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**

Teaching Plan

Semester - V

Name of the course: Taxonomy and Economic Botany

Sub. Code: BC1751

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

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	Relate the modifications in plant parts	PSO - 7	U
CO - 2	Evaluate the taxonomists of India	PSO - 1	Ev
CO - 3	Differentiate the artificial, natural and phylogenetic classification and learn about ICN rules	PSO - 1	An
CO - 4	construct digital herbarium and learn about Herbarium techniques	PSO - 5	C
CO - 5	Recall the characters of some important families	PSO - 6	R
CO - 6	Understand the economic importance of plants and their use at various levels	PSO - 1	U

Unit	Module	Topics	Lecture Hours	Learning outcome	Pedagogy	Assessment/ Evaluation
I	**Morphological modifications and contribution by taxonomists**					
	1.	Objectives and importance of systematic botany	2	To realizethe objectives and importance of systematic botany	Lecture	Class test Formative assessment
	2.	Morphology of root, stem, leaf and their modifications.	4	To differentiate the morphology of root, stem and leaf and their modifications	Lecture Demonstration with live Specimens	
	3.	Morphology of inflorescence, flower, fruit and their modifications	5	To learn about the different types of inflorescence, flower and fruit	Lecture Demonstration with live Specimens	

	4.	Contribution to systematic botany by Indian Taxonomist – K.M. Mathew	2	To study the renowned contribution of K.M Mathew in the field of Indian taxonomy	Lecture using chalk and board	
	5.	Contribution to systematic botany by Indian Taxonomist – HermenegildSantapau	2	To appreciate the contribution to systematic botany by HermenegildSantapau's	Lecture using chalk and board	
II	**Different systems of classification, principles of ICN and herbarium techniques**					
	1.	Systems of classification; Artificial – Linnaeus Natural – Bentham and Hooker Phylogenetic - Engler and Prantle merits and demerits	4	To gain knowledge on different types of classification	Lecture PPT	Quiz Class Test Multiple choice questions
	2.	APG Classification – an outline	3	To know the classification of families based on DNA sequences	Lecture and group discussion	
	3.	Chemotaxonomy	2	To categorizeplants on the basis of secondary metabolites present	Lecture using chalk and board	
	4.	Nomenclature – Binomial system	2	To understand *binomial system of nomenclature*	Lecture group discussion	
	5.	Principles of ICN Type method, Principle of priority and Author citation Effective and valid publication	3	To know the principles of ICN in detail	Lecture PPT	

	6.	Herbarium techniques. Digital Herbarium	1	To learn different herbarium techniques	Lecture Demonstration	
III	**Detailed study of the following families with their economic importance**					
	1.	Detailed study of the family Annonaceae with their economic importance	3	To understand the distinguishing features and economic importance of the family Annonaceae	Lecture Demonstration	Formative assessment Quiz Short test Assignment
	2.	Detailed study of the family Brassicaceae with their economic importance	2	To understand the distinguishing features and economic importance of the family Brassicaceae	Lecture PPT	
	3.	Detailed study of the family Rutaceae with their economic importance	2	To understand the distinguishing features and economic importance of the family Rutaceae	Lecture Chalk and board	
	4.	Detailed study of the family Meliaceae with their economic importance	3	To understand the distinguishing features and economic importance of the family Meliaceae	Lecture PPT	
	5.	Detailed study of the family Caesalpiniaceae with their economic importance	2	To understand the distinguishing features and economic importance of the family Caesalpiniaceae	Lecture demonstration	
	6.	Detailed study of the family Myrtaceae with their economic importance	3	To understand the distinguishing features and economic importance of the family Myrtaceae	Lecture demonstration	
IV	**Detailed study of the following families with their economic importance**					
	1.	Detailed study of the family Cucurbitaceae with their	3	To learn the distinguishing features and economic importance of the	Lecture Group discussion	Short test Multiple choice questions

		economic importance		family Cucurbitaceae		Quiz Assignment
	2.	Detailed study of the family Rubiaceae with their economic importance	3	To know the distinguishing features and economic importance of the family Rubiaceae	Lecture chalk and board	
	3.	Detailed study of the family Solanaceae with their economic importance	3	To understand the distinguishing features and economic importance of the family Solanaceae	Lecture demonstration	
	4.	Detailed study of the family Sapotaceae with their economic importance	2	To learn the distinguishing features and economic importance of the family Sapotaceae	Lecture Group discussion	
	5.	Detailed study of the family Apocynaceae and Asclepiadaceae with their economic importance	4	To know the distinguishing features and compare the characters of both the families - Apocynaceae&Asclepiadaceae	Lecture Demonstration	
V	**Detailed study of the following families with their economic importance**					
	1.	Detailed study of the family Lamiaceae with their economic importance	3	To know the distinguishing features and economic importance of the family Lamiaceae	Lecture demonstration	Quiz Formative assessment Short test
	2.	Detailed study of the family Euphorbiaceae with their economic importance	3	To learn the distinguishing features and economic importance of the family Euphorbiaceae	Lecture demonstration	

	3.	Detailed study of the family Amaranthacea e with their economic importance	3	To understand the distinguishing features and economic importance of the family Amaranthaceae	Lecture group discussion	
	4.	Detailed study of the family Arecaceae with their economic importance	2	To learn the distinguishing features and economic importance of the family Arecaceae	Lecture demonstrati on	
	5.	Detailed study of the family Cannaceaeand Orchidaceaewi th their economic importance	2	To know the distinguishing features and compare the characters of both the families – Cannaceae& Orchidaceae	Lecture PPT	
	6.	Detailed study of the family Poaceae with their economic importance	2	To learn the distinguishing features and economic importance of the family Poaceae	Lecture demonstrati on	

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

Name of the Course: Biochemistry and Biophysics

Sub. Code: BC1752

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

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	identify the levels of structure in proteins and describe its biological roles	PSO - 3	R
CO - 2	understand the structure, properties and fundamentals of biomolecules	PSO - 3	U
CO - 3	demonstrate thermodynamic principles in biological energy conversion	PSO - 4	Ap
CO - 4	analyze enzyme activity	PSO - 9	An
CO - 5	compare the structure of saturated fatty acids with unsaturated fatty acids	PSO - 9	E
CO - 6	analyse the biological data and interpret data with the hypothesis	PSO - 3	An

Unit	Module	Topics	Lecture Hours	Learning out come	Pedagogy	Assessment/ Evaluation
I	**Carbohydrates**					
	1	Types ofbonds	2	Distinguish the different types of bonds under study	Lecture Illustration	Short test Quiz Assignment on applications. Formative assessment
	2	P^H and Buffer	2	Evaluate the importance of buffer in biological systems	Experimental learning	
	3	Monosaccharides structure and properties of glucose and fructose Isomers of monosaccha	5	Learn the structure and properties selected monosaccharides	Lecture with PPT	

		rides				
	4	Disaccharides- structure and properties of maltose, Sucrose and Lactose	3	Analyze the structure and properties of disaccharides	Lecture with PPT	
	5	Polysaccharides- structure and properties of starch and cellulose	3	Compare the structure and properties of homo and hetero polysaccharides	Lecture with PPT	
II	**Proteins and Vitamins**					
	1	Amino Acids structure and properties	3	Know the importance of Amino Acids	Lecture with PPT	Short test Quiz Short questions Multiple choice questions Formative assessment Multiple Choice Questions
	2	Protein- Primary and secondary structure and properties	3	Explain the different bonds involved in primary and secondary structure of proteins	Lecture with PPT	
	3	Protein - tertiary and quaternary structure; Biological roles of proteins	3	Learn the structure of myoglobin and haemoglobin and biological functions of Proteins	Lecture with PPT	
	4	Vitamins - structure, importance, sourcesand deficiency symptoms of Thiamine, riboflavin and niacin	3	Analyze the structure and importance of thiamine, riboflavin and niacin	Lecture Discussion with PPT illustration	
	5	Fat soluble	3	Understand the	Lecture Group	

		vitamins- A, D and Ergosterol		fat-soluble vitamins and its importance	Discussion	
III	**Lipids and Nucleic Acids**					
	1	Lipids - classification and properties	3	Understand the classification of lipid based on its characteristics	Illustration Lecture	Short Test Short questions Quiz Multiple Choice Questions Formative assessment
	2	Fatty acids structure and functions essential fatty acids.	3	Discuss the structure and properties of fatty acids and their biological functions	Lecture PPT	
	3	General account of lipids (simple lipids Compound lipids and derived lipids)	3	Compare the structure and properties of triglycerides, phospholipids and cholestrol	Lecture Discussion	
	4	Nucleic acids- Structure of DNA	2	To study the double helical model of DNA structure (Watson and Crick)	Brain Storming Lecture	
	5	Nucleic acids- Structure of RNA.	4	Differentiate the structure and role of tRNA, mRNA and rRNA	PPT 3D structure Lecture	
IV	**Enzymes**					
	1	Nomenclature and classification of enzymes	3	Discuss the classification, nomenclature of enzyme	Illustration Lecture	Listing out important terms Slip test Formative assessment Short test Quiz Formative Assessment
	2	Structure of enzymes Activesite	3	Understand the role of active site in an enzyme	Lecture PPT	
	3	Cofactors, coenzymes,	3	Compare the role of cofactors,		

		isoenzyme		coenzymes, isoenzyme		
	4	Mechanism of enzyme action (activation energy, lock and key hypothesis, Induced - fit theory),	3	Analyze the mode of action of enzyme	Lecture PPT	
	5	Enzyme inhibition and factors affecting enzyme activity	3	Recall the inhibitory properties of enzymes	Lecture PPT	
V	**Bioenergetics**					
	1	Laws concept of free energy, endergonic and exergonic reactions, coupled reactions and redox reactions.	3	Analyse the law of thermodynamics and concepts of energy	Lecture, PPT Group discussion	Quiz Formative Assessment Short test Open book test Slip test
	2	ATP: structure, its role as a energy currency molecule	3	Imbibeknowledge on the role of ATPin human body	Lecture PPT	
	3	Photobiology - Dual nature of light and its characteristics.	2	Know the dual nature of light	Lecture	
	4	Electro Magnetic Spectrum, Action and Absorption	3	Compare the different types of spectrum based on their function	Lecture PPT Group discussion	

		spectrum,.				
	5	Emission spectrum – excitation and de-excitation Phosphorescence, fluorescence and bio-luminescence.	4	Differentiate different types of light emissions	Lecture PPT	

Course Instructor: Dr. Sr. P. Leema Rose HOD: Dr. C. Jespin Ida

Name of the Course : Microbiology and Plant Pathology
Subject Code : BC1753

Number of Hours Per week	Number of Credits	Total Number of Hours	Marks
5	4	75	100

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	be familiarize with basic information about microbiology and microbiologists	PSO - 1	U
CO - 2	explore the role and relevance of viruses and bacteria in the field of microbiology	PSO - 4	Ap
CO - 3	work safely, competently and effectively in the microbiology laboratory	PSO - 9	An
CO - 4	undertake careers in microbiology through the hands – on - training techniques they learnt	PSO - 3	C
CO - 5	recognize the signs and symptoms of important plant diseases and the major issues that arise due to such infections	PSO - 7	U

Unit	Module	Topics	Lecture Hours	Learning Outcome	Pedagogy	Assessment /Evaluation
Bacteria- Structure, Nutrition and Reproduction						
I	1	Bacteria- size, shape and arrangement	2	To be familiarize with different types of bacteria	Lecture PPT Microslides	Formative Assessment Quiz Short test
	2	Bacterial cell wall and cytoplasmic membrane	3	To know theE.M structureof bacterial cell	Lecture Charts	
	3	Bacterial flagella, pili, capsule and mesosomes	2	To study the different types bacterial cell components	Lecture Illustration	
	4	Nutritional type of bacteria	2	To differentiate bacteria based on their mode of nutrition	Lecture Group Discussion	
	5	Reproduction in bacteria	3	To understand the bacterial reproduction	Lecture Models	
Contribution of microbiologists, Virus-Structure, reproduction and types						
II	1	Contribution of Leeuwenhoek, Pasteur and Koch	4	To apprehend the valuable contribution of microbiologists	Lecture Group discussion	Formative assessment Quiz Multiple choice questions Short test
	2	Virus- General Characters	2	To understand the characters of virus	Lecture Debate	
	3	Reproduction in bacteriophage	2	To differentiate lytic cycle from lysogenic cycle	Lecture PPT	
	4	Structure of DNA virus	2	To study the structure of T-phage DNA virus	Lecture Chart	
	5	Structure of RNA virus	2	To differentiate DNA from RNA virus	Lecture PPT	
Growth of Microorganisms, Sterilization Methods						
III	1	Growth Curve, Pure, batch and continuous culture	3	To comprehend growth of microorganisms	Lecture Demonstration	Formative Assessment Quiz Assignment
	2	Characteristics of bacteria	2	To perceive the characteristic features of bacteria	Lecture Chart	
	3	Physical and chemical agents for controlling	2	To be familiar with the various	Lecture PPT	

		microorganisms		physical and chemical agents to control the growth of microorganisms		
	4	Dry and wet sterilization	2	To know the types of sterilization methods	Lecture Demonstration	
	5	Working principles of Autoclave, Laminar Air Flow and Incubator	3	To study the principles, working mechanisms and uses of various microbiologicaleq uipments	Lecture Hands on training	
Food, Dairy and Water Microbiology						
IV	1	Food spoilage through microbes	2	To assay the food spoiled by microbes	Lecture Demonstration	Formative assessment Quiz Short test Testing their Practical skill
	2	Food borne infections and preventions- Botulism and Salmonellosis	3	To perceive food borne infection and treatment	Lecture PPT	
	3	Sources of milk contamination Test for grading milk	2	To create an awareness about sources of milk contamination and milk grading	Lecture Demonstration	
	4	Pasteurization technique	2	To understand the steps involved in pasteurization	Lecture Field Visit	
	5	Portable and nonportable water	1	To identify portable andnon-portable water	Lecture Group Discussion	
	6	Test for detection of coliform bacteria	2	To test coliform bacteria in water	Lecture Hands on training	
Plant Pathology, Study of selected plant diseases						
V	1	Introduction to plant pathology	2	To realize the importance of plant pathology	Lecture	Class test Multiple choice questions Formative assessment Identification of diseased
	2	Causal organism, symptoms, dissemination, disease cycle and control measures of citrus	2	To apprehend the characters of citrus canker and its prevention	Lecture PPT Specimen	

		canker				plants
	3	Causal organism, symptoms, dissemination, disease cycle and control measures of bunchy top of banana	2	To know the disease cycle and prevention measures of bunchy top of banana	Lecture Specimen Chart	
	4	Causal organism, symptoms, dissemination, disease cycle and control measures of tikka disease of ground nut	2	To grasp the microorganism involved in tikka disease of ground nut	Lecture PPT	
	5	Causal organism, symptoms, dissemination, disease cycle and control measures of red rot of sugarcane	2	To be aware of red rot of sugarcane and its disease cycle	Lecture Specimen	
	6	Causal organism, symptoms, dissemination, disease cycle and control measures of late blight of potato	2	To study life cycle of fungus that infects potato and causes the late blight disease	Lecture Group Discussion	

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

Name of the course: Biological techniques(c)

Sub. Code: BC1756

Number of Hours Per week	Number of Credits	Total Number of Hours	Marks
5	5	75	100

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	determine the basic principles and techniques of instrument used in biology	PSO - 1	U
CO - 2	apply the skill ofmicrotechniques in preparing permanent slides	PSO – 3,5	Ap
CO - 3	understand the basic units of measurement	PSO - 1	U

CO - 4	recall the structure and functions of given instruments and develop creative skills for establishment	PSO – 6,9	R,C
CO - 5	demonstrate, use the techniques, skills, and tools necessary in research	PSO – 3,6	Ap
CO - 6	handle the biological instruments properly, competently and effectively in the laboratory	PSO - 9	An

Unit	Module	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
Microscopy and micrometry						
I	1	General introduction of Microscopy and micrometry	2	To Know the importance of Microscopy and micrometry	Lecture	Assessing their knowledge through simple questions Formative assessment Short test
	2	Principles and techniques of Light microscope	3	To understand the working mechanism of Light microscope	Lecture Illustrations	
	3	Principles and techniques of EM	2	To study the Principles, specimen preparation for EM	Lecture, Video clippings	
	4	Principles and techniques of TEM and SEM	3	To be familiarize the Principles, working mechanism and comparison of TEM and SEM	Lecture Video clippings	
	5	Principles and techniques of Fluorescent microscopy	2	To study the principle and the applications of Fluorescent microscope	PPT presentation	
Microtechniques						
II	1.	Introduction to microtechniques	1	To recall the scope ofmicrotechnique	Chalk and talk method	Formative assessment Quiz Assessing
	2.	Aims, types and mechanism of fixation and common cytological fixatives	3	To understand the importance of fixation and common fixatives	Lecture	

	3.	Dehydration, embedding and sectioning with rotary microtome. Types of stains and staining; mechanism of staining	5	To learn and demonstrate the various stepsinvolved in permanent slide preparation	Demonstration	their practical knowledge
	4.	Principles and methods of microphotography	3	To understand the Principles and methods of microphotography	PPT Presentation	
Basic units and Centrifugation						
III	1	Introduction to basic units	1	To know the basic units of weights	Lecture	Quiz
	2	Atomic weight, molecular weight, Gram molecular weight, Equivalent weight and Gram equivalent weight	4	To differentiate the various units of weight	Lecture; Chalk and talk	Group discussion
	3	Preparation of solutions: Molar (M), Normal (N), Weight - volume per cent w/v, osmolar, molal (m), parts per million(ppm).	4	To learn the preparation of Normal and Molar solutions	Demonstration	Solving problem related to preparation of different concentrations of solutions
	4	Ultracentrifuge-Basic principles, types and their applications	3	To know the Centrifugation techniques, principle and working mechanism of Ultracentrifuge	Chalk and talk method	
Instrumentation						
IV	1.	Structure and functions of pH meter	2	To understand basic principle, working mechanism and usage ofpH meter	Lecture Demonstration	Group discussion Short test
	2	Structure and functions of Colorimeter	2	To understand the aim and working mechanism of	Lecture Demonstration	Assessing their practical knowledge

				Colorimeter		
	3.	Introduction to Spectroscopic techniques	2	To know the principles of light absorption	Lecture with PPT	
	4.	Basic principlesand laws of UV-Vis spectrophotometry	3	To study the working mechanism and application ofUV-Vis spectrophotometry	Lecture with demonstration	
	5.	Principle and working mechanism of Atomic Absorption Spectrophotometer	3	To learn theworking mechanism of Atomic Absorption Spectrophotometer	Lecture Video clippings	
Chromatographic & Electrophoretic Techniques						
V	1	Basic principles and applications of Paper ChromatographyandThin Layer Chromatography	2	To understand the principles behind the separation of phytochemicals through Thin Layer Chromatography	Lecture Demonstration	Group Discussion Formative assessment, Quiz Short test
	2	Basic principles and applications of Column Chromatography	2	To know the principles and applications of Column Chromatography	Lecture PPT	
	3	Basic principles and applications of HPLC	2	To study the basic principles and applications of HPLC	Lecture and PPT	
	4	Principles, types and applications of Agarose gel electrophoresis	2	To realize the principle and applications of Agarose gel electrophoresis	Lecture Video clippings	
	5	Principles, types and applications of Native PAGE and SDS –PAGE electrophoresis	2	To understand the Principles, types and applications of PAGE electrophoresis	Lecture PPT	

Course Instructor: Dr. A. R. Florence HOD: Dr. C. Jespin Ida