Semester - I
Algae, Fungi and Lichens
Course Code: BC2011

Modules

Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
	Algae					
I	1	Classification of Algae according to Fritsch (1945).	1	To classify the different types of algae	Lecture PPT	Short test Assignment Quiz Short test
	2	General Characters, Salient features of the classes, occurrence, Structure and reproduction and life cycle Cyanophyceae– *Nostoc*	2	To know the vegetative and reproductive characters of *Nostoc*.	Lecture PPT, video	
	3	Chlorophyceae- *Volvox*,	2	To study the life cycle of *Volvox*	Lecture PPT, video	
	4	*Caulerpa*	2	To understand the structure and reproduction of *Caulerpa*	Lecture PPT, Group discussion	
	5	Phaeophyceae- *Sargassum*	2	To be familiarize with the vegetative and reproductive characters of Sargassum	Lecture PPT	
	Algae					
II	1	Rhodophyceae- *Gracilaria*	2	To realize the vegetative and reproductive e characters of *Gracilaria*	Lecture PPT	Assignment Short test Group discussion Quiz
	2	Xanthophyceae – *Vaucheria*	2	To understand the life cycle of *Vaucheria*	Lecture PPT video	

	3	Bacillariophyceae – *Diatoms*	2	To be familiarize with the structure and reproduction of *Diatoms*	Lecture PPT video	
	4	Economic and Ecological importance of Algae	3	To learn the economic and ecological importance of Algae	Lecture PPT	
Fungi						
III	1	Classification of fungi according to Alexopoulos and Mims (1979).	3	To understand the different types of algae	Lecture PPT	Short test Quiz Short test, CIA-I
	2	General characters, salient features of the classes, occurrence,Structure, reproduction and life cycle of Oomycetes - *Albugo*	2	To realize the vegetative and reproductive characters of *Albugo*	Lecture PPT Video	
	3	Zygomycetes - *Rhizopus*	2	To understand the structure, reproduction and life cycle of *Rhizopus.*	Lecture PPT	
	4	Economic importance of Fungi	2	To learn the economic importance of Fungi	Lecture PPT	
Fungi						
IV	1	Ascomycetes - *Aspergillus,*	2	To know the vegetative and reproductive characters of *Aspergillus*	Lecture, PPT, Videos	Assignment Short test Quiz
	2	*Peziza*	2	To learn the structure and reproduction of *Peziza.*	Lecture. PPT	
	3	Basidiomycetes - *Polyporus*	3	To realize vegetative and reproductive	Lecture, PPT	

				structures of *Polyporus*		
	4	General account on Glomeromycota-VAM Fungi	2	To understand the vegetative and reproductive characters of VAM fungi.	Lecture, PPT, Video	
Lichens						
V	1	General characters of Lichens	2	To know the general characters of Lichens	Lecture, PPT,	Short test Assignment Quiz Group discussion, CIA-II
	2	Classification of Lichens	2	To understand the different types of Lichens	Lecture, PPT	
	3	Ascolichen- *Usnea*	3	To study the structure and reproduction of *Usnea*	Lecture, PPT Video	
	4	Economic importance of Lichens	2	To learn the economic importance of Lichens	Lecture, PPT,	

Course Constructor: Dr. Bojaxa A. Rosy **HOD: Dr. C. Jespin Ida**

Allied - Chemistry of Life
Sub. Code: BA2011

Modules
Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Module	Topics	Lecture Hours	Learning outcome	Pedagogy	Assessment/ Evaluation
	Cell Biology					
I	1.	Objectives and importance of Cell Biology Structure: Prokaryotic cell and Eukaryotic	2	To realize the importance of Cell Biology and also to learn the ultra structure of prokaryotic cell.	Online Lecture	Assignment Short test Group discussion Quiz

	2.	Structure of plant cell	1	To Learn the ultra structure of a typical plant cell	Video clippings	
	3.	Chemical composition and functions of Plasma membrane (fluid mosaic model),	2	To know the fluid mosaic model of plasma membrane and integrates that with its functions	Online Lecture ,PPT	
	4.	Chemical composition and functions of Chloroplast	2	To understand how the structure of chloroplast is involved in photosynthesis	Online Lecture ,PPT	
	5.	Chemical composition and functions of Mitochondria	2	To study the structure and functions of Mitochondria	Online Lecture	
	Cell Biology					
II	1.	Ultrastructure and functions of nucleus.	2	To know the Ultrastructure and functions of nucleus.	Online Lecture PPT	Assignment Short test Group discussion Quiz
	2.	Cell division – cell cycle	2	To understand the events occurring in cell cycle	Online Lecture PPT	
	3.	Mitosis and its significance	2	To differentiate the various stages of mitosis	Online Lecture PPT	
	4.	Meiosis and its significance	2	To categorize the different stages of meiosis and also to know its significance in maintaining the chromosome sets	Online Lecture and group discussion	
	5.	Nonliving inclusions – starch grains, aleurone grain, cystolith and raphide.	1	To know the different types of non-living inclusions present in plants	Online Lecture	
	Biochemistry					

III	1.	Chemical bonds	3	To know the basics of bonds and its importance in bio-molecules	Online Lecture	Assignment Short test Group discussion Quiz CIA-I
	2.	Types of bonds:co-ordinate, covalent and hydrogen.	3	To understand and distinguish the different types of chemical bonds	Online Lecture PPT	
	3.	Monosaccharides : Structure and properties of glucose.	2	To study the Structure and properties of glucose	Lecture	
	4.	Disaccharides Structure and properties of sucrose	2	To understand the Structure and properties of sucrose	Lecture PPT	
	5.	Polysaccharides: Structure and properties of starch.	3	To state the structural organizations of starch	Online Lecture	
	Biochemistry					
IV	1.	Protein: Structure–primary, secondary, tertiary (myoglobin) and quaternary (hemoglobin).	2	To learn the Structure of protein at different levels-primary, secondary, tertiary and quaternary	Lecture ,PPT	Assignment Short test Group discussion Quiz
	2.	Vitamins - importance, sources, deficiency symptoms of water soluble and fat soluble vitamins.	2	To know the importance, sources, deficiency symptoms of water soluble and fat soluble vitamins	Online Lecture, Group discussion	
	3.	General account of simple lipids - Triglycerides	2	To understand the distinguishing features triglycerides	Lecture Video	
	4.	Compound lipids – Phospholipids	2	To learn the importance of Phospholipids with examples	Lecture PPT	

	5.	Derived lipids – Cholesterol	1	To know the structure of Cholesterol and also its importance	Online Lecture	
V	**Physiology**					
	1.	Photosynthesis- Mechanism of photosynthesis	2	To understand a brief introduction on photosynthesis	Video clippings	Assignment Short test Group discussion Quiz , CIA-II
	2.	pigment systems, light dependent reactions(cyclic and non-cyclic)	2	To learn and compare the mode of action of cyclic and non-cyclic electron transport systems	Lecture	
	3.	C_3 Cycle.	2	To understand the various events takes place in C3 cycle	PPT	
	4.	Factors affecting photosynthesis.	2	To study the various factors that affect photosynthesis	Online Lecture	
	5.	Defense mechanism in plants	1	To have a clear picture of the common defense mechanisms seen in plants	Lecture PPT	

Course Instructor:Dr.Jespin Ida **HoD:Dr.C.Jespin Ida**

Non Major Elective Course I - Gardening and Floriculture
Course Code: BNM201

Unit	Modules	Topics	Hours	Learning Outcome/ CO addressed	Pedagogy	Assessment
I	**Garden Nursery Structures (6 hrs.)**					
	1	Nursery Bed	2	Demonstrate nursery bed. **(CO-1,4)**	Video lecture	Formative Assessment I & Quiz I **Assignment: Essay on manures.**
	2	Mist Chamber	2	Illustrate mist chamber. **(CO-1,4)**	Jamboard	
	3	Manures and Vermicompost	2	Validate manures and vermicompost. **(CO1,4-)**	Blended learning	
II	**Plant Propagation (6 hrs.)**					
	1	Asexual methods - Air layering and Veneer Grafting.	3	Elucidate asexual methods of propagation.**(CO-2,4)**	PPT, Flow chart	Formative Assessment I & Quiz I

	2	Micropropagation - Induction of rooting and flowering.	3	Explain Micropropagation.**(CO-2,4)**	PPT, Video, Mind map	**Class test: Micropropagation**
III	**Green houses for tropical countries (6 hrs.)**					
	1	Pot mixture	1	Identify and assemble pot mixture.**(CO-1,4)**	Group discussion	Formative Assessment I & Quiz I (1,2). Formative Assessment II & Quiz II (3,4).
	2	Pot culture	2	Practice pot culture.**(CO-1,3,4)**	Virtual hands-on training	
	3	Packaging of Nursery Stock	2	Prepare nursery stock.**(CO-1,2,4)**	Classroomscreen	
	4	Marketing of Nursery Stock	1	Explain the marketing of Nursery Stock.**(CO-1,4)**	PPT	
IV	**Indoor Gardening(6 hrs.)**					
	1	Layout of lawns	1	Evaluate theLayout of lawns.**(CO-1,4)**	Virtual visits	Assignment: Bonsai Formative Assessment II & Quiz II
	2	Rockery	2	Analyse the features of a rockery.**(CO-1,4)**	Videos	
	3	Bonsai	2	Explicate Bonsai. **(CO-1,2,3,4)**	PPT, Video, Virtual tour	
	4	Hanging basket	1	Practice hanging basket gardening at home.**(CO-1,4)**	PPT, Virtual visits	
V	**Commercial Floriculture(6 hrs.)**					
	1	Cultivation of cut flowers - Rose	2	Elucidate the cultivation of rose.**(CO-1,2,3,4)**	PPT, Brain storming	Formative Assessment II & Quiz II Class test: Quizizz
	2	Cultivation of cut flowers - Orchids	2	Explain the cultivation of Orchids.**(CO-1,2,3,4)**	PPT, Video, Discussion	
	3	Flower arrangements	1	Perform flower arrangements. **(CO-2,4)**	Pictures, Video	
	4	Methods to prolong vase life	1	Analyse themethods to prolong vase life.**(CO-2,4)**	Blended learning	

Course Instructors		**Head of the Department**
Dr. S. Mary Mettilda Bai	Dr. C. Anitha	Dr. F. Brisca Renuga

Plant Anatomy and Developmental Botany

Sub. Code: BC2021

Unit	Module	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
Meristem and Tissues						

I	1	Meristems – Classification (origin, position and function);	2	To Analyse the growth of the plant	Lecture	Formative assessment Assignment Short test Assessing their creative knowledge Quiz
	2	Evolution of concept of organization of shoot apex (Histogen theory, Tunica Corpus theory).	2	To understand the growth of shoot apex	Lecture Video clippings	
	3	Organization of root apex (Histogen theory, Korper-Kappe theory); Quiescent centre; Root cap.	2	To correlate the difference between shoot and root tip	Lecture Illustrations	
	4	Tissues – Structure and function of simple tissue (parenchyma, collenchyma and sclerenchyma) and complex tissue (xylem and phloem).	2	To be familiarize with the functions of tissues	Lecture PPT presentation	
	5	Types of vascular bundles.	1	To recall the types of vascular bundles	Lecture, PPT, demonstration	
Primary and Secondary Structure						
I	1	Primary growth; Primary structure of dicot and monocot stem, root and leaf.	4	To compare the difference between monocot and dicot internal structure	Lecture, PPT, demonstration	Formative assessment Assignment Short test Assessing their creative knowledge

		Secondary growth in stem and root –				Quiz
	2	Formation of cambial ring, activity of cambial ring,	2	To recall the activity of cambial ring	Lecture, PPT, demonstration	
	3	secondary vascular tissue, formation of periderm, lenticels, dendrochronology, annual ring, Wood (heartwood and sapwood).	3	To know the formation of sap and hard wood	Lecture, PPT, demonstration	
Anomalous secondary thickening, Epidermis and node						
III	1	Anomalous secondary thickening in dicot stem (*Boerhaavia*) and monocot stem (*Dracaena*).	2	To understand the secondary thickening in dicot and monocot	Lecture' Images	Formative assessment Assignment Short test Assessing their creative knowledge Quiz
	2	Epidermal tissue system, cuticle, epicuticular waxes, trichomes (uni-and multicellular, glandular and nonglandular, two examples of each), stomata and its types;	3	To know the different tissues and its importance	demonstration	
	3	Nodal anatomy types - unilacunar	4	To be familiarize	demonstration	

		(*Justicia*), trilacunar (*Azadirachta*) and multilacunar (*Aralia*), Hydathodes and laticifers.		the nodal anatomy		
Embryology – Structure						
IV	1	Embryology – Structure of anther;	2	To understand the structure of anther	Lecture	Formative assessment Group discussion Short test Quiz
	2	Structure of microsporangium, microsporogenesis structure of pollen; development of male gametophyte.	3	To understand the structure of pollen and its development	Lecture with PPT	
	3	Structure and types of ovules; Structure of megasporangium, megasporogenesis.	3	To corelate the types of ovules	Lecture with Video clippings	
	4	Development of female gametophyte.	1	To know the development of female gametophyte	Lecture with demonstration	
Types of embryo, Pollination, Fertilization						
V	1	Types of embryo sac – Monosporic – Polygonum type.	2	To compare the different types of embryo	Lecture PPT,	Group discussion Formative assessment, Quiz Short test
	2	Pollination mechanisms and adaptations.	2	To realize the importance of pollination	Lecture,	
	3	Fertilization, endosperm - types- nuclear, cellular and helobial, ruminate endosperm, perisperm.	3	To apply the types of endosperm	Lecture with Video clippings	

	4	Development of embryo in dicot (*Capsella*) and monocot (*Luzula*). Apomixis and polyembryony.	2	To understand the development of embryo	Lecture, Group discussion	

Course Instructor: Dr. Sr.Leema Rose **HoD: Dr. C. Jespin Ida**

Allied - Taxonomy of Angiosperms and Herbal Technology

Subject code:BA2021

Modules

Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
Morphological modification of roots, stems and leaves.,Classification by Bentham & Hooker and Binomial nomenclature						
I	1	Objectives and importance of systematic botany	1	To understand the objectives and importance of systematic botany	Lecture	Assignment Short test Group discussion Quiz
	2	Morphology of root, stem,& leaves and their modifications.	2	To know the morphology of root, stem and leaf with their modifications	Lecture, specimens and PPT	
	3	Types of Inflorescences and fruits	3	To Learn about the different types of inflorescences, and fruits	Lecture Live specimens	

	4	Systems of classification; Natural –	2	To know how Bentham and Hooker classified plants	Lecture Group discussion PPT	

		Bentham and Hooker		and also understood the merits and demerits of that classification		
	5	Nomenclature – Binomial System	1	To understand the importance of binomial system of nomenclature	PPT Lecture	
Detailed study of the following families with their economic importance						
II	1	Detailed study of the family Rutaceae along with their economic important plants	2	To understand the distinguishing features and economic importance of the family Rutaceae	Lecture demonstration	Quiz Slip Test Short test CIA MCQs QUIZZIZZ
	2	Detailed study of the family Apiaceae with their economic importance	2	To understand the distinguishing features and economic importance of the family Apiaceae	Lecture PPT	
	3	Detailed study of the family Lamiaceaewith their economic importance	2	To understand the distinguishing features and economic importance of the family Lamiaceae	Lecture Chalk and board	
	4.	Detailed study of the family Euphorbiaceae	2	To learn the distinguishing features and economic importance of the family Euphorbiaceae	Lecture Showing many plants of that family	
	5.	Elaborate study of the family Liliaceae.	1	To study the characteristic features and economic importance of	Lecture Ppt	

				the family Liliaceae		
Herbal medicines						
III	1	Herbal medicines- History and scope	1	To have a brief knowledge on herbal medicine and the underlying principles	Lecture	Quiz Slip Test Short test CIA MCQs QUIZZIZZ, CIA-I
	2	Knowledge on- Ayurveda& Siddha	3	To be familiarize with the Principles and practices of Ayurveda & Siddha	Lecture PPT	
	3	Knowledge onUnani and Homeopathy	1	To know the importance and uniqueness of Unani and Homeopathy practices	Lecture Group discussion	
	4	Herbal preparation: decoction, extract& infusions	2	To know themethods of preparation ofdecoction, extract& infusions	Group discussion Lecture	
	5	Herbal preparation: oils, shampoos and powders	2	To learn the techniques of preparations of: oils, shampoos and powders	Group discussion Demonstration	
Phytochemistry						
IV	1	Phytochemistry - active principles and common methods of testing	1	To know the classification and economic importance of fungi	Lecture Chart	Quiz Slip Test Short test CIA MCQs QUIZZIZZ
	2	Iidentification and utilization of the medicinal herb *Catharanthus roseus* (cardiotonic),	2	To understand how the active principles of *Catharanthus roseus* acts ascardiotonic	Lecture	

	3	Withaniasomnifera (drugs acting on nervous system),	2	To know the drug of *Withaniasomnifera* and its potentiality	Lecture	
	4	*Clerodendronphlomoides* (anti-rheumatic)	2	To understand the active principle present in *Clerodendronphlomoides*	Lecture PPT	
	5	*Centella asiatica* (memory booster).	2	To realise the secondary metabolite of *Centella asiatica*as memory booster	Lecture	
Analytical pharmacognosy						
V	1	Analytical pharmacognosy	1	To understand the importance ofpharmacognosy	Lecture	Short test Slip test Assignment CIA Quiz, CIA-II
	2	Drug adulteration - types, methods of drug evaluation	2	To analyze the different adulterants used during drug formulation	Lecture Chart	
	3	Biological testing of herbal drugs	2	To know the importance of biological testing of herbal drugs	Lecture	
	4	Phytochemical screening tests for secondary metabolites-alkaloids& flavonoids	2	To identify the secondary metabolites through simple tests.	Lecture Demonstration	
	5	Phytochemical screening tests for secondary metabolites-steroids, triterpenoids& phenolic compounds	2	To distinguish betweensteroids, triterpenoids & phenolic compounds on the basis of their qualitative tests	Demonstration PPT	

Course Instructor: Dr.Jespin Ida **HOD: Dr. C. Jespin Ida**

Semester - III
Major Elective – I (b) Nursery and Gardening
Sub. Code: BC2033

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/Evaluation
I. Nursery						
	1	Objectives, scope and building up of infrastructure for nursery	3	To know how to make infrastructure for nursery	Lecture Images Group Discussion	Classroom quiz Short test Formative assessment
	2	Direct seeding and transplants	2	To know planting methods	Video clipping	Assignment
	2	Nursery practices for some important crops – Coconut, Areca nut, Pepper and Cardamom	4	To provide a thorough Knowledge of Nursery practices for Coconut, Areca nut, Pepper and Cardamom	Lecture with PPT and Video clippings	Evaluation through growing any one economic important crop
II Commercial cultivation						
	1	Importance and scope of ornamental horticulture in India. Making and maintenance of lawn, hedges and edges.	3	To practice making and maintenance of lawn, hedges and edges.	Lecture and Hands on training	Assessing their practical knowledge in field work

	2	Commercial cultivation of Rose, Canna, Marigold and Gladiolus.	4	To produce Commercial cultivation of Rose, Canna, Marigold and Gladiolus	Lecture with video clippings and Hands on training	Assessing their practical knowledge in field work

	3	Flower arrangement and techniques to prolong vase life of flowers.	2	To practice the Flower arrangement and techniques to prolong vase life of flowers.	Lecturing with PPT	Assessing their Flower arrangement and technical knowledge through competition
III Vegetative propagation						
	1	Brief introduction about grafting, cutting- selection of cutting, treatment of cutting, rooting medium and planting of cuttings and layering - air and ground layering	5	To understand and practice of grafting, cutting, rooting and layering methods.	Lecture with hands on training in field	Assessing their horticultural knowledge through demonstration
	2	Hardening of plants – greenhouse, mist chamber, shade house and glass house.	4	To provide students with the knowledge and skills of hardening of plants	Lecture with images	Assignment
IV Gardening:						
	1	Definition and scope, types of gardens- formal (Mughal) and informal (Japanese).	2	To know and differentiate the formal and informal garden	Lecture With images and video clippings	Short test Assignment Formative assessment Quiz

	2	Special types of gardens – Rock garden, water garden, Bog or Marsh garden, Sunken garden and roof garden.	5	To make special types of gardens in their areas	Lecture, Hands on Training	Assessing their knowledge to make anyone garden in their houses
	3	Gardening operations: soil laying, manuring, watering, management of pests and diseases.	2	To learn some Gardening operations	Lecture, Video clippings and Hands on Training	Mini Projects
V Cultivation and utilization of medicinal plants						
	1	Cultivation of vegetable crops – Tomato and Brinjal.	2	To understand the cultivation methods of vegetable crops	Lecture with Hands on Training	Assessing their cultivation knowledge through field work
	2	Cultivation of Root Crops – Radish and Carrot.	2	To understand the cultivation methods of root crops	Lecture with Hands on Training	Assessing their cultivation knowledge through field work
	3	Cultivation of Cucurbits- Cucumber and Bitter gourd.	2	To understand the cultivation methods of cucurbits	Lecture with Hands on Training	Assessing their cultivation knowledge through field work
	4.	Storage and marketing procedures of vegetable crops	2	To know the Storage and marketing procedures of vegetable crops	Lecture with PPT	Assignment and Quiz

Course Instructor: A.R. Florence H.O.D: C. Jespin Ida

Major Elective – I (c) Agricultural Botany
Sub. Code: BC2034

Module

Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
CROPPING						
I	1	Introduction to agriculture	1	To understand the need of agriculture	Lecture	Short test Assignment Formative assessment Quiz Open Book Test
	2	Agricultural Finance	1	To analyze finance for agriculture and crop rotation	Lecture, Group Discussion	
	3	Crop rotation-principles, limitation, advantages, rotational intensity cropping scheme, cropping intensity.	4	To be familiarize with principle, limitation and advantages of crop rotation	Lecture, PPT	
	4	Cropping system – intercropping, mixed cropping, multiple cropping and relay cropping.	3	To learn about the types of cropping system	Lecture Group Discussion	
Cultivation						

II	1	Area, soil, seed rate requirements, manuring, weed management and	3	To study the cultivation	Lecture Video	Class test Assignment

		harvest of Cereals and Millets: Rice and Maize		techniques of rice and maize		Formative assessment Quiz Open Book Test
	2	Area, soil, seed rate requirements, manuring, weed management and harvest of Pulses: Green gram and Black gram	3	To understand the cultivation technique of green gram and black gram	Lecture PPT	
	3	Area, soil, seed rate requirements, manuring, weed management and harvest of Oil Seeds: Ground nut and Sesame	3	To learn about the cultivation of ground nut and sesame	Lecture Video	
Seed technology						
III	1	Seed Viability, Dormancy.	2	To understand about the viability of seed	Lecture	Class test Assignment Formative assessment Quiz Open Book Test CIA-I
	2	Methods of breaking dormancy, Seed processing	3	To be familiarize with the process of breaking seed dormancy	Lecture PPT	
	3	Seed treatment for storage and seed certification.	4	To understand the importance of seed treatment and seed certification	Lecture Group Discussion	
Factors affecting agricultural crops						

IV	1	Biotic: Insects, Pests, Rodents, Weeds.	2	To learn about the biotic factors affecting agricultural crops	Lecture PPT	Class test Assignment Formative assessment Quiz Open Book Test
	2	Abiotic: Soil, Wind, Water, Atmospheric air, Humidity, Temperature.	2	To understand the abiotic factors affecting agricultural crops	Lecture Group Discussion	
	3	Agricultural Machinery: primary and secondary tillage.	2	To realize the usage of agricultural machinery	Lecture PPT	
	4	Seed drills and paddy transplanters	2	To learn about seed drills and paddy transplanters	Lecture PPT	
	5	Plant protection and harvesting tools.	1	To realize the methods of plant protection and use of harvest tools	Lecture Demonstration	
	Beneficial microorganisms in Agriculture					
V	1	Brief account on Biofertilizer(Cyanobacteria), microbial insecticides.	2	To introduce the students with biofertilizer	Lecture Video	Class test Assignment

				especially cyanobacteria		Formative assessment Quiz Open Book Test CIA-II
	2	Microbial agents for control of plant diseases	2	To understand the microbial agents used to control plant diseases	Lecture PPT	
	3	Genetically Modified Crops (Bt – Cotton and Golden rice).	3	To be familiarize with genetically modified crops	Lecture PPT	
	4	Implications of GM crops.	2	To learn about the implications of GM crops	Lecture	

Course Instructor: Dr. A. Anami Augustus Arul **H.O.D: C. Jespin Ida**

Allied II – Theory: Plant Diversity -I
Algae, Fungi, Bryophytes and Pteridophytes
Sub. Code: BA2031

Modules

Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
Algae						
I	1	General Characters,	1	To understand the general characters of algae	Lecture	Class test Assignment Formative assessment Quiz
	2	Classification of algae according to Fritsch, 1945 (up to class level) thallus	2	To classify the different types of algae	Lecture PPT	

	3	structure, reproduction and life cycle of the following (Development aspect not included) Cyanophyceae– *Nostoc*	3	To know the vegetative and reproductive characters of *Nostoc*.	Lecture PPT, video	
	4	Chlorophyceae- Volvox	3	To study the life cycle of *Volvox*	Lecture PPT,	
	Algae					
II	1	Phaeophyceae- *Sargassum*	3	To be familiarize with the vegetative and reproductive characters of Sargassum	Lecture PPT	Assignment Formative assessment Short test Quiz
	2	Rhodophyceae- *Gracilaria*	3	To realize the vegetative and reproductive e characters of *Gracilaria*	Lecture PPT	
	3	Economic importance of Algae	3	To know the economic importance of Algae	Lecture PPT	
Fungi						
III	1	General characters, a brief introduction of fungi	1	To learn the general characters of fungi	Lecture	Short test Quiz Formative assessment Class test Assignment CIA-I
	2	classification by Alexopoulos and Mims, 1979 (upto class level), thallus	2	To understand the different types of algae	Lecture PPT	
	3	structure, reproduction and life cycle of the following (Development aspect not included) Ascomycetes - *Aspergillus*	2	. To realize the vegetative and reproductive characters of *Aspergillus*	Lecture PPT Video	
	4	Basidiomycetes - *Puccinia*	2	To understand the structure, reproduction	Lecture PPT	

				and life cycle of *Puccinia*		
	5	Economic importance of Fungi	2	To learn the economic importance of Fungi	Lecture PPT	
Bryophytes:						
IV	1	General characters, A brief introduction of bryophyta	1	To know the general characters of Bryophyta	Lecture, PPT	Class test Assignment Quiz Formative assessment
	2	classification by Rothmaler,1951(up to class level),	3	To classify the bryophytes according to Rothmaler	Lecture. PPT	
	3	morphology, anatomy, reproduction and life cycle of *Polytrichum*. (Developmental details not to be included).	3	To realize vegetative and reproductive structures of *Polytrichum*	Lecture	
	4	Economic importance of Bryophytes.	2	To learn the economic importance of Bryophytes	Lecture, PPT	
Pteridophytes:						
V	1	General characteristics, A brief introduction of pteridophyte	1	To know the general characters of pteridophytes	Lecture	Group discussion Assignment Quiz Short test Formative Assessment CIA-II
	2	classification by Smith, 1955(upto class level)	3	To classify the pteridophytes according to Smith.	Lecture, PPT	
	3	morphology, anatomy, reproduction and life cycle of *Selaginella* (Developmental details not to be included).	3	To study the structure and reproduction of *Selaginella*	Lecture, PPT Video	
	4	Economic importance of Pteridophytes.	2	To learn the economic importance of Pteridophytes.	Lecture, PPT	

1. **Course Instructor:Dr. Bojaxa A. Rosy** **H.O.D: C. Jespin Ida**

Major Core – IV Plant Ecology and Phytogeography
Sub. Code: BC2041

Modules
Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
Ecosystem						
I	1	Fresh water (pond ecosystem) and marine ecosystem	2	To understand the producers, c onsumers and decomposers of these ecosystems.	Lecture with blackboard	Formative assessment Class test Quiz Group discussion Short test
	2	Trophic organization, energy flow, autotrophy and heterotrophy	2	Know the behavior of organisms in each trophic level of an ecosystem.	Lecture with blackboard	
	3	Food chains and food webs, ecological pyramids	2	Learn the predators and preys and their interconnections in an ecosystem.	Lecture with charts	
	4	Plant interactions-symbiosis, commensalism and parasitism	2	Understand the relationship between plant and other organisms.	Lecture with PPT	
Soil						
II	1	Importance, Origin, Types Formation of soil	2	To understand the importance, origin,	Lecture	Formative assessment

				types and formation of soil		Group discussion Short test Assignment Quiz
	2	Composition of soil, Physical, chemical and biological components of soil	2	To be familiarize with the Composition and components of soil	Lecture	
	3	SoilProfile, Role of climate in soil development.	2	To know the profile of soil androle of climate in soil development.	Lecture Video clippings	
Water						
III	1	Importance of water, States of water in the environment	2	To realize the importance and States of water	Lecture	Formative assessment Class test Quiz Group discussion Short test CIA-I
	2	Atmospheric moisture; Precipitation types (rain, fog, snow, hail, dew)	3	To categorize the Precipitation types	Lecture Video clippings	
	3	Water bodies: Water in soil; Water table, Aquifers, Water shed management.	4	To know the Water bodies and Water shed management	Lecture, group discussion	
Ecological groups						
IV	1	Morphological, anatomical and physiological adaptations of hydrophytes	2	To understand the special structures produced by plants to adapt water habitats.	Lecture Classroom Discussion	Diagrammatic assessment Assessing their Practical knowledge
	2	Morphological, anatomical and physiological	3	To identify the xerophytes and study their	Lecture with blackboard	

		adaptations of xerophytes		anatomical and physiological adaptations		Formative assessment Class test Quiz Group discussion Short test
	3	Morphological, anatomical and physiological adaptations of halophytes	3	To learn the modifications made by plants to adapt high salinity.	Lecture Classroom Discussion	
	4	Study of vegetation by quadrat and transect method.	3	To analyse the vegetation by quadrat and transect method.	Field study	
Phytogeography						
V	1	Principles of phytogeography	2	Know the pattern and process in plant distribution.	Lecture with blackboard	Short test Choose the correct answer Formative assessment Assignment Quiz CIA-II
	2	Types of plant distribution – continuous, discontinuous and endemic.	3	Understand the different types of distribution of plants.	Lecture PPT	
	3	Plate tectonics, continental drift, theory of land bridges, age and area hypothesis.	4	Learn about the movements of continents.	Lecture PPT	
	4	Centers of origin of cultivated crops.	1	Know about the origin of crops	Lecture PPT	

Course Instructor: Dr. A.R. Florence **H.O.D: C.Jespin Ida**

Semester - V

Major Core-V Taxonomy of Angiosperms and Economic Botany

Sub. Code: BC2051

Number of Hours Per week	Number of Credits	Total Number of Hours	Marks
6	6	90	100

Objectives:1. To know the principles of classification of taxa.

2. To evaluate the medicinal importance of selected angiosperms.

3. To acquire knowledge on the botanical vocabulary and taxonomical terminology to identify plants.

CO	Upon completion of this course the students will be able to:	PSO addressed	CL

CO - 1	relate the modifications in plant parts.	PSO–1	U
CO - 2	differentiate the artificial, natural and phylogenetic classification and learn about ICN rules.	PSO–2	An
CO - 3	evaluate the taxonomists of India.	PSO–1	Ev
CO - 4	recall the characters of some important families.	PSO–1	R
CO - 5	understand the economically important products of plants and their use at various levels.	PSO - 2	U
CO - 6	construct digital herbarium and learn about Herbarium techniques.	PSO - 5	C

Unit	**Module**	**Topics**	**Lecture Hour**	**Learning outcome**	**Pedagogy**	**Assessment/ Evaluation**
I	**Morphological modifications and contribution by taxonomists**					
1	1	Botanical nomenclature: Principles and rules of International Code of Nomenclature (ICN)	2	To Understand *binomial nomenclature* and realize the Principles and rules of ICN	Lecture	Class test Formative assessment
	2	Ranks and names; Typification, author citation, valid publication, rejection of names, principle of priority and its limitations	3	To know the Typification, author citation and valid publication	Lecture Chalk and Talk	
	3	Morphology of root, stem and their modifications	3	To differentiate the morphology of root, and stem with theirmodifications	Lecture PPT	
	4	Morphology of leaf, fruit and their modifications	3	To learn about the different types of leaf and fruit with their modifications	Lecture, Demonstration with live Specimens	

	5	Morphology of inflorescence, flower and their modifications	4	To learn about the different types of inflorescence and flower with their modifications	Lecture, Demonstration live Specimens	
II	**Different systems of classification, principles of ICN and herbarium techniques**					
2	1	Systems of classification; Detailed study on Sexual system-Carolus Linnaeus	2	To gain knowledge onSexual system of classification	Lecture PPT	Quiz Class Test Multiple choice questions
	2	Natural System – Bentham and Hooker	2	To gain knowledge onnatural system of classification	Lecture with flow chart	
	3	Phylogenetic System - APG Classification (2016)	2	To gain knowledge onphylogenetic system of classification	Lecture with flow chart	
	4	Functions of Herbarium; Virtual herbarium; E-flora; Herbarium techniques.	5	To learn different herbarium techniques	Lecture group discussion PPT	
	5	Contribution to systematic botany by Indian Taxonomists: K.M. Mathew and Hermenegild Santapau.	4	To study the renowned contribution to systematic botany by Hermenegild and Santapau's of Indian taxonomy	Lecture chalk and talk	
III	**Detailed study of the following families with their economic importance**					
	1	Detailed study of the family Annonaceae and Rutaceae with their economic importance	3	To understand the distinguishing features and economic importance of the family Annonaceae and Rutaceae	Lecture with live Specimens	Formative assessmentQuiz Short test Assignment
	2	Detailed study of the family Caesalpiniaceae and Meliaceae with their	4	To understand the distinguishing	Lecture with live Specimen	

3		economic importance		features and economic importance of the family Caesalpiniaceae and Meliaceae		
	3	Detailed study of the family Anacardiaceae and Cucurbitaceae with their economic importance	4	To understand the distinguishing featuresand economic importanc e of the family Anacardia ceae and Cucurbita ceae	Lecture with live Specimens	
	4	Detailed study of the familyRubiaceae and Sapotaceae with their economic importance	4	To understand the distinguishing features and economic importance of the family Rubiaceae and Sapotaceae.	Lecture with live Specimen	
IV	**Detailed study of the following families with their economic importance**					
4	1	Detailed study of the family Apocynaceae and Asclepiadaceae with their economic importance	4	To learn the distinguishing features and economic importance of thefamily Apocynaceae and Asclepiadaceae	Lecture with live Specimens	Short test Multipl choice questions
	2	Detailed study of the family Lamiaceae and Euphorbiaceae with theireconomic importance	4	To know the distinguishing features and economic importance of the family Lamiaceae and Euphorbiaceae	Lecture with live Specimens	

	3	Detailed study of the family Amaranthaceae, Cannaceae with their economic importance	3	To understand the distinguishing features and economic importance of the family Amaranthaceae and Cannaceae	Lecture with live Specimens	
	4	Detailed study of the family Orchidaceae and Poaceae with their economic importance	4	To learn the distinguishing features and economic importance of the family Orchidaceae and Poaceae	Lecture with live Specimen	
V	**Detailed study of useful part, economic products and uses of plants**					
5	1	Morphology of useful part, economic products and uses of Cereals (Paddy, Wheat) Pulses (Green gram, Bengal gram)	3	To know the economic products of Cereals and Pulses	Lecture	Short test Multipl choice questions
	2	Morphology of useful part, economic products and uses of Tuber crops (Tapioca, Potato); Spices (Pepper, Cardamom)	3	To learn the economic products of of Tuber crops and Spices	Lecture	
	3	Morphology of useful part, economic products and uses of Beverages (Tea, Coffee) Oil yielding plants (Coconut, Groundnut)	3	To understand the economic products of Beverages and Oil yielding plants	Lecture	
	4	Morphology of useful part, economic products and uses of Fibre yielding plants (Cotton, Coir) Timber yielding plants (Teak, Rose wood)	3	To understand the economic products of Fibre yielding and Timber yielding plants	Lecture	
	5	Morphology of useful part, economic products and uses of Latex yielding plants (Para rubber,	3	To know the economic products of Latex yielding and	Lecture	

		Sapota) Ornamental plants (Rose, Orchids		Ornamental plants		

Course Instructor: Dr. Bojaxa A. Rosy **HOD: Dr. A. Anami Augustus Arul**

Semester **V**

Name of the Course **: Biochemistry and Biophysics**

Subject code **: BC2052**

Number of hours per week	Credit	Total no.of hours	Marks
6	**6**	**90**	**100**

Course Outcomes (COs)

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	apply the usage of P H and buffers in biological experiments..	PSO - 3	Ap
CO - 2	understand the importance of Bio-molecules.	PSO - 1	U
CO - 3	describe its biological roles and significance of lipids.	PSO - 1	U
CO - 4	analyze enzyme activity	PSO - 2	An
CO - 5	demonstrate thermodynamic principles in biological energy conversion.	PSO - 7	E

Unit	Module	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
I. CHEMICAL BONDS						
	1	Types (co-ordinate, covalent, hydrogen); Acids and Bases - pH and Buffer System	3	To know about the basics of bonds and buffering systems	Lecture, PPT, Chart	Experimental analysis, Group Discussion, Short test, Online Quiz
	2	. Classification of carbohydrates; Monosaccharides: Structure of glucose (linear, open chain, ring form) and fructose, properties of monosaccharides. .	3	To classify carbohydrates .with suitable examples	Lecture, PPT, Charts	
	3	Disaccharides: Structure and properties of maltose, sucrose and lactose	3	To understand the importance of disaccharides with examples	Lecture, Video clippings,	
	4	Polysaccharides: Structure and properties of starch and cellulose. (Seminar)	4	To know about the biological importance of polysaccharides	Lecture, Charts	
II. AMINO ACIDS						
	1	Classification, structure and properties. Protein – primary, secondary, tertiary (myoglobin) and quaternary (hemoglobin).Protein denaturation and biological roles of proteins	4	To categorize the different types of proteins	Lecture, PPT	Diagramatic representation, Question – answer session, class test Online Quiz
	2	Water-soluble vitamins e.g., Thiamine, Riboflavin and Niacin	3	To understand the basic structure and uses of water soluble vitamins	Lecture, PPT, Video clippings	
	4	Fat-solublle vitamins e.g., vitamin A- retinol, Vitamin D –	4	To know the importance of fat soluble vitamins	Lecture, Chart	

		Ergosterol				
III. LIPIDS						
	1	Saturated and unsaturated fatty acids. Classification-structure and properties of simple lipids (waxes and triglycerides)	4	To differentiate Saturated and unsaturated fatty acids	Lecture, PPT	Group Discussion, Multiple Choice Questions, CIA -I
	2	Compound lipids (phospholipid and glycolipid)	3	To analyze the different compound lipids and its importance	Lecture, PPT, Laboratory tests	
	3	Derived lipids (cholesterol, carotenoids and terpenes).	4	To know about the derived Lipids with examples	Lecture, PPT, Laboratory practice	
IV. ENZYMES						
	1	Classification, nomenclature based on IUB	3	To classify enzymes based on IUB	Lecture, PPT	Short test, Online Quiz, Models
	2	Activation energy, active site, cofactors, coenzymes (NAD, CoA), isoenzyme	3	To differentiate cofactors and isoenzyme	Lecture, PPT	
	3	Mechanism of enzyme action (lock and key model, induced - fit theory),	3	To analyze the mechanism of enzyme action	Lecture, PPT, Video clippings	
	4	Enzyme inhibition and factors affecting enzyme activity	**3**	To evaluate enzyme inhibition with examples	Lecture, PPT	
V. PHOTOBIOLOGY						
	1	Dual nature of light and its characteristics. Electromagnetic Spectrum, Action and Absorption spectrum, Emission spectrum – excitation and de-excitation. .	3	To categorize the different spectrum of electromagnets	Lecture, PPT	Short test, Online Quiz, Open Book test, CIA –II
	2	Phosphorescence, fluorescence and bio-luminescence, Bioenergetics: Laws of	2	To understand the mechanism of bioenergetics	Lecture, PPT	

		thermodynamics, concept of free energy, endergonic and exergonic reactions, coupled reactions, redox reactions.				
	3	ATP: structure, its role as an energy currency molecule	3	To analyze the role of ATP	Lecture, PPT	

Course Instructor: Ms. J. Albino Wins HOD: Dr. A. Anami Augustus Arul

Semester - V

Major Core – VII – Microbiology and Plant Pathology

Sub. Code: BC2053

Number of Hours Per week	Number of Credits	Total Number of Hours	Marks
6	5	90	100

Objectives: 1. To provide the students with the comprehensive understanding and appreciation for the diversity and significance of microbes on planet earth.

2. To study the interaction between plant and pathogen and to develop method of disease management.
3. To know the working principal and mechanism of action of instruments related to microbiology.

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO – 1	get an insight on the structure and reproduction of bacteria and viruses.	PSO - 1	U
CO – 2	explore the role and relevance of bacteria and viruses in the field of microbiology.	PSO - 1	An
CO–3	learn the sterilization techniques and preparation of culture media.	PSO–2	Ap
CO– 4	Become an expert in operating microbiological instruments thereby undertaking careers in that field.	PSO - 5	Ap
CO -5	Understand the economic and pathological importance of bacteria, viruses and fungi.	PSO - 1	U

Unit	Module	Topics	Lecture Hours	Learning Outcome	Pedagogy	Assessment /Evaluation
UNIT: I Introduction to microbial world						
I	1	**Bacteria:** General characteristics; Archaebacteria, Eubacteria, wall-less forms (mycoplasmas). **Ultrastructure**	**3**	To be familiarize with different types of bacteria and it's structure	Lecture PPT Microslides	Formative Assessme ntQuiz Short test Group Discussion Slip Test
	2	Nutritional types of bacteria - autotrophs and heterotroph s,	3	To know the Nutritional types of bacteria	Lecture Charts Video clippin gs	
	3	Reproduction and recombination (conjugation, transformation and transduction). Binary fission and endospore.	3	To differentiate bacteria based on their mode of reproduction	Lecture Illustration	
	4	Economic importance of bacteria with reference to their role in agriculture and industry (fermentation and medicine).	3	To understand the economic importance of bacteria	Lecture Group Discussion PPT	
UNIT: II VIRUSES						
II	1	General characteristics; classification (Baltimore),	2	To understand the characters of virus and it's classification	Lecture Group discussion	Formative assessment Quiz Multiple choice questions Short test
	2	Structure and replication of DNA virus(T4)	2	To study the structure of T-phage DNA virus	Lecture, PPT	

	3	Lytic and lysogenic cycle	2	To differentiate lytic cycle from lysogenic cycle	Lecture Debate	
	4	RNA virus (TMV, Corona Virus), viroids and prions.	3	To learn about the RNA virus	Lecture PPT	
	5	Economic importance of viruses with reference to vaccine production, role in research, medicine and diagnostics, as causal organisms of plant diseases.	3	To comprehend the economic importance of viruses	Lecture Chart, Video clippin gs	
UNIT: III Preparation of Microbiology Lab						
III	1	Sterilization of glassware	2	To learn the sterilization techniques	Lecture Demonstrat ion	Formative Assessme ntQuiz Short test Group Discussion Slip Test Assignment
	2	Preparation of agar medium.	1	To perceive the agar media preparation	Lecture Chart	
	3	Bacterial growth- growth curve- pure culture, batch culture and continuous culture.	2	To study the different types of bacterial growth	Lecture PPT	
	4	Physical and chemical agents for controlling microorganisms. Dry and Wet sterilization	2	To be familiar with the various physical and chemical agents to control the growth of microorganisms	Lecture Demonstrat ion	
	5	Working principles of Autoclave, Laminar Air Flow and Incubator.	2	To be able to operate the microbiological instruments	Lecture Hands on training	
	6	Contributions to Microbiology: Anton Van Leeuwenhoek, Louis Pasteur and Robert Koch.	3	To apprehend the valuable **contribution of microbiologists**		
UNIT: IV Food, Dairy and Water Microbiology						
	1	Food Microbiology: General account of food spoilage through microbes.	2	To assay the food spoiled by microbes	Lecture Demonstrat Ion	Formative Assessme ntQuiz Short test Group

						Discussion Slip Test Assignment
	2	Food borne infections and preventions – Botulism and Salmonellosis	3	To perceive food borne infection and treatment	LecturePPT	
	3	Dairy microbiology – Sources of milk contamination, Pasteurization technique, Test for grading milk quality	2	To create an awareness about sources of milk contamination and milk grading	Lecture Demonstration	
	4	Potable and non potable water	2	To identify portable and non-portable water	Lecture Field Visit	
	5	Municipal sewage treatment process: Primary, Secondary, (aerobic and anaerobic process), chemical treatment: chlorination. Disposal of treated sewage. (sludge as fertilizer ; irrigation and dilution)	1	To learn about the municipal sewage treatment	Lecture Group Discussion	
	6	Test for detection of coliform bacteria	2	To test coliform bacteria in water	Lecture Hands on training	
UNIT: V Plant Pathology, Study of selected plant diseases						
V	1	Terms and concepts; General symptoms; Etiology; Symptomology; Host-Pathogen relationships; Disease	3	To realize the importance of plant pathology and to learn the terminologies of Plant Pathology	Lecture	Formative Assessment Quiz Short test Group Discussion Slip Test

	cycle and environmental relation; prevention and control of plant diseases, and role of quarantine				Assignment
2	Bacterial diseases – Citrus canker and angular leaf spot of Cotton.	3	To apprehend the characters of Citrus canker and angular leaf spot of Cotton and its prevention	Lecture PPT Specimen	
3	Viral diseases –Bunchy Top of Banana, Vein clearing in lady's finger.	3	To know the disease cycle and prevention measures of bunchy top of Banana and Vein clearing in lady's finger.	Lecture Specimen Chart	
4	Fungal diseases – Late blight of Potato and Tikka Disease of Groundnut	3	To grasp the microorganism involved in Late blight of Potato and Tikka Disease of Groundnut	Lecture PPT	

Course Co-Ordinator: Dr. A. Anami Augustus Arul HoD: Dr. A. Anami Augustus Arul