar

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session: 2019-2020

BOTANY (General); Semester: 4TH; Paper: E 402 (Practical) - Detailed

Paper: E 402 (Practical) (***Plant Physiology and Biochemistry***)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	1. Determine the osmotic potential of cell sap by plasmolytic method. 2. Determine the Diffusion Pressure Deficit (DPD) of plant cells. 3. Determine the effect of time period on the rate of imbibition in different types of seeds. 4. Determine the relation between absorption and transpiration.	Dr. Kamal Choudhury	12	March
II	5. Measure the effect of different environmental conditions on the rate of transpiration of a twig by Ganong's Potometer. 6. Determine the effect of CO2 concentration on the rate of photosynthesis. 7. Determine RQ of different plant materials (Germinating seeds, Leaf buds, Flower buds).	Dr. Nandini Kakoti	12	March
III	8. Qualitative analysis of plant materials to prove the presence of Sucrose, Glucose, Proteins, Fats and Cellulose. 9. Qualitative analysis of Plant ash to prove the presence of Iron, Potassium, Calcium, Magnesium, Phosphorus.	Mrs. Chunamoni Das	12	March

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi

Session**:** **2019 - 2020**
Semester: **Sixth Semester**
Course: **Major**

Outline of the Course:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
M 601 (Theory)	60	15	75	06
M 602 (Theory)	60	15	75	06
M 603 (Theory)	60	15	75	06
M 604 (Theory)	60	15	75	06
M 605 (Practical)	60	15	75	06
M 606 (Practical)	60	15	75	06
Total	**360**	**90**	**450**	**36**

Botany (Major); Semester: 6TH; Paper: M- 601 (Theory) **- Detailed**

Paper: M 601 (Theory) **(*Molecular Biology and Plant Biochemistry*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Molecular Biology:** Structure and organization of gene, expression and regulation of gene, Genetic code; properties and evidences	Mrs. Chunamoni Das	10	Jan. –Feb.
II	**Molecular Biology:** DNA replication, different forms of RNA and their roles, concept of exons and introns, Transcription and Translation in Prokayotes	Mrs. Chunamoni Das	10	February
III	**Molecular Biology:** Mutation: Point mutation-transition, transversion, frameshift mutation, molecular mechanism	Mrs. Chunamoni Das	10	Feb. –Mar.
IV	**Plant Biochemistry:** Nitrogen metabolism, Amino acid metabolism and protein synthesis	Mrs. Chunamoni Das	10	March
V	**Plant Biochemistry:** Enzymes- Classification and nomenclature of enzymes, Enzyme as biocatalyst, properties and function	Mrs. Chunamoni Das	10	Mar. -Apr
VI	**Plant Biochemistry:** Carbohydrate metabolism - Structure of monosaccharides, disaccharides and polysaccharides	Mrs. Chunamoni Das	10	Apr. -May

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019 -2020**

Botany (Major); Semester: 6TH; Paper: M- 602 (Theory) - Detailed

Paper: M 602 (Theory) **(*Bioinformatics, Computer Application and Biotechnology*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Bioinformatics:** Introduction to Bioinformatics, branches of Bioinformatics, Aim, Scope and Research areas of Bioinformatics, biological databases, classification format of databases, biological database retrieval system	Dr. Kamal Choudhury	12	Jan. –Feb.
II	**Bioinformatics:** DNA replication, different forms of RNA and their roles, concept of exons and introns, Transcription and Translation in Prokayotes	Dr. Kamal Choudhury	12	February
III	**Computer Applications:** Basics of computer**,** use of operating system (MS Office)**,** Data representation, Internet browsing and searching of biological data using search engines	Dr. Kamal Choudhury	12	Feb. –Mar.
IV	**Biotechnology:** History, scope and significance of biotechnology	Dr. Kamal Choudhury	12	March
V	**Biotechnology:** Plant Tissue culture-different techniques, micropropagation, meristem culture, embryo culture, somatic embryogenesis, pollen culture and development of haploid plants, somaclonal variation, transgenic plants	Dr. Kamal Choudhury	12	Mar. -Apr
VI	**Biotechnology:** Plant genetic engineering, techniques and applications: (restriction enzymes, construction of DNA libraries, DNA fingerprinting, DNA sequencing), application in agriculture and medicines	Dr. Kamal Choudhury	12	Apr. -May

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019 -2020**

Botany (Major); Semester: 6TH; Paper: M- 603 (Theory) - Detailed

Paper: M 603 (Theory) (***Plant Physiology***)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	Plant-soil-water relationship: component and classification of soil, Soil to plant-water potential, osmotic potential, Movement of water within the plant body: absorption, transpiration and its significance, factors, mechanisms of transpiration, ascent of sap	Dr. Kamal Choudhury	10	Jan. –Feb.
II	Mineral nutrition and mineral salt absorption, criteria of essentiality of elements, micro and macro nutrients- specific functions and deficiency symptoms, mineral salt absorption	Dr. Kamal Choudhury	10	February
III	Photosynthesis: photolysis of water, cyclic and non-cyclic photophosphorylation, electron transport system, C3 cycle, photorespiration and glycolytic metabolism (C2 cycle), CAM pathway, C4 cycle, chemosynthesis	Dr. Kamal Choudhury	10	Feb. –Mar.
IV	Respiration: Aerobic respiration, Glycolysis (EMP, PPP) and TCA cycles and its regulation, anaerobic respiration mechanism and factors	Dr. Kamal Choudhury	10	March
V	Translocation of organic solutes: mechanism of translocation, diffusion, Munch hypothesis, source and sink relationships, phloem loading and unloading	Dr. Kamal Choudhury	10	Mar. -Apr
VI	Growth and development: Phages of growth, growth regulation-physiological role and mechanism of action (Auxins, cytokinins, GA, ABA, ethylene); Physiology of flowering - photoperiodism and vernalization; seed dormancy-types and causes, methods of overcoming dormancy; senescence and aging; stress physiology-concept of biotic, abiotic and xenobiotic stresses.	Dr. Kamal Choudhury	10	Apr. -May

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019 -2020**

Botany (Major); Semester: 6TH; Paper: M- 604 (Theory) - Detailed

Paper: M 604 (Theory) (***Plant Resource Utilization***)				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Origin of Cultivated Plants**: Concept of centers of origin; Plant introduction; Crop domestication; Classification of plant resources on the basis of their uses; Cereals: Rice, wheat and their role in green revolution; Leguminous plant resources: soybean, arhar dal, pea - their products and uses	Dr. Kamal Choudhury	10	March
II	**Beverages:** Tea, Coffee and cocoa - their sources, products and uses; Spices and condiments: Sources and uses of black pepper, cinnamon, clove, bay leaf, turmeric, zinger; Oil: Mustard, groundnut, castor and citronella	Dr. Kamal Choudhury	10	Apr. -May
III	Fibers - Botany and uses of cotton, jute and ramie; Fruits - orange, pineapple, banana; Products and byproducts of sugar industry - Sugarcane, sugar beat	Dr. Nandini Kakoti	10	March
IV	**Timber and non-timber plant resources:** sal, gamari, teetasopa; Botany and uses of cane and bamboo, Para-rubber, herbal dye (henna, manjistha, bixa); Botany and uses of medicinal plants (*Holarhhena, Rauvolfia, Catharanthus, Taxus, Plumbago, Azadirachta, Andrographis*)	Dr. Nandini Kakoti	10	Apr. -May
V	Pharmacognosy: Pharmacognosy and its importance in medicinal plant uses	Mrs. Chunamoni Das	10	March
VI	**Ethnobotany**: Definition, concept and scope; discipline and sub-disciplines of ethnobotany, importance of traditional knowledge in relation to plant uses and IPR (Intellectual Property Rights); stress physiology-concept of biotic, abiotic and xenobiotic stresses.	Mrs. Chunamoni Das	10	April

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

Botany (Major); Semester: 6TH; Paper: M- 605 (Practical) - Detailed

Paper: M 605 (Practical) (***Molecular Biology, Biotechnology, Bioinformatics and Computer Application***)				
S. No.	Course Content	Allotted to	Hours/ Lecture	Month
I	**Molecular Biology:** 1. Curve of protein and determine protein content in plant materials by Biuret method. 2. Separate and identify amino acids by Paper Chromatography, Thin Layer chromatography. 3. Quantitative estimation of reducing sugar and total sugar by Somogyi's method. 6. Estimation of Total Nitrogen by Micro Kjeldahl method. 4. Separate and identify chlorophyll pigments by Paper Chromatography. 5. Determine Titratable Acid Number (TAN) in Bryophyllum leaves.	Mrs. Chunamoni Das	10	March
II	**Biotechnology:** 1. Preparation and sterilization of the medium, Slant preparation and Inoculation - MS medium. 2. Micro propagation of some important plants. 3. Study of Genetic engineering Techniques (photographs): FISH, DNA Fingerprinting, DNA Sequencing, Gene gun, Ti plasmid. 4. Study of steps of genetic engineering techniques from photographs (Bt cotton, Golden rice, Flavr Savr tomato) 5. Construction of Restriction Map from the data provided. 6. Aseptic seed germination - legume seed 7. Study of different bio fertilizers. 8. Homology Modeling through the BLAST	Mrs. Chunamoni Das	10	March
III	**Bioinformatics:** 1. Nucleic acid and protein databases. 2. Sequence retrieval from databases. 3. Sequence alignment. 4. Sequence homology and Gene annotation. 5. Construction of phylogenetic tree	Dr. Pankaj Dar (Guest Teacher, Pub Kamrup College)	10	April -May
IV	**Computer Application:**	Mr. Amitabh Sarma (Dept. of Computer Science	10	April -May

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi
Session**: 2019-2020**

Botany (Major); Semester: 6TH; Paper: M- 606 (Practical) - Detailed

Paper: M 605 (Practical) **(*Molecular Biology, Biotechnology, Bioinformatics and Computer Application*)**				
S. No.	Course Content	Allotted to	Hours/ Lecture	Month
I	**Plant Physiology:** 1. Determine the osmotic potential of cell sap by plasmolytic method. 2. Determine the water potential of plant tissue. 3. Determine the stomatal index, stomatal frequency and estimate the transpiration rate of different types of leaves. 4. Study the effect of temperature on the rate of imbibitions and determine the Q10. 5. Determine RQ of different plant materials (Seeds, Leaf buds, Flower buds). 6. Extract and separate chloroplast pigments by solvent method and Paper chromatography 7. Determine effect of CO2 concentration on the rate of photosynthesis.	Dr. Kamal Choudhury	20	Mar.- Apr.
2	**Plant Resource Utilization:** 1. Chemical tests for tannins (Tea); Alkaloids (*Vinca rosea*) 2. Pharmacognosical studies of both crude and powdered drugs - Zinger, Holarrhena, Rauwolfia 3. Histochemical test for *Curcuma longa*, starch in non-lignified vessels (Zingiber); Alkaloid (*Andrographis*, Neem and *Plumbago*)	Dr. Nandini Kakoti	20	Mar.- Apr.

TEACHING PLAN
Department of Botany, SBMS College, Sualkuchi

Session**:** **2019- 2020**
Semester: **Sixth Semester**
Course: **General**

Outline of the Course:

Paper	Allotment of Marks			Credits
	Course work	Internal Assessment	Total	
E 601 (Theory)	80	20	100	08
E 602 (Practical)	80	20	100	08
Total	**160**	**40**	**200**	**16**

Botany (General); Semester: 6TH; Paper: E- 601 (Theory) **- Detailed**

Paper: E 601 (Theory) **(*Ecology and Utilization of Plants*)**				
Unit	Course Content	Allotted to	Hours/ Lecture	Month
I	**Ecology**: Introduction, concept, definition, Autecology and Synecology, Ecosystem Ecology: Introduction, ecological organization – species population, community ecosystem and biosphere, Kinds of ecosystem, structure and function of ecosystem, abiotic components, biotic components and their role.	Dr. Kamal Choudhury	10	Jan. –Feb.
II	**Ecology:** Ecological succession-Types and pattern, food chain, food web, ecological pyramid	Mr. Chunamoni Das	10	Jan. –Feb.
III	**Ecology:** Bio-geo-chemical cycles-concept, details of Nitrogen and carbon cycle, Composition and functioning of ecosystem: i) Simple – pond ecosystem, ii) Complex – forest ecosystem, iii) Artificial – crop land ecosystem.	Mr. Chunamoni Das	10	Feb. -Mar
IV	**Ecology:** Ecological grouping of plants with reference to their significance of adaptive external and internal features: Hydrophytes and Xerophytes. Environmental pollution with special reference to Air and Water pollutions - causes, effects and control measures; Green house effect.	Dr. Kamal Choudhury	10	Feb. –Mar.

V	**Utilization of Plants**: Classification of plants on the basis of Botanical sources and uses of Rice, Wheat, Maize,	Dr. Kamal Choudhury	10	Mar. -April
VI	**Utilization of Plants**: Sugar cane**,** Gram, Pea, Coffee and Tea, Black pepper, Turmeric, Clove, and mustard - Their uses and botanical sources	Mr. Chunamoni Das	10	Mar. -April
VII	**Utilization of Plants**: Non timber plant products - Cotton, Jute, Rubber, Bamboo, and Jatropha. Their uses and botanical sources	Dr. Nandini Kakoti	10	Jan. –Feb.
VIII	**Utilization of Plants**: Timber and medicinal plant resources: Teak, Sal, Rauvolfia, Neem, Cinchona-their uses and botanical sources	Dr. Nandini Kakoti	10	March

****