Teaching Plan 2017-18 (Theory)

Class: B.Sc. I			Sem I Subject	et: Botany	
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Diversity (15)	1	15
			1.1 Introduction to Plant Kingdom:	03	
			Cryptogams 1.2 Diversity of plants with respect to habitat, form, nutrition and ecological status	03	
			1.3 General Account of Viruses and structure of TMV and HIV	03	
			1.4 Bacteria: structure, Nutrition and reproduction	03	
			1.5 Role of microbes in Agriculture, Medicine and Industries	03	
02	Aug- Sept	UNIT-II	Algae (15)		15
			2.1. Classification according to F. E. Fritsch and G. M. Smith up to classes	02	
			2.2. General characters of algae with reference to Habitat, Thallus organization, Pigmentation, Reserve food and Reproduction	02	
			2.3. General characters of following classes with special reference to examples mentioned	02	
			2.3.1. Chlorophyta - Oedogonium	03	
			2.3.2. Charophyta – Chara (Thallus structure and reproduction)	03	
			2.3.3. Phaeophyta – Sargassum (Thallus structure and reproduction)	02	
			2.3.4. Rhodophyta – Batrachospermum	01	1
03		UNIT-III	Fungi (15)		15
			3.1. General characteristics of following classes with special reference to examples mentioned	03	
			3.1.1. Mastigomycotina : Albugo (Cystopus)	03	
			3.1.2. Ascomycotina : Aspergillus	02]
			3.1.3. Basidiomycotina : Puccinia graministritici	02	
			3.1.4. Deuteromycotina : General characters	03	
			3.2 Lichen-Types & Economic importance	02]
04	Sept	Unit-IV	Bryophyte (15)		15
			4.1. General characters, thallus organization and life cycle of	03	
			4.1.1. Hepaticopsida – Marchantia	03	1
			1.1.2. Bryopsida – Funaria	03	1
			4.2. Affinities of bryophytes with algae and pteridophytes	03	
			4.5. Brief Account on some Indian Bryologist	03	
05	Sept-Oct	Unit-V	Pteridophyte (15)		15
		·		<u> </u>	

			5.1. Pteridophytes as First Vascular Plants. 5.3. General characters of the following classes with special reference to examples mentioned – 5.3.1. Sphenopsida – Equisetum 5.3.2. Filicopsida – Marsilea 5.4. Stele types in pteridophytes 5.5 Heterospory and Seed Habit in Pteridophytes	02 02 03 03 02 03	
06	Oct	Unit-VI	Application of Microbes Cryptogams (15) 6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects 6.2. Mycorrhiza – Types and Application 6.3. Role of Fungi in Industries, Medicine, Food & Agriculture	03 02 02	15
			6.4. Plant Diseases – 6.4.1. Viral –TMV 6.4.2. Bacteria – Black arm of cotton (Xanthomonos malvacearum) 6.4.3. Fungal – Tikka disease of groundnut (Cercospora sps.)	02 02 02 02	-

Teaching Plan 2017-18 (Practical)

Class:				ect: Botany	
	DIV	VERSITY &	APPLICATIONS OF MICROBES AND CRYPTO	OGAMS	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	July		ALGAE Preparation of temporary mount, identification with reason of following algal materials		07
		1	1. Oedogonium,	01	
		2	2 Hydrodictyon	01	
		3	3 Chara,	01	
		4	4 Vaucheria	01	
		5	5 Ectocarpus	01	
		6	6 Sargassum	01	
		7	7. Batrachospermum	01	
02	August		FUNGI AND PLANT PATHOLOGY		06
		8	Study of following genera Albugo, Uncinula,	01	
		9	Penicillium, Agaricus,	01	
		10	Puccinia, Cercospora	01	
		11	Study of Crustose, Fruticose & Foliose Lichen	01	
		12	Study of symptoms of fungal, viral, bacterial and Mycoplasmal diseases	01	
		13	Demonstration of Mushroom Cultivation Technology	01	
03	Sept		BRYOPHYTES		05
		14	Study of external and anatomy features of vegetative and reproductive parts of following genera – <i>Marchantia</i> ,	01	
		15	Anthoceros,	01	
		16	Funaria,	01	
		17	Polytrichum	01	
		18	Sphagnum	01	
04	Sept-Oct		PTERIDOPHYTES Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of following genera –		07
		19	Lycopodium	01	
		20	Equisetum,	01	
		21	Osmunda,	01	
		22	Selaginella,	01	
		23	Adiantum,	01	
		24	Marsilea	01	
	_	25	Any one fossil specimen	01	
05	Oct		Botanical excursion		
06	Oct		Common algal, fugal, pathological, bryophytic and pteridophytic collection and excursion report must be submitted at the time of practical exam		

Teaching Plan 2017-18

	ss: B.Sc. I		Sem II Subject: Botany		
(GYMNOS	SPERM,	MORPHOLOGY OF ANGIOSPERMS AND UTILIZATION OF	PLAN	ITS
01	January	UNIT-	UNIT-I: Palaeobotany (15)		15
	_	I	1.1. Process of plant fossilization and types of fossils	03	
			1.2. Geological Time Scale	03	
			1.3. Fossil Gymnosperms	03	
			1.3.1. Pteridospermales: Lyginopteris oldhamia	03	
			1.3.2. Bennettitales: Bennittites	03	
02	Jan-	UNIT-	UNIT-II : Gymnosperms (15)		15
~_	Feb	II	2.1. Classification according to D. D. Pant	03	
			2.2. General account: morphology, anatomy, life cycle and taxonomic	04	
			position of Pinus and Gnetum	0 -	
			2.3. Affinities with pteridophytes and angiosperms	04	
			zier i zirimizes wim prozitospirjos una ungrosporms		
			2.4. Economic importance of Gymnosperms	04	
03	Feb	UNIT-	UNIT-III: Morphology (15)	0.	15
00	100	III	Civil III. Morphology (12)		
			3.1. Diversity in Plants habits – Annual, biannual, perennials	03	
			3.2. Roots – Types of root : tap and adventitious, modification of root : for	04	
			food storage, respiration and supports.	• •	
			3.3. Stem – Types of Stem, Characteristic features, branching,	04	
			modification of Stem – Underground and aerial	••	
			3.4. Leaf – Parts of leaf, types of leaves – simple and compound;	04	
			Phyllotaxy; Venation; Stipule. Modification of leaves	04	
04	Feb	Unit-	UNIT-IV: Morphology (15)		15
•	100	IV	4.1. Inflorescences – Types: Racemose, Cymose and Special	06	- 10
			4.2. Flower – Flower as modified shoot; Structure of flower – Calyx,	09	
			Corolla, Androecium and Gynoecium. Placentation; Types of Pollination.	0,5	
05	March	Unit-	UNIT-V: Morphology and Utilization of Plants (15)		15
UJ	war ch	V	OTVIT-V. Morphology and Cumzation of Francis (13)		13
		'	5.1. Fruits – Morphological types	03	
			3.1. Traits Morphotogreat types		
			5.2. Utilization of Plants	03	
			5.2.1. Food Plants – Wheat, Potato – Morphology, varieties and economic	03	
			importance.	0.5	
			5.2.2. Fiber Plant – Morphology, varieties and economic importance of	03	
			Cotton.	0.5	
			5.2.3. Oil yielding Plant – Morphology, Varieties and economic	03	
			importance of Ground nut.	0.5	
	March	Unit-	UNIT-VI: Utilization of Plants (15)		15
06		VI	6.1. Spices – General account and economic importance of Black pepper,	02	_ 10
06				02	
06		VI.	Clove Cinnamon and Cardamom		
06		VI	Clove, Cinnamon and Cardamom 6.2. General account and sources of firewood, timber and Bamboos	02	
06		VI	6.2. General account and sources of firewood, timber and Bamboos.	02	
06		VI	6.2. General account and sources of firewood, timber and Bamboos.6.3. Essential oils – General account, economic importance of Eucalyptus.	02	
06		VI	 6.2. General account and sources of firewood, timber and Bamboos. 6.3. Essential oils – General account, economic importance of Eucalyptus. 6.4. Pharmacognosy and Phytochemistry with respect to following 		
06		VI	 6.2. General account and sources of firewood, timber and Bamboos. 6.3. Essential oils – General account, economic importance of Eucalyptus. 6.4. Pharmacognosy and Phytochemistry with respect to following medicinal plants – 	02	
06		VI	 6.2. General account and sources of firewood, timber and Bamboos. 6.3. Essential oils – General account, economic importance of Eucalyptus. 6.4. Pharmacognosy and Phytochemistry with respect to following 		

6.4.4. Azadirachta indica	01
6.4.5. Catharanthus roseus	
6.4.6. Chlorophytum borivillianum	01
6.4.7. Emblica officinalis	01
6.4.8. Ocimum sanctum	01
6.4.9. Rauwolfia serpentina	01
6.4.10. Vitex negundo	01
6.4.11. Withania somnifera	

Class:	B.Sc. I		Sem II Subject	et: Botany	
GY	MNOSPERN	M, MORPH	OLOGY OF ANGIOSPERMS AND UTILIZA	TION OF I	PLANTS
		•	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I. Gymnosperms: Morphology and anatomy of the following members –		
		1	a. Pinus: Root, Stem, Leaf	02	
		2	b. Gnetum: Root, Stem, Leaf	02	
		3	II. Preparation of double stained permanent mount of Pinus stem, needle and Gnetum stem and leaf	02	
		4	III. Study of fossil slides of Lyginopteris and Bennettites	01	07
02	February	5	IV. Detailed morphological study of types of root, stem and leaf with its modifications	04	
		6	V. Forms of corolla	01	
		7	VI. Types of placentation	01	
		8	VII. Morphology of fruits	01	07
03	March	9	VIII. Morphology of plant parts used and medicinal plants prescribed in syllabi	03	
		10	IX. Utilization of plants: Spices, fiber yielding plants and food plants prescribed in syllabi	03	06
		11	Botanical excursion		
04	March	12	Practical Examination		

Teaching Plan 2017-18

Class:	B.Sc. II			t: Botany	
			YSTEMATICS, ANATOMY & EMBRYO		T
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Angiosperm Systematics and Biodiversity		15
			1.1 Angiosperms: Origin and Evolution (Pteridospermean and Bennititalean Theory)	02	
			1.2 Botanical Nomenclature: Principles of rules, Taxonomic Ranks, Type concept, Valid publication.	03	
			1.3 Herbarium – Concept & significance, Royal Botanical Garden, Kolkata.	04	
			1.4 Concept of biodiversity, Ex situ and In situ conservation	04	
			1.5 Concept & importance of Biodiversity.	02	
02	August	UNIT-II	Angiosperm Systematics		15
			2.1 Systems of Classification: Bentham and Hooker's System, Engler and Prantle's system.	03	
			2.2 Systematic studies & economic importance of following Families: Dicotyledons (Polypetalae): Malvaceae,	12	
			Brassicaceae, Leguminosae, Apiaceae,		
03	Aug- Sept	UNIT-III	Angiosperm Systematics		15
			3.1 Systematic studies & economic importance of following Families: Dicotyledons (Gamopetalae): Asteraceae, Asclepiadaceae, Apocynaceae, Solanaceae, Verbenaceae, Lamiaceae.	10	
			3.2 Dicotyledons (Monoclamydeae): Euphorbiaceae.	02	
			3.3 Monocotyledons: Liliaceae, Poaceae.	03	-
04	Sept	Unit-IV	Anatomy 4.1 Types of Tissues: Meristematic – Types of meristems Permanent – Simple	04	15
			and complex.4.2 Characteristics of growth rings,Sapwood and heartwood.	04	
			4.3 Anatomy of root: Primary structure in dicot and monocot root, normal secondary growth in dicot root.	07	
05	Sept-Oct	Unit-V	Anatomy		15
			5.1 Anatomy of stem: Primary structure in monocot and dicot stem, normal	06	

			secondary growth in dicot stem. 5.2 Anomalies in primary structure in <i>Boerhhavia</i> stem, secondary structure in <i>Bignonia</i> and <i>Dracaena</i> stem. 5.3 Leaf Anatomy: Internal structure in <i>Nerium</i> and <i>Maize</i> leaf.	06	
06	Oct	Unit-VI	Embryology 5.1 Microsporangium, microsporogenesis, development of male gametophyte. 5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte monosporic, Bisporic &	04	15
			tetrasporic). 5.3 Double fertilization and triple fusion. 5.4 Embryo – Classification of embryo. 5.5 Endosperm types & significance, Suspended animation	02 02 03	

Teaching Plan 2017-18 (Practical)

Class:	B.Sc. II		Sem III Subject	ct: Botany	
	AN	GIOSPERI	M SYSTEMATICS, ANATOMY & EMBRYO	LOGY	
			ABORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	July		Anatomy of angiosperms : Preparation of		
			double stained slides of root, stem and leaves		
			of angiosperms mentioned in the syllabus		
		1	Anatomy of root in Dicot & Monocot	01	
		2	Anatomy of stem in Dicot & Monocot	01	
		3	Anatomy of Leaf in Dicot & Monocot	01	03
02			Taxonomy : Description of ten plants		
			belonging to different families in technical		
		_	language and identification up to family level.		
		4	Brassiacaceae	01	
	August	5	Malvaceae	01	
		6	Fabaceae	01	
		7	Caesalpinoidae	01	
		8	Mimosoidae	01	
		9	Apiaceae	01	
		10	Apocynaceae	01	
		11	Asclepiadaceae	01	
		12	Solanaceae	01	
		13	Euphorbiacea	01	
	September	14	Lamiaceae	01	
	_	15	Asteraceae	01	
		16	Verbanaceae	01	
		17	Liliaceae	01	
		18	Poaceae	01	15
03			Embryology of Angiosperms		-
		19	Observation of wide range of flowers	01	
			available in the locality and methods of their		
			pollination.		
		20	Study through permanent slides of	01	
			T.S. of anthers, microsporogenesis, L.S. of		
			ovule, types of endosperms and embryo of		
			Capsella		
	October	21	Mounting of T.S. of anthers, Pollen grains	01	
			and pollinia.		03
04			Long and short excursion tour		0.0
	1	I	Long and bhot cacatbion tout	i .	

Teaching Plan 2017-18

Class:	B.Sc. II	TELL DIOL		t: Botany	
Sr. No.	Month	Unit No.	OGY, GENETICS AND BIOCHEMISTR Topic Name	Period Required	Total Period
01	Dec- January	UNIT-I	Unit – I : Cell Biology	Required	1 CHOU
01			1.1 Cell concept – Prokaryotic and	02	
			Eukaryotic cell	V=	
			1.2 Cell wall –Structure and Functions	03	
			1.3 Plasma membrane –Structure	04	
			(models) and Functions		
			1.4 Nucleus – Ultra structure (nuclear	04	
			membrane, nuclear pore complex and		
			nucleolus) and functions		
			1.5 Chloroplast- Structure and Functions	02	15
02	Jan- Feb	UNIT-II	Unit-II : Cell Biology Structure and		
			functions of-		
			2.1 Endoplasmic Reticulum	03	
			2.2 Golgi complex	02	
			2.3 Vacuole	02	
			2.4 Ribosome	02	
			2.5 Perixysome	02	
			2.6 Mitochondria	02	
			2.7 Cell cycle: Mitosis and Meiosis	02	15
03	February	UNIT-III	Unit – III : Genetics		
			3.1 Chromosome- Morphology, Types,	04	
			Centromere & Telomere		
			3.2 Chromosomal aberrations –		
			3.2.1 Structural aberrations: Deletion,	05	
			Duplication, Inversion and Translocation		
			3.2.2 Numerical aberrations: Euploidy and	06	
			aneuploidy		15
04	Feb- March	Unit-IV	Unit-IV: Genetics		
			4.1 Mendellism: Mendel's law of	05	
			Dominance, Segregations and		
			Independent assortment,		
			Incomplete dominance		
			4.2 Interaction of genes- Complimentary,	05	
			Supplementary and Epistasis		
			4.3 Problems based on Mendelism and	05	
			Interaction of Genes		15
05	Feb- March	Unit-V	Unit – V Genetics		
			5.1 Linkage – Concept, Types and	03	
			theories		
			5.2 Crossing over: Concept, Types and	04	
		<u> </u>	theories		15

			5.3 Gene mutations- Spontaneous and Induced	04	
			5.4 Extra-nuclear Genome- Mitchondrial DNA and Chloroplast DNA	04	
06	March	Unit-VI	Unit – VI Biochemistry		
			6.1 Nomenclature of Enzymes	03	-
			6.2 Characteristics of Enzymes	03	1
			6.3 Concept of holoenzymes, coenzymes and cofactor	03	
			6.4 Theories for Mechanism of action of Enzymes	03	
			6.5 Structure and functions	03	
			Carbohydrates: Monosaccharides		
			(Glucose), Disaccharides (Galactose) and		
			Polysaccharides (Starch)		15
07			Subject related Project & Seminar		

Class: B.Sc. II			Sem IV Subject:	Botany	
		CELL BI	IOLOGY, GENETICS AND BIOCHEMISTR	Ϋ́	
			ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I Cell Biology (Any Two)		
		1	Squash preparation for the study of various stages of mitosis	02	
		2	Smear preparation for the study of various stages of meiosis.	02	04
02	February		II Genetics		-
		3	1. To prove Mendel's Monohybrid ratio.	01	
		4	2. To prove Mendel's Dihybrid ratio	01	
		5	3. Problems based on Interaction of genes	01	03
03	Feb-		III Biochemistry		
	March	6	1. To study the enzyme activity of catalase.	01	
		7	2. To demonstrate test for glucose in grapes,& sucrose in cane sugar / beet root.	01	
		8	3. To demonstrate test for protein.	01	03
03	March	9	4. To demonstrate the lipid test in oily seeds.	01	
		10	5. To demonstrate the test for starch / cellulose.	01	
		11	6. To demonstrate the activity of enzyme	01	
			amylase from germinating Wheat grains		03
			Practical Examination		

Teaching Plan 2017-18

Class:	B.Sc. III			oject: Botany	
	T		T PHYSIOLOGY AND ECOLOGY		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Water Relations		
			1.1 Importance of water to plant life.	04	
			Imbibition, Diffusion, Osmosis,		
			Plasmolysis.		
			1.2 Active and passive Absorption of	02	
			water.		
			1.3 Ascent of sap - Root Pressure and	03	
			Transpiration Pull Theory.		
			1.4 Transpiration - Types of transpiration,	03	
			Stomatal movements, Mechanism of		
			transpiration (Starch) sugar		
			hypothesis), Significance. Antitranspirant,		
			Guttation.		
			1.5 Mineral uptake - Active uptake -	03	
			Career Concept, Passive uptake Ion		
			Exchange.		15
02	July-August	UNIT-II	Metabolism-		
			2.1 Photosynthesis - Introduction, Role of	07	
			Light, Photosynthetic Apparatus and		
			Pigments, Two Pigment Systems,		
			Photophosphorylation, C3 and C4 cycle,		
			CAM Pathway.	00	
			2.2 Respiration - Introduction,	08	
			Mitochondria as a Respiratory centre,		
			Types of Respiration - Aerobic and		
			Anaerobic, Mechanism of aerobic		
			respiration- Glycolysis, Kreb cycle,		
			Electron transport system and Chemiosmotic ATP generation,		
			Respiratory Quotient.		15
03	August	UNIT-III	Metabolism and growth		15
03	August	CIVIT-III	3.1 Nitrogen Metabolism- Sources of	06	
			nitrogen, Symbiotic nitrogen fixation,		
			Role of Nitrate reductase.		
			3.2 Growth - Phases of growth, Growth	06	
			curve, Physiological role of growth		
			hormones (Auxins, Gibberellins,		
			Cytokinins, Abscisic acid, and Ethylene).		
			3.3 Physiology of Senescence and	03	
			Abscission.		15
04	August-Sept	Unit-IV	Plant responses		
~ ~		,	4.1 Photoperiodism - Concept of Florigen,	04	15

			Role of Phytochrome,		
			4.2 Vernalization- Concept and	02	
			Significance.		
			4.3 Plant movement- Tropic (Phototropic	05	
			and Geotropic) and Nastic (Epinasty,		
			Hyponasty and Seismonasty)		
			4.4 Stress physiology- Concept, Types of	04	
			stress, Water and Salinity stress.		
05	Sept	Unit-V	Ecology and Environment		
			5.1 Concept of environment, Concept and	02	
			scope of ecology.		
			5.2 Ecological factors- Climatic- Light,	02	
			Temperature and Water.		
			5.3 Atmosphere and its composition.	03	
			5.4 Edaphic factor- Process of soil	04	
			formation, soil profile, soil biota and their		
			role.		
			5.5 Ecological Adaptations -	04	
			Morphological and Anatomical adaptation		
			in Hydrophytes, and Xerophytes		15
06	Oct	Unit-VI	Ecosystem		
			6.1 Population Ecology- Natality and	05	
			Mortality, Community characteristics –		
			Frequency, Density and		
			Abundance		
			6.2 Ecological Succession - Hydrosere	03	
			and Xerosere		
			6.3 Ecosystem – Definition, Structure and	05	
			Function, Food chain, Food web, Energy		
			flow model (Single		
			channel model)		15
			6.4 Types of Ecosystem- Pond ecosystem,	02	
			Desert ecosystem.		

Class:	B.Sc. III			oject: Botany	
			LANT PHYSIOLOGY AND ECOLOGY		
	<u> </u>		ABORATORY EXERCISE (PRACTICALS)	T	
Sr.	Month	Practical	Practical Name	Practical	Total
No.	T1	No.	Dis A Dis A Lor	Required	Practical
01	July- August		Plant Physiology Major experiment (Apr. Seven)		
	August	1	Major experiment (Any Seven) To study the effect of temperature and	01	
		1	organic solvent on permeability of plasma	01	
			membrane.		
		2	To study osmotic pressure of cell sap by	01	
		_	plasmolytic method.		
		3	To determine the path of water (ascent of sap)	01	
		4	To determine the rate of transpiration by	01	
			Ganongs photometer/Screen.		
		5	To determine rate of photosynthesis under	01	
			varying quality of light and CO2		
			concentration.		
		6	Separation of chloroplast pigments by paper	01	
			chromatography/solvent extraction method.		
		7	To determine R.Q. using different substrates.	01	07
02	August		Plant Physiology		
		_	Minor experiment (Any Three)		
		8	To demonstrate fermentation.	01	
		9	To demonstrate exo and endosmosis	01	
		10	To demonstrate the phenomenon of nastic	01	
			movement with help of <i>Mimosa pudica</i> / or		0.3
02	A Com4		Biophytum sensitivum.		03
03	Aug-Sept	11	Ecology: Major experiment (Any Three)	02	
		11	Study of morphological and anatomical adaptations in hydrophytes – <i>Hydrilla</i> ,	02	
			Eichhornia, Typha, Vallisneria and		
			Nymphaea (any two)		
		12	Study of morphological and anatomical	02	
			adaptations in xerophytes -Asparagus,	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
			Nerium, Casuarina, Euphorbia, Cycas,		
			Opuntia (any two)		
		13	Study of community characteristics by quadrat	01	
			method.		05
04	Sept-Oct		Ecology: Minor experiment (Any Two)		
		14	Determination of pH of different soils and	01	
			water samples by pH papers/ pH meter.		
		15	Study of meteorological instruments -Rain	01	
			gauge, Hygrometer, Barometer		02
05	Oct		Subject related Project & Seminar		

Teaching Plan 2017-18

Class:	B.Sc. III			ıbject: Botany	r
			AR BIOLOGY AND BIOTECHNOLOGY		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	January	UNIT-I	Unit-I: DNA the genetic material:		
			1.1 Historical account – Giffith's Expt,	04	
			Hershy and Chase Expt.		
			1.2 DNA– Chemical composition and	02	
			Double Helical model,		
			1.3 DNA replication in Eukaryotes;	03	
			1.4 DNA Packaging - Nucleosome and Solenoid	03	
			1.5 Satellite, Repetitive DNA and	03	
			Transposable element in plants (AC-DS		
			system)		15
02	January	UNIT-II	Unit-II: Gene Structure and		
			Expression -	0.2	
			2.1 Concept of gene, Fine structure of	03	
			Gene	03	
			2.2 Gene Expression – Central Dogma, Types of RNA, Genetic code, Ribosome	03	
			as a translation machine		15
			2.3 Transcription in Eukaryotes –	03	13
			Mechanism of Transcription and RNA		
			Processing		
			2.4 Translation in Eukaryotes.	03	
			2.5 Endomembrane system (Flow of	03	
			Peptide)		
03	February	UNIT-III	Unit – III : Regulation of Gene		
			Expression		
			3.1 Regulation of Gene Expression in	03	
			Prokaryotes – Operon concept with		
			special reference to Lac Operon		
			3.2 Regulation of gene expression of	03	
			Eukaryotes – Britton Davidson Model		
			3.3 Protein Folding Mechanism and	03	
			Structure (Primary, Secondary, Tertiary		
			and Quaternary)		
			247	0.2	15
			3.4 Protein Sorting – Targeting to proteins	03	
			to organelles		
			3.5 Protein Trafficking	03	
04	February	Unit-IV	Unit-IV : Genetic Engineering -		15

				1	
			4.1 Tools and techniques of recombinant DNA technology,	02	
			4.2 Restriction Enzymes – Nomenclature and Types	02	
			4.3 Cloning vectors – Plasmids, Phages, Cosmids	03	
			4.4 Gene Source- Genomic and c-DNA library	03	
			4.5 Gene Transfer Techniques – Direct - (1) Chemical method, (2) Electroporation, (3) Gene gun method Indirect – Agrobacterium mediated gene	03	
			transfer	02	
			4.6 Gene AmplificationPolymerase Chain Reaction (PCR	02	
05	Feb-March	Unit-V	Unit-V : Plant Tissue Culture -		
			5.1 Basic aspects of plant tissue culture	03	
			5.2 Laboratory Requirement –	06	
			Infrastructure, Instruments (laminar air		
			flow, autoclave, growth chamber),		
			Culture Media (MS Media), Growth		
			Hormone (Auxin, Cytokinin and		
			Gibberellins) Sterilization Techniques		
			5.3 Tissue Culture Technique - Cellular	06	
			totipotency, differentiation and		
			morphogenesis; Callus Culture; Micro		
			propagation		15
06	March	Unit-VI	Unit-VI : Applications of Biotechnology		
			6.1 Agriculture – Haploid plant	04	
			production (Anther and Pollen Culture);		
			Protoplast Culture and Somatic		
			Hybridization; Transgenic Plant - BT		
			Cotton, Synthetic seed. Salient		
			achievements of crop biotechnology		
			6.2 Industry– Fermentation Technology-	04	
			Bakery Products and Alcohol		
			Productions.		
			6.3 Health Care – Edible Vaccines	03	
			6.4 Conservation – Cryopreservation,	04	15
			Genetically Modified Organisms: - Pros		
			and Cons		
07	March		Subject related Project & Seminar		

Class: B.Sc. III			Sem VI S	ubject: Botany	
		MOLEC	CULAR BIOLOGY AND BIOTECHNOLOG	GY	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	January		1) Molecular biology (Major) (Any One)		
		1	1. Isolation of DNA by crude method	02	
			2) Molecular biology (Minor) (Any One)		
		2	1. Demonstration of DNA Electrophoresis	02	
			3) Biotechnology (Any Six)		
		3	1. Working Principle and application of	02	
			Autoclave		06
02	February	4	2. Working Principle and application of	01	
			Laminar Air Flow.		
		5	3. Cleaning and Sterilization of Glassware	01	
		6	4. Sterilization of Explant	01	
		7	6. Demonstration of in vitro culture	02	
			techniques – anther and pollen culture		05
03	March	8	9. Demonstration of technique of	02	
			Micropropogation		02
			Visit to molecular biology, biotechnological		
			research institute/ industry		
04			Practical Examination		

Teaching Plan 2018-19 (Theory)

Class:	B.Sc. I		Sem I Subject	et: Botany	
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Diversity (15)	-	15
			1.1 Introduction to Plant Kingdom:	03	
			Cryptogams		
			1.2 Diversity of plants with respect to habitat,	03	
			form, nutrition and ecological status	02	-
			1.3 General Account of Viruses and structure of TMV and HIV	03	
			1.4 Bacteria: structure, Nutrition and	03	-
			reproduction		
			1.5 Role of microbes in Agriculture, Medicine	03	1
			and Industries		
02	Aug- Sept	UNIT-II	Algae (15)		15
			2.1. Classification according to F. E. Fritsch	02	
			and G. M. Smith up to classes		 -
			2.2. General characters of algae with	02	
			reference to Habitat, Thallus organization, Pigmentation, Reserve food and Reproduction		
			2.3. General characters of following classes	02	-
			with special reference to examples mentioned	02	
			2.3.1. Chlorophyta - Oedogonium	03	-
			2.3.2. Charophyta – Chara (Thallus structure	03	1
			and reproduction)		
			2.3.3. Phaeophyta – Sargassum (Thallus	02	
			structure and reproduction)		 -
0.2		**************************************	2.3.4. Rhodophyta – Batrachospermum	01	4.5
03		UNIT-III	Fungi (15)	02	15
			3.1. General characteristics of following classes with special reference to examples	03	
			mentioned		
			3.1.1. Mastigomycotina : Albugo (Cystopus)	03	-
			3.1.2. Ascomycotina : Aspergillus	02	-
			3.1.3. Basidiomycotina : Puccinia graminis-	02	
			tritici		
			3.1.4. Deuteromycotina : General characters	03	_
			3.2 Lichen-Types & Economic importance	02	
04	Sept	Unit-IV	Bryophyte (15)	0.2	15
			4.1. General characters, thallus organization	03	
			and life cycle of	03	-
			4.1.1. Hepaticopsida – Marchantia 1.1.2. Bryopsida – Funaria	03	-
			4.2. Affinities of bryophytes with algae and	03	-
			pteridophytes		
			4.5. Brief Account on some Indian Bryologist	03	1
05	Sept-Oct	Unit-V	Pteridophyte (15)		15
	-	•		•	•

			5.1. Pteridophytes as First Vascular Plants. 5.3. General characters of the following classes with special reference to examples mentioned – 5.3.1. Sphenopsida – Equisetum 5.3.2. Filicopsida – Marsilea 5.4. Stele types in pteridophytes 5.5 Heterospory and Seed Habit in Pteridophytes	02 02 03 03 02 03	
06	Oct	Unit-VI	Application of Microbes Cryptogams (15) 6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects 6.2. Mycorrhiza – Types and Application 6.3. Role of Fungi in Industries, Medicine, Food & Agriculture	03 02 02	15
			6.4. Plant Diseases – 6.4.1. Viral –TMV 6.4.2. Bacteria – Black arm of cotton (Xanthomonos malvacearum) 6.4.3. Fungal – Tikka disease of groundnut (Cercospora sps.)	02 02 02 02	-

Teaching Plan 2018-19 (Practical)

Class:	B.Sc. I			ect: Botany	
	DIV	VERSITY &	APPLICATIONS OF MICROBES AND CRYPTO	OGAMS	
		_	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	July		ALGAE Preparation of temporary mount, identification		07
			with reason of following algal materials		
		1	1. Oedogonium,	01	
		2	2 Hydrodictyon	01	
		3	3 Chara,	01	
		4	4 Vaucheria	01	
		5	5 Ectocarpus	01	
		6	6 Sargassum	01	
		7	7. Batrachospermum	01	
02	August		FUNGI AND PLANT PATHOLOGY		06
		8	Study of following genera Albugo, Uncinula,	01	
		9	Penicillium, Agaricus,	01	
		10	Puccinia, Cercospora	01	
		11	Study of Crustose, Fruticose & Foliose Lichen	01	
		12	Study of symptoms of fungal, viral, bacterial and	01	
			Mycoplasmal diseases		
		13	Demonstration of Mushroom Cultivation	01	
			Technology		
03	Sept		BRYOPHYTES	0.1	05
		14	Study of external and anatomy features of	01	
			vegetative and reproductive parts of following		
		1.5	genera – Marchantia,	01	
		15 16	Anthoceros, Funaria,	01	
		17	Polytrichum	01	
		18	,	01	
04	Sont Oot	10	Sphagnum PTERIDOPHYTES	01	07
04	Sept-Oct		Study of Pteridophyte external and anatomy		U/
			features of vegetative and reproductive parts of		
			following genera –		
		19	Lycopodium	01	
		20	Equisetum,	01	
		21	Osmunda,	01	
		22	Selaginella,	01	
		23	Adiantum,	01	
		24	Marsilea	01	
		25	Any one fossil specimen	01	
05	Oct	1	Botanical excursion	<u> </u>	
06	Oct		Common algal, fugal, pathological, bryophytic		
			and pteridophytic collection and excursion report		
			must be submitted at the time of practical exam		

Late Ku. Durga K. Banmeru Science College, Lonar, Dist. Buldana. DEPARTMENT OF BOTANY

Teaching Plan 2018-19

Cla	ss: B.Sc. I		Sem II Subject: Botany		
		PERM	MORPHOLOGY OF ANGIOSPERMS AND UTILIZATION OF	PLAN	TS
01	January		UNIT-I: Palaeobotany (15)	LEAN	15
VI.	January	I	1.1. Process of plant fossilization and types of fossils	03	- 13
		_	1.2. Geological Time Scale	03	_
			1.3. Fossil Gymnosperms	03	_
			1.3.1. Pteridospermales: Lyginopteris oldhamia	03	
			1.3.2. Bennettitales: Bennittites	03	
02	Jan-	UNIT-	UNIT-II : Gymnosperms (15)	03	15
U2	Feb	II	2.1. Classification according to D. D. Pant	03	- 13
	100	11	2.2. General account: morphology, anatomy, life cycle and taxonomic	04	_
			position of Pinus and Gnetum	04	
			2.3. Affinities with pteridophytes and angiosperms	04	_
			2.5. Arminics with picridophytes and angiosperius	04	
			2.4. Economic importance of Gymnosperms	04	
03	Feb	UNIT-	UNIT-III: Morphology (15)	04	15
00	100	III	CITE III. Morphology (10)		
		411	3.1. Diversity in Plants habits – Annual, biannual, perennials	03	
			3.2. Roots – Types of root : tap and adventitious, modification of root : for	04	
			food storage, respiration and supports.	• •	
			3.3. Stem – Types of Stem, Characteristic features, branching,	04	
			modification of Stem – Underground and aerial		
			3.4. Leaf – Parts of leaf, types of leaves – simple and compound;	04	
			Phyllotaxy; Venation; Stipule. Modification of leaves		
04	Feb	Unit-	UNIT-IV: Morphology (15)		15
		IV	4.1. Inflorescences – Types: Racemose, Cymose and Special	06	
			4.2. Flower – Flower as modified shoot; Structure of flower – Calyx,	09	
			Corolla, Androecium and Gynoecium. Placentation; Types of Pollination.		
05	March	Unit-	UNIT-V: Morphology and Utilization of Plants (15)		15
		\mathbf{V}			
			5.1. Fruits – Morphological types	03	
			5.2. Utilization of Plants	03	
			5.2.1. Food Plants – Wheat, Potato – Morphology, varieties and economic	03	
			importance.		
			5.2.2. Fiber Plant – Morphology, varieties and economic importance of	03	
			Cotton.		
			5.2.3. Oil yielding Plant – Morphology, Varieties and economic	03	
			importance of Ground nut.		
06	March	Unit-	UNIT-VI: Utilization of Plants (15)		15
		VI	6.1. Spices – General account and economic importance of Black pepper,	02	
			Clove, Cinnamon and Cardamom		
			6.2. General account and sources of firewood, timber and Bamboos.	02	
			6.3. Essential oils – General account, economic importance of Eucalyptus.	02	_
			6.4. Pharmacognosy and Phytochemistry with respect to following		
			medicinal plants –	1	_
			6.4.1. Aloe vera	01	_
			6.4.2. Adathoda vasica	01	_
			6.4.3. Asparagus racemosa	01	

6.4.4. Azadirachta indica	01	
6.4.5. Catharanthus roseus		
6.4.6. Chlorophytum borivillianum	01	
6.4.7. Emblica officinalis	01	
6.4.8. Ocimum sanctum	01	
6.4.9. Rauwolfia serpentina	01	
6.4.10. Vitex negundo	01	
6.4.11. Withania somnifera		

Class:	B.Sc. I		Sem II Subject	et: Botany	
GY	MNOSPERN	A, MORPH	OLOGY OF ANGIOSPERMS AND UTILIZA	TION OF I	PLANTS
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I. Gymnosperms: Morphology and anatomy of the following members –		
		1	a. Pinus: Root, Stem, Leaf	02	
		2	b. Gnetum: Root, Stem, Leaf	02	
		3	II. Preparation of double stained permanent mount of Pinus stem, needle and Gnetum stem and leaf	02	
		4	III. Study of fossil slides of Lyginopteris and Bennettites	01	07
02	February	5	IV. Detailed morphological study of types of root, stem and leaf with its modifications	04	
		6	V. Forms of corolla	01	
		7	VI. Types of placentation	01	
		8	VII. Morphology of fruits	01	07
03	March	9	VIII. Morphology of plant parts used and medicinal plants prescribed in syllabi	03	
		10	IX. Utilization of plants: Spices, fiber yielding plants and food plants prescribed in syllabi	03	06
		11	Botanical excursion		
04	March	12	Practical Examination		

Teaching Plan 2018-19

Class: B.Sc. II Sem III Subject: Botany						
			YSTEMATICS, ANATOMY & EMBRYO		1	
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period	
01	July	UNIT-I	Angiosperm Systematics and Biodiversity		15	
			1.1 Angiosperms: Origin and Evolution (Pteridospermean and Bennititalean Theory)	02		
			1.2 Botanical Nomenclature: Principles of rules, Taxonomic Ranks, Type concept, Valid publication.	03		
			1.3 Herbarium – Concept & significance, Royal Botanical Garden, Kolkata.	04		
			1.4 Concept of biodiversity, Ex situ and In situ conservation	04		
			1.5 Concept & importance of Biodiversity.	02		
02	August	UNIT-II	Angiosperm Systematics		15	
			2.1 Systems of Classification: Bentham and Hooker's System, Engler and Prantle's system.	03		
			2.2 Systematic studies & economic importance of following Families: Dicotyledons (Polypetalae): Malvaceae, Brassicaceae, Leguminosae, Apiaceae,	12		
03	Aug- Sept	UNIT-III	Angiosperm Systematics		15	
	Tang Sept		3.1 Systematic studies & economic importance of following Families: Dicotyledons (Gamopetalae): Asteraceae, Asclepiadaceae, Apocynaceae, Solanaceae, Verbenaceae, Lamiaceae.	10		
			3.2 Dicotyledons (Monoclamydeae): Euphorbiaceae.	02		
			3.3 Monocotyledons: Liliaceae, Poaceae.	03	1	
04	Sept	Unit-IV	Anatomy 4.1 Types of Tissues: Meristematic – Types of meristems Permanent – Simple and complex.	04	15	
			4.2 Characteristics of growth rings, Sapwood and heartwood.	04		
			4.3 Anatomy of root: Primary structure in dicot and monocot root, normal secondary growth in dicot root.	07		
05	Sept-Oct	Unit-V	Anatomy		15	
			5.1 Anatomy of stem: Primary structure in monocot and dicot stem, normal	06		

			secondary growth in dicot stem. 5.2 Anomalies in primary structure in <i>Boerhhavia</i> stem, secondary structure in <i>Bignonia</i> and <i>Dracaena</i> stem. 5.3 Leaf Anatomy: Internal structure in <i>Nerium</i> and <i>Maize</i> leaf.	06	
06	Oct	Unit-VI	Embryology 5.1 Microsporangium, microsporogenesis, development of male gametophyte. 5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte monosporic, Bisporic & tetrasporic).	04	15
			 5.3 Double fertilization and triple fusion. 5.4 Embryo – Classification of embryo. 5.5 Endosperm types & significance, Suspended animation 	02 02 03	

Teaching Plan 2018-19 (Practical)

Class:	B.Sc. II		Sem III Subject	ct: Botany	
	AN	GIOSPERI	M SYSTEMATICS, ANATOMY & EMBRYO	LOGY	
			ABORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	July		Anatomy of angiosperms : Preparation of		
			double stained slides of root, stem and leaves		
			of angiosperms mentioned in the syllabus		
		1	Anatomy of root in Dicot & Monocot	01	
		2	Anatomy of stem in Dicot & Monocot	01	
		3	Anatomy of Leaf in Dicot & Monocot	01	03
02			Taxonomy : Description of ten plants		
			belonging to different families in technical		
		_	language and identification up to family level.		
		4	Brassiacaceae	01	
	August	5	Malvaceae	01	
		6	Fabaceae	01	
		7	Caesalpinoidae	01	
		8	Mimosoidae	01	
		9	Apiaceae	01	
		10	Apocynaceae	01	
		11	Asclepiadaceae	01	
		12	Solanaceae	01	
		13	Euphorbiacea	01	
	September	14	Lamiaceae	01	
	_	15	Asteraceae	01	
		16	Verbanaceae	01	
		17	Liliaceae	01	
		18	Poaceae	01	15
03			Embryology of Angiosperms		-
		19	Observation of wide range of flowers	01	
			available in the locality and methods of their		
			pollination.		
		20	Study through permanent slides of	01	
			T.S. of anthers, microsporogenesis, L.S. of		
			ovule, types of endosperms and embryo of		
			Capsella		
	October	21	Mounting of T.S. of anthers, Pollen grains	01	
			and pollinia.		03
04			Long and short excursion tour		0.0
	1	I	Long and bhot cacatbion tout	i .	

Teaching Plan 2018-19

Class:	B.Sc. II			t: Botany	
			OGY, GENETICS AND BIOCHEMISTR		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	Dec- January	UNIT-I	Unit – I : Cell Biology		
			1.1 Cell concept – Prokaryotic and	02	
			Eukaryotic cell		
			1.2 Cell wall –Structure and Functions	03	
			1.3 Plasma membrane –Structure	04	
			(models) and Functions		
			1.4 Nucleus – Ultra structure (nuclear	04	
			membrane, nuclear pore complex and		
			nucleolus) and functions		
			1.5 Chloroplast- Structure and Functions	02	15
02	Jan- Feb	UNIT-II	Unit-II: Cell Biology Structure and		
			functions of-	0.2	
			2.1 Endoplasmic Reticulum	03	
			2.2 Golgi complex	02	
			2.3 Vacuole	02	
			2.4 Ribosome	02	
			2.5 Perixysome	02	
			2.6 Mitochondria	02	
0.2			2.7 Cell cycle: Mitosis and Meiosis	02	15
03	February	UNIT-III	Unit – III : Genetics	0.4	
			3.1 Chromosome- Morphology, Types,	04	
			Centromere & Telomere		
			3.2 Chromosomal aberrations –	05	
			3.2.1 Structural aberrations: Deletion,	05	
			Duplication, Inversion and Translocation	06	
			3.2.2 Numerical aberrations: Euploidy and aneuploidy	00	15
04	Feb- March	Unit-IV	Unit-IV: Genetics		15
V -	reb- March	Cint-1 v	4.1 Mendellism: Mendel's law of	05	
			Dominance, Segregations and	03	
			Independent assortment,		
			Incomplete dominance		
			4.2 Interaction of genes- Complimentary,	05	
			Supplementary and Epistasis		
			4.3 Problems based on Mendelism and	05	
			Interaction of Genes		15
05	Feb- March	Unit-V	Unit – V Genetics		
			5.1 Linkage – Concept, Types and	03	
			theories		
			5.2 Crossing over: Concept, Types and	04	
			theories		15

			5.3 Gene mutations- Spontaneous and Induced	04	
			5.4 Extra-nuclear Genome- Mitchondrial DNA and Chloroplast DNA	04	
06	March	Unit-VI	Unit – VI Biochemistry		
			6.1 Nomenclature of Enzymes	03	-
			6.2 Characteristics of Enzymes	03	1
			6.3 Concept of holoenzymes, coenzymes and cofactor	03	
			6.4 Theories for Mechanism of action of Enzymes	03	
			6.5 Structure and functions	03	
			Carbohydrates: Monosaccharides		
			(Glucose), Disaccharides (Galactose) and		
			Polysaccharides (Starch)		15
07			Subject related Project & Seminar		

Class:	B.Sc. II		Sem IV Subject:	Botany	
		CELL BI	IOLOGY, GENETICS AND BIOCHEMISTR	Y	
			ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I Cell Biology (Any Two)		
		1	Squash preparation for the study of various stages of mitosis	02	
		2	Smear preparation for the study of various stages of meiosis.	02	04
02	February		II Genetics		-
		3	1. To prove Mendel's Monohybrid ratio.	01	
		4	2. To prove Mendel's Dihybrid ratio	01	
		5	3. Problems based on Interaction of genes	01	03
03	Feb-		III Biochemistry		
	March	6	1. To study the enzyme activity of catalase.	01	
		7	2. To demonstrate test for glucose in grapes,& sucrose in cane sugar / beet root.	01	
		8	3. To demonstrate test for protein.	01	03
03	March	9	4. To demonstrate the lipid test in oily seeds.	01	
		10	5. To demonstrate the test for starch / cellulose.	01	
		11	6. To demonstrate the activity of enzyme	01	
			amylase from germinating Wheat grains		03
			Practical Examination		

Teaching Plan 2018-19

Class:	B.Sc. III			bject: Botany	
	3.5 (1		T PHYSIOLOGY AND ECOLOGY		- TD 4 1
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Water Relations	-	
			1.1 Importance of water to plant life.	04	
			Imbibition, Diffusion, Osmosis,		
			Plasmolysis.		
			1.2 Active and passive Absorption of	02	
			water.		
			1.3 Ascent of sap - Root Pressure and	03	
			Transpiration Pull Theory.		
			1.4 Transpiration - Types of transpiration,	03	
			Stomatal movements, Mechanism of		
			transpiration (Starch) sugar		
			hypothesis), Significance. Antitranspirant,		
			Guttation.		
			1.5 Mineral uptake - Active uptake -	03	
			Career Concept, Passive uptake Ion		
			Exchange.		15
02	July-August	UNIT-II	Metabolism-		
			2.1 Photosynthesis - Introduction, Role of	07	
			Light, Photosynthetic Apparatus and		
			Pigments, Two Pigment Systems,		
			Photophosphorylation, C3 and C4 cycle,		
			CAM Pathway.		
			2.2 Respiration - Introduction,	08	
			Mitochondria as a Respiratory centre,		
			Types of Respiration - Aerobic and		
			Anaerobic, Mechanism of aerobic		
			respiration- Glycolysis, Kreb cycle,		
			Electron transport system and		
			Chemiosmotic ATP generation,		
			Respiratory Quotient.		15
03	August	UNIT-III	Metabolism and growth		
			3.1 Nitrogen Metabolism- Sources of	06	
			nitrogen, Symbiotic nitrogen fixation,		
			Role of Nitrate reductase.		
			3.2 Growth - Phases of growth, Growth	06	
			curve, Physiological role of growth		
			hormones (Auxins, Gibberellins,		
			Cytokinins, Abscisic acid, and Ethylene).		
			3.3 Physiology of Senescence and	03	
			Abscission.		15
04	August-Sept	Unit-IV	Plant responses		
			4.1 Photoperiodism - Concept of Florigen,	04	15

			Role of Phytochrome,		
			4.2 Vernalization- Concept and	02	
			Significance.		
			4.3 Plant movement- Tropic (Phototropic	05	
			and Geotropic) and Nastic (Epinasty,		
			Hyponasty and Seismonasty)		
			4.4 Stress physiology- Concept, Types of	04	
			stress, Water and Salinity stress.		
05	Sept	Unit-V	Ecology and Environment		
			5.1 Concept of environment, Concept and	02	
			scope of ecology.		
			5.2 Ecological factors- Climatic- Light,	02	
			Temperature and Water.		
			5.3 Atmosphere and its composition.	03	
			5.4 Edaphic factor- Process of soil	04	
			formation, soil profile, soil biota and their		
			role.		
			5.5 Ecological Adaptations -	04	
			Morphological and Anatomical adaptation		
			in Hydrophytes, and Xerophytes		15
06	Oct	Unit-VI	Ecosystem		
			6.1 Population Ecology- Natality and	05	
			Mortality, Community characteristics –		
			Frequency, Density and		
			Abundance		
			6.2 Ecological Succession - Hydrosere	03	
			and Xerosere		
			6.3 Ecosystem – Definition, Structure and	05	
			Function, Food chain, Food web, Energy		
			flow model (Single		
			channel model)		15
			6.4 Types of Ecosystem- Pond ecosystem,	02	10
			Desert ecosystem.		

Class:	B.Sc. III			ject: Botany	
			LANT PHYSIOLOGY AND ECOLOGY		
	<u> </u>		ABORATORY EXERCISE (PRACTICALS)	T	
Sr.	Month	Practical	Practical Name	Practical	Total
No.	T1	No.	Dis A Dis A Lor	Required	Practical
01	July- August		Plant Physiology Major experiment (Apr. Seven)		
	August	1	Major experiment (Any Seven) To study the effect of temperature and	01	
		1	organic solvent on permeability of plasma	U1	
			membrane.		
		2	To study osmotic pressure of cell sap by	01	
		_	plasmolytic method.	0.2	
		3	To determine the path of water (ascent of sap)	01	
		4	To determine the rate of transpiration by	01	
			Ganongs photometer/Screen.		
		5	To determine rate of photosynthesis under	01	
			varying quality of light and CO2		
			concentration.		
		6	Separation of chloroplast pigments by paper	01	
			chromatography/solvent extraction method.		
		7	To determine R.Q. using different substrates.	01	07
02	August		Plant Physiology		
		_	Minor experiment (Any Three)		
		8	To demonstrate fermentation.	01	
		9	To demonstrate exo and endosmosis	01	
		10	To demonstrate the phenomenon of nastic	01	
			movement with help of <i>Mimosa pudica</i> / or		0.3
02	A Com4		Biophytum sensitivum.		03
03	Aug-Sept	11	Ecology: Major experiment (Any Three)	02	
		11	Study of morphological and anatomical adaptations in hydrophytes – <i>Hydrilla</i> ,	02	
			Eichhornia, Typha, Vallisneria and		
			Nymphaea (any two)		
		12	Study of morphological and anatomical	02	
			adaptations in xerophytes -Asparagus,		
			Nerium, Casuarina, Euphorbia, Cycas,		
			Opuntia (any two)		
		13	Study of community characteristics by quadrat	01	
			method.		05
04	Sept-Oct		Ecology: Minor experiment (Any Two)		
		14	Determination of pH of different soils and	01	
			water samples by pH papers/ pH meter.		
		15	Study of meteorological instruments -Rain	01	
		1	gauge, Hygrometer, Barometer		02
05	Oct		Subject related Project & Seminar		

Teaching Plan 2018-19

Class:	B.Sc. III			ıbject: Botany	•
	T		AR BIOLOGY AND BIOTECHNOLOGY		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	January	UNIT-I	Unit-I: DNA the genetic material:		
			1.1 Historical account – Giffith's Expt,	04	
			Hershy and Chase Expt.		
			1.2 DNA– Chemical composition and	02	
			Double Helical model,	0.2	
			1.3 DNA replication in Eukaryotes;	03	
			1.4 DNA Packaging - Nucleosome and Solenoid	03	
			1.5 Satellite, Repetitive DNA and	03	
			Transposable element in plants (AC-DS		
			system)		15
02	January	UNIT-II	Unit-II: Gene Structure and		
			Expression -	0.2	
			2.1 Concept of gene, Fine structure of	03	
			Gene	03	
			2.2 Gene Expression – Central Dogma, Types of RNA, Genetic code, Ribosome	03	
			as a translation machine		15
			2.3 Transcription in Eukaryotes –	03	13
			Mechanism of Transcription and RNA		
			Processing		
			2.4 Translation in Eukaryotes.	03	
			2.5 Endomembrane system (Flow of	03	
			Peptide)		
03	February	UNIT-III	Unit – III: Regulation of Gene		
			Expression		
			3.1 Regulation of Gene Expression in	03	
			Prokaryotes – Operon concept with		
			special reference to Lac Operon		
			3.2 Regulation of gene expression of	03	
			Eukaryotes – Britton Davidson Model		
			3.3 Protein Folding Mechanism and	03	
			Structure (Primary, Secondary, Tertiary		
			and Quaternary)		
					15
			3.4 Protein Sorting – Targeting to proteins	03	
			to organelles		
			3.5 Protein Trafficking	03	
04	February	Unit-IV	Unit-IV : Genetic Engineering -		15

	1			1	
			4.1 Tools and techniques of recombinant DNA technology,	02	
			4.2 Restriction Enzymes – Nomenclature and Types	02	
			4.3 Cloning vectors – Plasmids, Phages, Cosmids	03	
			4.4 Gene Source- Genomic and c-DNA	03	
			library 4.5 Gene Transfer Techniques – Direct - (1) Chemical method, (2) Electroporation, (3) Gene gun method	03	
			Indirect – Agrobacterium mediated gene transfer		
			4.6 Gene AmplificationPolymerase Chain Reaction (PCR	02	
05	Feb-March	Unit-V	Unit-V : Plant Tissue Culture -		
			5.1 Basic aspects of plant tissue culture	03	
			5.2 Laboratory Requirement –	06	
			Infrastructure, Instruments (laminar air		
			flow, autoclave, growth chamber),		
			Culture Media (MS Media), Growth		
			Hormone (Auxin, Cytokinin and		
			Gibberellins) Sterilization Techniques		
			5.3 Tissue Culture Technique - Cellular	06	
			totipotency, differentiation and		
			morphogenesis; Callus Culture; Micro		
			propagation		15
06	March	Unit-VI	Unit-VI : Applications of Biotechnology		
			6.1 Agriculture – Haploid plant	04	
			production (Anther and Pollen Culture);		
			Protoplast Culture and Somatic		
			Hybridization; Transgenic Plant - BT		
			Cotton, Synthetic seed. Salient		
			achievements of crop biotechnology		
			6.2 Industry– Fermentation Technology-	04	
			Bakery Products and Alcohol		
			Productions.		
			6.3 Health Care – Edible Vaccines	03	
			6.4 Conservation – Cryopreservation,	04	15
			Genetically Modified Organisms: - Pros		
			and Cons		
07	March		Subject related Project & Seminar		

Class: B.Sc. III			Sem VI Su	ıbject: Botany	
		MOLEC	CULAR BIOLOGY AND BIOTECHNOLOG	Y	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	January		1) Molecular biology (Major) (Any One)		
		1	1. Isolation of DNA by crude method	02	
			2) Molecular biology (Minor) (Any One)		
		2	1. Demonstration of DNA Electrophoresis	02	
			3) Biotechnology (Any Six)		
		3	1. Working Principle and application of	02	
			Autoclave	ļ	06
02	February	4	2. Working Principle and application of	01	
			Laminar Air Flow.	ļ	
		5	3. Cleaning and Sterilization of Glassware	01	
		6	4. Sterilization of Explant	01	
		7	6. Demonstration of in vitro culture	02	
			techniques – anther and pollen culture	ļ	05
03	March	8	9. Demonstration of technique of	02	
			Micropropogation		02
			Visit to molecular biology, biotechnological		
			research institute/ industry		
04			Practical Examination		

Teaching Plan 2019-20 (Theory)

Class: B.Sc. I			Sem I Subject: Botany		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Diversity (15)	-	15
			1.1 Introduction to Plant Kingdom: Cryptogams	03	
			1.2 Diversity of plants with respect to habitat, form, nutrition and ecological status	03	
			1.3 General Account of Viruses and structure of TMV and HIV	03	
			1.4 Bacteria: structure, Nutrition and reproduction	03	
			1.5 Role of microbes in Agriculture, Medicine and Industries	03	
02	Aug- Sept	UNIT-II	Algae (15)		15
			2.1. Classification according to F. E. Fritsch and G. M. Smith up to classes	02	
			2.2. General characters of algae with reference to Habitat, Thallus organization, Pigmentation, Reserve food and Reproduction	02	
			2.3. General characters of following classes with special reference to examples mentioned	02	
			2.3.1. Chlorophyta - Oedogonium	03	
			2.3.2. Charophyta – Chara (Thallus structure and reproduction)	03	
			2.3.3. Phaeophyta – Sargassum (Thallus structure and reproduction)	02	
			2.3.4. Rhodophyta – Batrachospermum	01	
03		UNIT-III	Fungi (15)		15
			3.1. General characteristics of following classes with special reference to examples mentioned	03	
			3.1.1. Mastigomycotina : Albugo (Cystopus)	03	
			3.1.2. Ascomycotina : Aspergillus	02	
			3.1.3. Basidiomycotina : Puccinia graministritici	02	
			3.1.4. Deuteromycotina : General characters	03	
			3.2 Lichen-Types & Economic importance	02	
04	Sept	Unit-IV	Bryophyte (15)		15
			4.1. General characters, thallus organization and life cycle of	03	
			4.1.1. Hepaticopsida – Marchantia	03	
			1.1.2. Bryopsida – Funaria	03	
			4.2. Affinities of bryophytes with algae and pteridophytes	03	
			4.5. Brief Account on some Indian Bryologist	03	
05	Sept-Oct	Unit-V	Pteridophyte (15)		15

			5.1. Pteridophytes as First Vascular Plants. 5.3. General characters of the following classes with special reference to examples mentioned – 5.3.1. Sphenopsida – Equisetum 5.3.2. Filicopsida – Marsilea 5.4. Stele types in pteridophytes 5.5 Heterospory and Seed Habit in Pteridophytes	02 02 03 03 02 03	
06	Oct	Unit-VI	Application of Microbes Cryptogams (15) 6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects 6.2. Mycorrhiza – Types and Application 6.3. Role of Fungi in Industries, Medicine, Food & Agriculture	03 02 02	15
			6.4. Plant Diseases – 6.4.1. Viral –TMV 6.4.2. Bacteria – Black arm of cotton (Xanthomonos malvacearum) 6.4.3. Fungal – Tikka disease of groundnut (Cercospora sps.)	02 02 02 02	

Teaching Plan 2019-20 (Practical)

Class:				ct: Botany	
	DIV	VERSITY &	APPLICATIONS OF MICROBES AND CRYPTO	OGAMS	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	July		ALGAE Preparation of temporary mount, identification with reason of following algal materials		07
		1	1. Oedogonium,	01	
		2	2 Hydrodictyon	01	
		3	3 Chara,	01	
		4	4 Vaucheria	01	
		5	5 Ectocarpus	01	
		6	6 Sargassum	01	
		7	7. Batrachospermum	01	
02	August		FUNGI AND PLANT PATHOLOGY		06
		8	Study of following genera Albugo, Uncinula,	01	
		9	Penicillium, Agaricus,	01	
		10	Puccinia, Cercospora	01	
		11	Study of Crustose, Fruticose & Foliose Lichen	01	
		12	Study of symptoms of fungal, viral, bacterial and Mycoplasmal diseases	01	
		13	Demonstration of Mushroom Cultivation Technology	01	
03	Sept		BRYOPHYTES		05
		14	Study of external and anatomy features of vegetative and reproductive parts of following genera – <i>Marchantia</i> ,	01	
		15	Anthoceros,	01	
		16	Funaria,	01	
		17	Polytrichum	01	
		18	Sphagnum	01	
04	Sept-Oct		PTERIDOPHYTES Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of following genera –		07
		19	Lycopodium	01	
		20	Equisetum,	01	
		21	Osmunda,	01	
		22	Selaginella,	01	
		23	Adiantum,	01	
		24	Marsilea	01	
	_	25	Any one fossil specimen	01	
05	Oct		Botanical excursion		
06	Oct		Common algal, fugal, pathological, bryophytic and pteridophytic collection and excursion report must be submitted at the time of practical exam		

Teaching Plan 2019-20

Cla	ss: B.Sc. I		Sem II Subject: Botany		
		SPERM.	MORPHOLOGY OF ANGIOSPERMS AND UTILIZATION OF	PLAN	TS
01	January	UNIT-	UNIT-I: Palaeobotany (15)		15
VI.	January	I	1.1. Process of plant fossilization and types of fossils	03	- 10
		_	1.2. Geological Time Scale	03	
			1.3. Fossil Gymnosperms	03	
			1.3.1. Pteridospermales: Lyginopteris oldhamia	03	-
			1.3.2. Bennettitales: Bennittites	03	
02	Jan-	UNIT-	UNIT-II : Gymnosperms (15)	03	15
U2	Feb	II	2.1. Classification according to D. D. Pant	03	- 13
	100		2.2. General account: morphology, anatomy, life cycle and taxonomic	04	-
			position of Pinus and Gnetum	04	
			2.3. Affinities with pteridophytes and angiosperms	04	-
			2.5. Arminies with pieridophytes and angiosperins	04	
			2.4. Economic importance of Gymnosperms	04	
03	Feb	UNIT-	UNIT-III: Morphology (15)		15
•		III			
			3.1. Diversity in Plants habits – Annual, biannual, perennials	03	
			3.2. Roots – Types of root: tap and adventitious, modification of root: for	04	
			food storage, respiration and supports.		
			3.3. Stem – Types of Stem, Characteristic features, branching,	04	
			modification of Stem – Underground and aerial		
			3.4. Leaf – Parts of leaf, types of leaves – simple and compound;	04	
			Phyllotaxy; Venation; Stipule. Modification of leaves		
04	Feb	Unit-	UNIT-IV: Morphology (15)		15
		IV	4.1. Inflorescences – Types: Racemose, Cymose and Special	06	
			4.2. Flower – Flower as modified shoot; Structure of flower – Calyx,	09	
			Corolla, Androecium and Gynoecium. Placentation; Types of Pollination.		
05	March	Unit-	UNIT-V: Morphology and Utilization of Plants (15)		15
		V	5.1. Fruits – Morphological types	03	
			3.1. Tuits – Morphological types	03	
			5.2. Utilization of Plants	03	-
			5.2.1. Food Plants – Wheat, Potato – Morphology, varieties and economic	03	
			importance.		
			5.2.2. Fiber Plant – Morphology, varieties and economic importance of	03	
			Cotton.		
			5.2.3. Oil yielding Plant – Morphology, Varieties and economic	03	
			importance of Ground nut.		
06	March	Unit-	UNIT-VI: Utilization of Plants (15)		15
		VI	6.1. Spices – General account and economic importance of Black pepper,	02	
			Clove, Cinnamon and Cardamom		
			6.2. General account and sources of firewood, timber and Bamboos.	02	1
			6.3. Essential oils – General account, economic importance of Eucalyptus.	02	1
			6.4. Pharmacognosy and Phytochemistry with respect to following		1
			medicinal plants –		
			6.4.1. Aloe vera	01	1
			6.4.2. Adathoda vasica	01	1
			0.4.2. Mathoda vasica	UI.	

6.4.4. Azadirachta indica	01	
6.4.5. Catharanthus roseus		
6.4.6. Chlorophytum borivillianum	01	
6.4.7. Emblica officinalis	01	
6.4.8. Ocimum sanctum	01	
6.4.9. Rauwolfia serpentina	01	
6.4.10. Vitex negundo	01	
6.4.11. Withania somnifera		

Class:	B.Sc. I		Sem II Subject	et: Botany	
GY	MNOSPERN	A, MORPH	OLOGY OF ANGIOSPERMS AND UTILIZA	TION OF I	PLANTS
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I. Gymnosperms: Morphology and anatomy of the following members –		
		1	a. Pinus: Root, Stem, Leaf	02	
		2	b. Gnetum: Root, Stem, Leaf	02	
		3	II. Preparation of double stained permanent mount of Pinus stem, needle and Gnetum stem and leaf	02	
		4	III. Study of fossil slides of Lyginopteris and Bennettites	01	07
02	February	5	IV. Detailed morphological study of types of root, stem and leaf with its modifications	04	
		6	V. Forms of corolla	01	
		7	VI. Types of placentation	01	
		8	VII. Morphology of fruits	01	07
03	March	9	VIII. Morphology of plant parts used and medicinal plants prescribed in syllabi	03	
		10	IX. Utilization of plants: Spices, fiber yielding plants and food plants prescribed in syllabi	03	06
		11	Botanical excursion		
04	March	12	Practical Examination		

Teaching Plan 2019-20

Class: B.Sc. II Sem III Subject: Botany ANCIOSPEDM SYSTEMATICS: ANATOMY & EMPRIOR OCY						
			YSTEMATICS, ANATOMY & EMBRYO		1	
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period	
01	July	UNIT-I	Angiosperm Systematics and Biodiversity		15	
			1.1 Angiosperms: Origin and Evolution (Pteridospermean and Bennititalean Theory)	02		
			1.2 Botanical Nomenclature: Principles of rules, Taxonomic Ranks, Type concept, Valid publication.	03		
			1.3 Herbarium – Concept & significance, Royal Botanical Garden, Kolkata.	04		
			1.4 Concept of biodiversity, Ex situ and In situ conservation	04		
			1.5 Concept & importance of Biodiversity.	02		
02	August	UNIT-II	Angiosperm Systematics		15	
			2.1 Systems of Classification: Bentham and Hooker's System, Engler and Prantle's system.	03		
			2.2 Systematic studies & economic importance of following Families: Dicotyledons (Polypetalae): Malvaceae, Brassicaceae, Leguminosae, Apiaceae,	12		
03	Aug- Sept	UNIT-III	Angiosperm Systematics		15	
	Tang Sept		3.1 Systematic studies & economic importance of following Families: Dicotyledons (Gamopetalae): Asteraceae, Asclepiadaceae, Apocynaceae, Solanaceae, Verbenaceae, Lamiaceae.	10		
			3.2 Dicotyledons (Monoclamydeae): Euphorbiaceae.	02		
			3.3 Monocotyledons: Liliaceae, Poaceae.	03	1	
04	Sept	Unit-IV	Anatomy 4.1 Types of Tissues: Meristematic – Types of meristems Permanent – Simple and complex.	04	15	
			4.2 Characteristics of growth rings, Sapwood and heartwood.	04		
			4.3 Anatomy of root: Primary structure in dicot and monocot root, normal secondary growth in dicot root.	07		
05	Sept-Oct	Unit-V	Anatomy		15	
			5.1 Anatomy of stem: Primary structure in monocot and dicot stem, normal	06		

			secondary growth in dicot stem. 5.2 Anomalies in primary structure in <i>Boerhhavia</i> stem, secondary structure in <i>Bignonia</i> and <i>Dracaena</i> stem. 5.3 Leaf Anatomy: Internal structure in <i>Nerium</i> and <i>Maize</i> leaf.	06	
06	Oct	Unit-VI	Embryology 5.1 Microsporangium, microsporogenesis, development of male gametophyte. 5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte monosporic, Bisporic & tetrasporic).	04	15
			 5.3 Double fertilization and triple fusion. 5.4 Embryo – Classification of embryo. 5.5 Endosperm types & significance, Suspended animation 	02 02 03	

Teaching Plan 2019-20 (Practical)

Class:	B.Sc. II		Sem III Subject	ct: Botany				
	AN	GIOSPERI	M SYSTEMATICS, ANATOMY & EMBRYO	LOGY				
	LABORATORY EXERCISE (PRACTICALS)							
Sr.	Month	Practical	Practical Name	Practical	Total			
No.		No.		Required	Practical			
01	July		Anatomy of angiosperms : Preparation of					
			double stained slides of root, stem and leaves					
			of angiosperms mentioned in the syllabus					
		1	Anatomy of root in Dicot & Monocot	01				
		2	Anatomy of stem in Dicot & Monocot	01				
		3	Anatomy of Leaf in Dicot & Monocot	01	03			
02			Taxonomy : Description of ten plants					
			belonging to different families in technical					
		_	language and identification up to family level.					
		4	Brassiacaceae	01				
	August	5	Malvaceae	01				
		6	Fabaceae	01				
		7	Caesalpinoidae	01				
		8	Mimosoidae	01				
		9	Apiaceae	01				
		10	Apocynaceae	01				
		11	Asclepiadaceae	01				
		12	Solanaceae	01				
		13	Euphorbiacea	01				
	September	14	Lamiaceae	01				
	_	15	Asteraceae	01				
		16	Verbanaceae	01				
		17	Liliaceae	01				
		18	Poaceae	01	15			
03			Embryology of Angiosperms		-			
		19	Observation of wide range of flowers	01				
			available in the locality and methods of their					
			pollination.					
		20	Study through permanent slides of	01				
			T.S. of anthers, microsporogenesis, L.S. of	_				
			ovule, types of endosperms and embryo of					
			Capsella					
	October	21	Mounting of T.S. of anthers, Pollen grains	01				
			and pollinia.		03			
04			Long and short excursion tour		0.0			
	1	I	Long and bhot cacatbion tout	i .				

Teaching Plan 2019-20

Class:	B.Sc. II			t: Botany	
			OGY, GENETICS AND BIOCHEMISTR		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	Dec- January	UNIT-I	Unit – I : Cell Biology		
			1.1 Cell concept – Prokaryotic and	02	
			Eukaryotic cell		
			1.2 Cell wall –Structure and Functions	03	
			1.3 Plasma membrane –Structure	04	
			(models) and Functions		
			1.4 Nucleus – Ultra structure (nuclear	04	
			membrane, nuclear pore complex and		
			nucleolus) and functions		
			1.5 Chloroplast- Structure and Functions	02	15
02	Jan- Feb	UNIT-II	Unit-II: Cell Biology Structure and		
			functions of-	0.2	
			2.1 Endoplasmic Reticulum	03	
			2.2 Golgi complex	02	
			2.3 Vacuole	02	
			2.4 Ribosome	02	
			2.5 Perixysome	02	
			2.6 Mitochondria	02	
0.2			2.7 Cell cycle: Mitosis and Meiosis	02	15
03	February	UNIT-III	Unit – III : Genetics	0.4	
			3.1 Chromosome- Morphology, Types,	04	
			Centromere & Telomere		
			3.2 Chromosomal aberrations –	05	
			3.2.1 Structural aberrations: Deletion,	05	
			Duplication, Inversion and Translocation	06	
			3.2.2 Numerical aberrations: Euploidy and aneuploidy	00	15
04	Feb- March	Unit-IV	Unit-IV: Genetics		15
V -	reb- March	Cint-1 v	4.1 Mendellism: Mendel's law of	05	
			Dominance, Segregations and	03	
			Independent assortment,		
			Incomplete dominance		
			4.2 Interaction of genes- Complimentary,	05	
			Supplementary and Epistasis		
			4.3 Problems based on Mendelism and	05	
			Interaction of Genes		15
05	Feb- March	Unit-V	Unit – V Genetics		
			5.1 Linkage – Concept, Types and	03	
			theories		
			5.2 Crossing over: Concept, Types and	04	
			theories		15

			5.3 Gene mutations- Spontaneous and Induced	04	
			5.4 Extra-nuclear Genome- Mitchondrial DNA and Chloroplast DNA	04	
06	March	Unit-VI	Unit – VI Biochemistry		
			6.1 Nomenclature of Enzymes	03	-
			6.2 Characteristics of Enzymes	03	1
			6.3 Concept of holoenzymes, coenzymes and cofactor	03	
			6.4 Theories for Mechanism of action of Enzymes	03	
			6.5 Structure and functions	03	
			Carbohydrates: Monosaccharides		
			(Glucose), Disaccharides (Galactose) and		
			Polysaccharides (Starch)		15
07			Subject related Project & Seminar		

Class: B.Sc. II			Sem IV Subject:	Botany	
		CELL BI	IOLOGY, GENETICS AND BIOCHEMISTR	Y	
			ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I Cell Biology (Any Two)		
		1	Squash preparation for the study of various stages of mitosis	02	
		2	Smear preparation for the study of various stages of meiosis.	02	04
02	February		II Genetics		-
		3	1. To prove Mendel's Monohybrid ratio.	01	
		4	2. To prove Mendel's Dihybrid ratio	01	
		5	3. Problems based on Interaction of genes	01	03
03	Feb-		III Biochemistry		
	March	6	1. To study the enzyme activity of catalase.	01	
		7	2. To demonstrate test for glucose in grapes,& sucrose in cane sugar / beet root.	01	
		8	3. To demonstrate test for protein.	01	03
03	March	9	4. To demonstrate the lipid test in oily seeds.	01	
		10	5. To demonstrate the test for starch / cellulose.	01	
		11	6. To demonstrate the activity of enzyme	01	
			amylase from germinating Wheat grains		03
			Practical Examination		

Teaching Plan 2019-20

Class:	B.Sc. III			bject: Botany	
PLANT PHYSIOLOGY AND ECOLOGY Str. March Haif No. Taris Name Paris I					
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Water Relations		
			1.1 Importance of water to plant life.	04	
			Imbibition, Diffusion, Osmosis,		
			Plasmolysis.		
			1.2 Active and passive Absorption of	02	
			water.		
			1.3 Ascent of sap - Root Pressure and	03	
			Transpiration Pull Theory.		
			1.4 Transpiration - Types of transpiration,	03	
			Stomatal movements, Mechanism of		
			transpiration (Starch) sugar		
			hypothesis), Significance. Antitranspirant,		
			Guttation.		
			1.5 Mineral uptake - Active uptake -	03	
			Career Concept, Passive uptake Ion		
			Exchange.		15
02	July-August	UNIT-II	Metabolism-		
			2.1 Photosynthesis - Introduction, Role of	07	
			Light, Photosynthetic Apparatus and		
			Pigments, Two Pigment Systems,		
			Photophosphorylation, C3 and C4 cycle,		
			CAM Pathway.		
			2.2 Respiration - Introduction,	08	
			Mitochondria as a Respiratory centre,		
			Types of Respiration - Aerobic and		
			Anaerobic, Mechanism of aerobic		
			respiration- Glycolysis, Kreb cycle,		
			Electron transport system and		
			Chemiosmotic ATP generation,		
			Respiratory Quotient.		15
03	August	UNIT-III	Metabolism and growth		
			3.1 Nitrogen Metabolism- Sources of	06	
			nitrogen, Symbiotic nitrogen fixation,		
			Role of Nitrate reductase.		
			3.2 Growth - Phases of growth, Growth	06	
			curve, Physiological role of growth		
			hormones (Auxins, Gibberellins,		
			Cytokinins, Abscisic acid, and Ethylene).		
			3.3 Physiology of Senescence and	03	
			Abscission.		15
04	August-Sept	Unit-IV	Plant responses		
			4.1 Photoperiodism - Concept of Florigen,	04	15

			Role of Phytochrome,		
			4.2 Vernalization- Concept and	02	
			Significance.		
			4.3 Plant movement- Tropic (Phototropic	05	
			and Geotropic) and Nastic (Epinasty,		
			Hyponasty and Seismonasty)		
			4.4 Stress physiology- Concept, Types of	04	
			stress, Water and Salinity stress.		
05	Sept	Unit-V	Ecology and Environment		
			5.1 Concept of environment, Concept and	02	
			scope of ecology.		
			5.2 Ecological factors- Climatic- Light,	02	
			Temperature and Water.		
			5.3 Atmosphere and its composition.	03	
			5.4 Edaphic factor- Process of soil	04	
			formation, soil profile, soil biota and their		
			role.		
			5.5 Ecological Adaptations -	04	
			Morphological and Anatomical adaptation		
			in Hydrophytes, and Xerophytes		15
06	Oct	Unit-VI	Ecosystem		
			6.1 Population Ecology- Natality and	05	
			Mortality, Community characteristics –		
			Frequency, Density and		
			Abundance		
			6.2 Ecological Succession - Hydrosere	03	
			and Xerosere		
			6.3 Ecosystem – Definition, Structure and	05	
			Function, Food chain, Food web, Energy		
			flow model (Single		
			channel model)		15
			6.4 Types of Ecosystem- Pond ecosystem,	02	10
			Desert ecosystem.		

Class:	B.Sc. III			ject: Botany	
			LANT PHYSIOLOGY AND ECOLOGY		
	<u> </u>		ABORATORY EXERCISE (PRACTICALS)	T	
Sr.	Month	Practical	Practical Name	Practical	Total
No.	T1	No.	Dis A Dis A Lor	Required	Practical
01	July- August		Plant Physiology Major experiment (Apr. Seven)		
	August	1	Major experiment (Any Seven) To study the effect of temperature and	01	
		1	organic solvent on permeability of plasma	U1	
			membrane.		
		2	To study osmotic pressure of cell sap by	01	
		_	plasmolytic method.	0.2	
		3	To determine the path of water (ascent of sap)	01	
		4	To determine the rate of transpiration by	01	
			Ganongs photometer/Screen.		
		5	To determine rate of photosynthesis under	01	
			varying quality of light and CO2		
			concentration.		
		6	Separation of chloroplast pigments by paper	01	
			chromatography/solvent extraction method.		
		7	To determine R.Q. using different substrates.	01	07
02	August		Plant Physiology		
		_	Minor experiment (Any Three)		
		8	To demonstrate fermentation.	01	
		9	To demonstrate exo and endosmosis	01	
		10	To demonstrate the phenomenon of nastic	01	
			movement with help of <i>Mimosa pudica</i> / or		0.3
02	A Com4		Biophytum sensitivum.		03
03	Aug-Sept	11	Ecology: Major experiment (Any Three)	02	
		11	Study of morphological and anatomical adaptations in hydrophytes – <i>Hydrilla</i> ,	02	
			Eichhornia, Typha, Vallisneria and		
			Nymphaea (any two)		
		12	Study of morphological and anatomical	02	
			adaptations in xerophytes -Asparagus,		
			Nerium, Casuarina, Euphorbia, Cycas,		
			Opuntia (any two)		
		13	Study of community characteristics by quadrat	01	
			method.		05
04	Sept-Oct		Ecology: Minor experiment (Any Two)		
		14	Determination of pH of different soils and	01	
			water samples by pH papers/ pH meter.		
		15	Study of meteorological instruments -Rain	01	
		1	gauge, Hygrometer, Barometer		02
05	Oct		Subject related Project & Seminar		

Teaching Plan 2019-20

Class:	B.Sc. III			bject: Botany	7	
	MOLECULAR BIOLOGY AND BIOTECHNOLOGY					
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period	
01	January	UNIT-I	Unit-I: DNA the genetic material:			
			1.1 Historical account – Giffith's Expt,	04		
			Hershy and Chase Expt.	02		
			1.2 DNA– Chemical composition and Double Helical model,	02		
			1.3 DNA replication in Eukaryotes;	03		
			1.4 DNA Packaging - Nucleosome and Solenoid	03		
			1.5 Satellite, Repetitive DNA and	03		
			Transposable element in plants (AC-DS			
			system)		15	
02	January	UNIT-II	Unit-II: Gene Structure and			
			Expression - 2.1 Concept of gene, Fine structure of	03		
			Gene			
			2.2 Gene Expression – Central Dogma,	03		
			Types of RNA, Genetic code, Ribosome			
			as a translation machine		15	
			2.3 Transcription in Eukaryotes –	03		
			Mechanism of Transcription and RNA Processing			
			2.4 Translation in Eukaryotes.	03		
			2.5 Endomembrane system (Flow of	03		
			Peptide)			
03	February	UNIT-III	Unit – III: Regulation of Gene			
			Expression			
			3.1 Regulation of Gene Expression in	03		
			Prokaryotes – Operon concept with			
			special reference to Lac Operon			
			2.2 Description of some symmetric of	03		
			3.2 Regulation of gene expression of Eukaryotes – Britton Davidson Model	03		
			Editary of the State of State			
			3.3 Protein Folding Mechanism and	03		
			Structure (Primary, Secondary, Tertiary			
			and Quaternary)		15	
			3.4 Protein Sorting – Targeting to proteins	03	15	
			to organelles			
			3.5 Protein Trafficking	03		
04	February	Unit-IV	Unit-IV : Genetic Engineering -		15	

	1			1	
			4.1 Tools and techniques of recombinant DNA technology,	02	
			4.2 Restriction Enzymes – Nomenclature and Types	02	
			4.3 Cloning vectors – Plasmids, Phages, Cosmids	03	
			4.4 Gene Source- Genomic and c-DNA	03	
			library 4.5 Gene Transfer Techniques – Direct - (1) Chemical method, (2) Electroporation, (3) Gene gun method	03	
			Indirect – Agrobacterium mediated gene transfer		
			4.6 Gene AmplificationPolymerase Chain Reaction (PCR	02	
05	Feb-March	Unit-V	Unit-V : Plant Tissue Culture -		
			5.1 Basic aspects of plant tissue culture	03	
			5.2 Laboratory Requirement –	06	
			Infrastructure, Instruments (laminar air		
			flow, autoclave, growth chamber),		
			Culture Media (MS Media), Growth		
			Hormone (Auxin, Cytokinin and		
			Gibberellins) Sterilization Techniques		
			5.3 Tissue Culture Technique - Cellular	06	
			totipotency, differentiation and		
			morphogenesis; Callus Culture; Micro		
			propagation		15
06	March	Unit-VI	Unit-VI : Applications of Biotechnology		
			6.1 Agriculture – Haploid plant	04	
			production (Anther and Pollen Culture);		
			Protoplast Culture and Somatic		
			Hybridization; Transgenic Plant - BT		
			Cotton, Synthetic seed. Salient		
			achievements of crop biotechnology		
			6.2 Industry– Fermentation Technology-	04	
			Bakery Products and Alcohol		
			Productions.		
			6.3 Health Care – Edible Vaccines	03	
			6.4 Conservation – Cryopreservation,	04	15
			Genetically Modified Organisms: - Pros		
			and Cons		
07	March		Subject related Project & Seminar		

Class: B.Sc. III			Sem VI Su	ıbject: Botany	
		MOLEC	CULAR BIOLOGY AND BIOTECHNOLOG	Y	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	January		1) Molecular biology (Major) (Any One)		
		1	1. Isolation of DNA by crude method	02	
			2) Molecular biology (Minor) (Any One)		
		2	1. Demonstration of DNA Electrophoresis	02	
			3) Biotechnology (Any Six)		
		3	1. Working Principle and application of	02	
			Autoclave	ļ	06
02	February	4	2. Working Principle and application of	01	
			Laminar Air Flow.	ļ	
		5	3. Cleaning and Sterilization of Glassware	01	
		6	4. Sterilization of Explant	01	
		7	6. Demonstration of in vitro culture	02	
			techniques – anther and pollen culture	ļ	05
03	March	8	9. Demonstration of technique of	02	
			Micropropogation		02
			Visit to molecular biology, biotechnological		
			research institute/ industry		
04			Practical Examination		

Teaching Plan 2020-21 (Theory)

Note: Due to Covid-19 pandemic situations the teaching plan is for online mode teaching using online platforms like Zoom meeting, Google classroom, Google meet, Eduscoop

Class:	Class: B.Sc. I Sem I Subject: Bo				
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	Nov	UNIT-I	Plant Diversity (15)	-	15
			1.1 Introduction to Plant Kingdom:	03	
			Cryptogams		
			1.2 Diversity of plants with respect to habitat,	03	
			form, nutrition and ecological status		
			1.3 General Account of Viruses and structure	03	
			of TMV and HIV		
			1.4 Bacteria: structure, Nutrition and	03	
			reproduction		
			1.5 Role of microbes in Agriculture, Medicine	03	
			and Industries		
02	Dec	UNIT-II	Algae (15)		15
			2.1. Classification according to F. E. Fritsch	02	
			and G. M. Smith up to classes		
			2.2. General characters of algae with	02	
			reference to Habitat, Thallus organization,		
			Pigmentation, Reserve food and Reproduction		
			2.3. General characters of following classes	02	
			with special reference to examples mentioned		
			2.3.1. Chlorophyta - Oedogonium	03	
			2.3.2. Charophyta – Chara (Thallus structure	03	
			and reproduction)	0.0	
			2.3.3. Phaeophyta – Sargassum (Thallus	02	
			structure and reproduction)	01	
0.2		***************************************	2.3.4. Rhodophyta – Batrachospermum	01	4 =
03		UNIT-III	Fungi (15)	0.2	15
			3.1. General characteristics of following	03	
			classes with special reference to examples		
			mentioned 3.1.1. Mastigomycotina : Albugo (Cystopus)	03	
			3.1.2. Ascomycotina : Aspergillus		
			3.1.2. Ascomycouna : Asperginus 3.1.3. Basidiomycotina : Puccinia graminis-	02	
			•	02	
			tritici 3.1.4. Deuteromycotina : General characters	03	1
			3.2 Lichen-Types & Economic importance	03	1
0.4	T	TT24 TT7	· · · · · · · · · · · · · · · · · · ·	U2	15
04	Jan	Unit-IV	Bryophyte (15)	02	15
			4.1. General characters, thallus organization	03	
			and life cycle of	02	
			4.1.1. Hepaticopsida – Marchantia	03	
			1.1.2. Bryopsida – Funaria	03	<u> </u>

			4.2. Affinities of bryophytes with algae and pteridophytes	03	
			4.5. Brief Account on some Indian Bryologist	03	
05	Feb	Unit-V	Pteridophyte (15)		15
			5.1. Pteridophytes as First Vascular Plants.	02	
			5.3. General characters of the following classes with special reference to examples mentioned –	02	
			5.3.1. Sphenopsida – Equisetum	03	
			5.3.2. Filicopsida – Marsilea	03	
			5.4. Stele types in pteridophytes	02	
			5.5 Heterospory and Seed Habit in	03	
			Pteridophytes		
06	Feb	Unit-VI	Application of Microbes Cryptogams (15)		15
			6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects	03	
			6.2. Mycorrhiza – Types and Application	02	
			6.3. Role of Fungi in Industries, Medicine, Food & Agriculture	02	
			6.4. Plant Diseases –	02	
			6.4.1. Viral –TMV	02	
			6.4.2. Bacteria – Black arm of cotton (Xanthomonos malvacearum)	02	
			6.4.3. Fungal – Tikka disease of groundnut (Cercospora sps.)	02	

Teaching Plan 2020-21 (Practical)

Class:				ect: Botany	
	DI	VERSITY &	APPLICATIONS OF MICROBES AND CRYPTO	OGAMS	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	Dec 20		ALGAE Preparation of temporary mount, identification with reason of following algal materials		07
		1	1. Oedogonium,	01	
		2	2 Hydrodictyon	01	
		3	3 Chara,	01	
		4	4 Vaucheria	01	
		5	5 Ectocarpus	01	
		6	6 Sargassum	01	
		7	7. Batrachospermum	01	
02	Dec		FUNGI AND PLANT PATHOLOGY		06
		8	Study of following genera Albugo, Uncinula,	01	
		9	Penicillium, Agaricus,	01	
		10	Puccinia, Cercospora	01	
		11	Study of Crustose, Fruticose & Foliose Lichen	01	
		12	Study of symptoms of fungal, viral, bacterial and Mycoplasmal diseases	01	
		13	Demonstration of Mushroom Cultivation Technology	01	
03	Jan 21		BRYOPHYTES		05
		14	Study of external and anatomy features of vegetative and reproductive parts of following genera – <i>Marchantia</i> ,	01	
		15	Anthoceros,	01	
		16	Funaria,	01	
		17	Polytrichum	01	
		18	Sphagnum	01	
04	Feb		PTERIDOPHYTES Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of following genera –		07
		19	Lycopodium	01	
		20	Equisetum,	01	
		21	Osmunda,	01	
		22	Selaginella,	01	
		23	Adiantum,	01	
		24	Marsilea	01	
		25	Any one fossil specimen	01	
05			Botanical excursion		
06			Common algal, fugal, pathological, bryophytic and pteridophytic collection and excursion report must be submitted at the time of practical exam		

Late Ku. Durga K. Banmeru Science College, Lonar, Dist. Buldana. DEPARTMENT OF BOTANY

Teaching Plan 2020-21

Cla	ss: B.Sc.	Ī	Sem II Subject: Botany		
			I, MORPHOLOGY OF ANGIOSPERMS AND UTILIZATION OF	PLAN	ITS
01	March		UNIT-I: Palaeobotany (15)		15
VI.	21	I	1.1. Process of plant fossilization and types of fossils	03	
		_	1.2. Geological Time Scale	03	
			1.3. Fossil Gymnosperms	03	
			1.3.1. Pteridospermales: Lyginopteris oldhamia	03	
			1.3.2. Bennettitales: Bennittites	03	
02	March	UNIT-	UNIT-II : Gymnosperms (15)	0.5	15
02	wiai cii	II	2.1. Classification according to D. D. Pant	03	- 15
			2.2. General account: morphology, anatomy, life cycle and taxonomic	04	
			position of Pinus and Gnetum	04	
			2.3. Affinities with pteridophytes and angiosperms	04	
			2.5. Thinnies with periodphytes and anglosperms	04	
			2.4. Economic importance of Gymnosperms	04	
03	April	UNIT-	UNIT-III: Morphology (15)	· •	15
	P	III	or and the state of the state o		
			3.1. Diversity in Plants habits – Annual, biannual, perennials	03	
			3.2. Roots – Types of root : tap and adventitious, modification of root : for	04	
			food storage, respiration and supports.		
			3.3. Stem – Types of Stem, Characteristic features, branching, modification	04	
			of Stem – Underground and aerial		
			3.4. Leaf – Parts of leaf, types of leaves – simple and compound;	04	
			Phyllotaxy; Venation; Stipule. Modification of leaves		
04	April	Unit-	UNIT-IV: Morphology (15)		15
		IV	4.1. Inflorescences – Types: Racemose, Cymose and Special	06	
			4.2. Flower – Flower as modified shoot; Structure of flower – Calyx,	09	
			Corolla, Androecium and Gynoecium. Placentation; Types of Pollination.		
05	May	Unit-	UNIT-V: Morphology and Utilization of Plants (15)		15
		V			
			5.1. Fruits – Morphological types	03	
			5.2. Utilization of Plants	03	
			5.2.1. Food Plants – Wheat, Potato – Morphology, varieties and economic	03	
			importance.		
			5.2.2. Fiber Plant – Morphology, varieties and economic importance of	03	
			Cotton.	0.0	
			5.2.3. Oil yielding Plant – Morphology, Varieties and economic importance	03	
0.6	3.6	T 7 •4	of Ground nut.		1.5
06	May	Unit-	UNIT-VI: Utilization of Plants (15)	02	15
		VI	6.1. Spices – General account and economic importance of Black pepper,	02	
			Clove, Cinnamon and Cardamom	02	
			6.2. General account and sources of firewood, timber and Bamboos.	02	
			6.3. Essential oils – General account, economic importance of Eucalyptus.	02	
			6.4. Pharmacognosy and Phytochemistry with respect to following		
			medicinal plants –	01	
			6.4.1. Aloe vera 6.4.2. Adathoda vasica	01	
			6.4.3. Asparagus racemosa	01	

6.4.4. Azadirachta indica	01
6.4.5. Catharanthus roseus	
6.4.6. Chlorophytum borivillianum	01
6.4.7. Emblica officinalis	01
6.4.8. Ocimum sanctum	01
6.4.9. Rauwolfia serpentina	01
6.4.10. Vitex negundo	01
6.4.11. Withania somnifera	

Class:	B.Sc. I		Sem II Subject	et: Botany	
GY	MNOSPERN	I, MORPH	OLOGY OF ANGIOSPERMS AND UTILIZA	TION OF I	PLANTS
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	March 21		I. Gymnosperms: Morphology and anatomy of the following members –	_	
		1	a. Pinus: Root, Stem, Leaf	02	
		2	b. Gnetum: Root, Stem, Leaf	02	
		3	II. Preparation of double stained permanent mount of Pinus stem, needle and Gnetum stem and leaf	02	
		4	III. Study of fossil slides of Lyginopteris and Bennettites	01	07
02	April	5	IV. Detailed morphological study of types of root, stem and leaf with its modifications	04	
		6	V. Forms of corolla	01	
		7	VI. Types of placentation	01	
		8	VII. Morphology of fruits	01	07
03	May	9	VIII. Morphology of plant parts used and medicinal plants prescribed in syllabi	03	
		10	IX. Utilization of plants: Spices, fiber yielding plants and food plants prescribed in syllabi	03	06
		11	Botanical excursion		
04	May	12	Practical Examination		

Teaching Plan 2020-21

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Class:	B.Sc. II		Sem III Subjec	t: Botany			
ANGIOSPERM SYSTEMATICS, ANATOMY & EMBRYOLOGY							
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period		
01	Nov 20	UNIT-I	Angiosperm Systematics and	•	15		
			Biodiversity				
			1.1 Angiosperms: Origin and Evolution	02			
			(Pteridospermean and Bennititalean				
			Theory)				
			1.2 Botanical Nomenclature: Principles of	03			
			rules, Taxonomic Ranks, Type concept,				
			Valid publication.				
			1.3 Herbarium – Concept & significance,	04			
			Royal Botanical Garden, Kolkata.				
			1.4 Concept of biodiversity, Ex situ and In	04			
			situ conservation		-		
			1.5 Concept & importance of	02			
			Biodiversity.				
02	Dec	UNIT-II	Angiosperm Systematics		15		
			2.1 Systems of Classification: Bentham	03			
			and Hooker's System, Engler and				
			Prantle's system.				
			2.2 Systematic studies & economic	12			
			importance of following Families:				
			Dicotyledons (Polypetalae): Malvaceae,				
0.2			Brassicaceae, Leguminosae, Apiaceae,		4.5		
03	Dec	UNIT-III	Angiosperm Systematics	10	15		
			3.1 Systematic studies & economic	10			
			importance of following Families:				
			Dicotyledons (Gamopetalae): Asteraceae,				
			Asclepiadaceae, Apocynaceae,				
			Solanaceae, Verbenaceae, Lamiaceae.	02	-		
			3.2 Dicotyledons (Monoclamydeae):	02			
			Euphorbiaceae.	02	-		
04	Jan 21	Unit-IV	3.3 Monocotyledons: Liliaceae, Poaceae.	03	15		
U4	Jan 41	Unit-1 V	Anatomy 4.1 Types of Tissues: Maristametic	04	15		
			4.1 Types of Tissues: Meristematic –	U4			
			Types of meristems Permanent – Simple				
			and complex.	04	-		
			4.2 Characteristics of growth rings, Sapwood and heartwood.	U-1			
				07	-		
			4.3 Anatomy of root: Primary structure in	U/	<u>l</u>		

			dicot and monocot root, normal secondary growth in dicot root.		
05	Jan	Unit-V	Anatomy		15
			5.1 Anatomy of stem: Primary structure in monocot and dicot stem, normal secondary growth in dicot stem.	06	
			5.2 Anomalies in primary structure in <i>Boerhhavia</i> stem, secondary structure in <i>Bignonia</i> and <i>Dracaena</i> stem.	06	
			5.3 Leaf Anatomy: Internal structure in <i>Nerium</i> and <i>Maize</i> leaf.	03	
06	Feb 21	D 21 Unit-VI	Embryology		15
			5.1 Microsporangium, microsporogenesis, development of male gametophyte.	04	
			5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte monosporic, Bisporic & tetrasporic).	04	
			5.3 Double fertilization and triple fusion.	02	
			5.4 Embryo – Classification of embryo.	02	
			5.5 Endosperm types & significance, Suspended animation	03	

Teaching Plan 2020-21 (Practical)

Class:	B.Sc. II		Sem III Subject	ct: Botany	
	AN		M SYSTEMATICS, ANATOMY & EMBRYO	LOGY	
			ABORATORY EXERCISE (PRACTICALS)	1	
Sr.	Month	Practical	Practical Name	Practical	Total
No. 01	Dec 20	No.	Anatomy of on a company and Duon out in a f	Required	Practical
UI	Dec 20		Anatomy of angiosperms: Preparation of		
			double stained slides of root, stem and leaves of angiosperms mentioned in the syllabus		
		1	Anatomy of root in Dicot & Monocot	01	
		2	Anatomy of stem in Dicot & Monocot Anatomy of stem in Dicot & Monocot	01	
		3	Anatomy of Stell in Dicot & Monocot Anatomy of Leaf in Dicot & Monocot	01	03
02			Taxonomy : Description of ten plants	01	0.5
-			belonging to different families in technical		
			language and identification up to family level.		
		4	Brassiacaceae	01	
	Jan 21	5	Malvaceae	01	
		6	Fabaceae	01	
		7	Caesalpinoidae	01	
		8	Mimosoidae	01	
		9	Apiaceae	01	
		10	Apocynaceae	01	
		11	Asclepiadaceae	01	
		12	Solanaceae	01	
		13	Euphorbiacea	01	
	Jan	14	Lamiaceae	01	
		15	Asteraceae	01	
		16	Verbanaceae	01	
		17	Liliaceae	01	
		18	Poaceae	01	15
03	7		Embryology of Angiosperms		
		19	Observation of wide range of flowers	01	
			available in the locality and methods of their		
			pollination.		
		20	Study through permanent slides of	01	
			T.S. of anthers, microsporogenesis, L.S. of		
			ovule, types of endosperms and embryo of		
			Capsella		
	Feb	21	Mounting of T.S. of anthers, Pollen grains	01	
			and pollinia.		03
04			Long and short excursion tour		

Teaching Plan 2020-21

Class:	B.Sc. II			: Botany	
<u> </u>	3.6 41		OGY, GENETICS AND BIOCHEMISTR		TD 4.1
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	March 21	UNIT-I	Unit – I : Cell Biology	Required	1 01104
			1.1 Cell concept – Prokaryotic and	02	
			Eukaryotic cell		
			1.2 Cell wall –Structure and Functions	03	
			1.3 Plasma membrane –Structure	04	
			(models) and Functions		
			1.4 Nucleus – Ultra structure (nuclear	04	
			membrane, nuclear pore complex and		
			nucleolus) and functions		
			1.5 Chloroplast- Structure and Functions	02	15
02	March	UNIT-II	Unit-II : Cell Biology Structure and		
			functions of-		
			2.1 Endoplasmic Reticulum	03	
			2.2 Golgi complex	02	
			2.3 Vacuole	02	
			2.4 Ribosome	02	
			2.5 Perixysome	02	
			2.6 Mitochondria	02	
			2.7 Cell cycle: Mitosis and Meiosis	02	15
03	April	UNIT-III	Unit – III : Genetics		
			3.1 Chromosome- Morphology, Types,	04	
			Centromere & Telomere		
			3.2 Chromosomal aberrations –		
			3.2.1 Structural aberrations: Deletion,	05	
			Duplication, Inversion and Translocation	0.5	
			3.2.2 Numerical aberrations: Euploidy and	06	
0.4	3.4	TI '4 TY/	aneuploidy		15
04	May	Unit-IV	Unit-IV: Genetics	0.5	
			4.1 Mendellism: Mendel's law of	05	
			Dominance, Segregations and		
			Independent assortment,		
			Incomplete dominance 4.2 Interaction of genes- Complimentary,	05	
			Supplementary and Epistasis	03	
			4.3 Problems based on Mendelism and	05	
			Interaction of Genes	05	15
05	May	Unit-V	Unit – V Genetics		13
<i>30</i>	17 14 1		5.1 Linkage – Concept, Types and	03	
			theories		
			5.2 Crossing over: Concept, Types and	04	
			theories		15

			5.3 Gene mutations- Spontaneous and Induced	04	
			5.4 Extra-nuclear Genome- Mitchondrial DNA and Chloroplast DNA	04	
06	May	Unit-VI	Unit - VI Biochemistry		
			6.1 Nomenclature of Enzymes	03	
			6.2 Characteristics of Enzymes	03	
			6.3 Concept of holoenzymes, coenzymes and cofactor	03	
			6.4 Theories for Mechanism of action of Enzymes	03	
			6.5 Structure and functions	03	
			Carbohydrates: Monosaccharides		
			(Glucose), Disaccharides (Galactose) and		
			Polysaccharides (Starch)		15
07			Subject related Project & Seminar		

Class:	B.Sc. II		Sem IV Subject:	Botany	
			OLOGY, GENETICS AND BIOCHEMISTR	X	
			ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	March		I Cell Biology (Any Two)		
		1	Squash preparation for the study of various stages of mitosis	02	
		2	Smear preparation for the study of various stages of meiosis.	02	04
02	April		II Genetics		-
		3	1. To prove Mendel's Monohybrid ratio.	01	
		4	2. To prove Mendel's Dihybrid ratio	01	
		5	3. Problems based on Interaction of genes	01	03
03	May		III Biochemistry		
		6	1. To study the enzyme activity of catalase.	01	
		7	2. To demonstrate test for glucose in grapes,& sucrose in cane sugar / beet root.	01	
		8	3. To demonstrate test for protein.	01	03
03	May	9	4. To demonstrate the lipid test in oily seeds.	01	
		10	5. To demonstrate the test for starch / cellulose.	01	
		11	6. To demonstrate the activity of enzyme	01	
			amylase from germinating Wheat grains		03
			Practical Examination		

Teaching Plan 2020-21

Class:	B.Sc. III		Sem V Subject: Botany			
			T PHYSIOLOGY AND ECOLOGY			
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period	
01	Nov 20	UNIT-I	Plant Water Relations			
			1.1 Importance of water to plant life.	04		
			Imbibition, Diffusion, Osmosis,			
			Plasmolysis.			
			1.2 Active and passive Absorption of	02		
			water.			
			1.3 Ascent of sap - Root Pressure and	03		
			Transpiration Pull Theory.			
			1.4 Transpiration - Types of transpiration,	03		
			Stomatal movements, Mechanism of			
			transpiration (Starch) sugar			
			hypothesis), Significance. Antitranspirant,			
			Guttation.			
			1.5 Mineral uptake - Active uptake -	03		
			Career Concept, Passive uptake Ion			
			Exchange.		15	
02	Dec	UNIT-II	Metabolism-	0=		
			2.1 Photosynthesis - Introduction, Role of	07		
			Light, Photosynthetic Apparatus and			
			Pigments, Two Pigment Systems,			
			Photophosphorylation, C3 and C4 cycle,			
			CAM Pathway.	00		
			2.2 Respiration - Introduction,	08		
			Mitochondria as a Respiratory centre,			
			Types of Respiration - Aerobic and Anaerobic, Mechanism of aerobic			
			respiration- Glycolysis, Kreb cycle,			
			Electron transport system and			
			Chemiosmotic ATP generation,			
			Respiratory Quotient.		15	
03	Jan 21	UNIT-III	Metabolism and growth		10	
	_		3.1 Nitrogen Metabolism- Sources of	06		
			nitrogen, Symbiotic nitrogen fixation,			
			Role of Nitrate reductase.			
			3.2 Growth - Phases of growth, Growth	06		
			curve, Physiological role of growth			
			hormones (Auxins, Gibberellins,			
			Cytokinins, Abscisic acid, and Ethylene).			
			3.3 Physiology of Senescence and	03		
			Abscission.		15	
04	Jan	Unit-IV	Plant responses			
			4.1 Photoperiodism - Concept of Florigen,	04	15	

			Role of Phytochrome,		
			4.2 Vernalization- Concept and	02	
			Significance.		
			4.3 Plant movement- Tropic (Phototropic	05	
			and Geotropic) and Nastic (Epinasty,		
			Hyponasty and Seismonasty)		
			4.4 Stress physiology- Concept, Types of	04	
			stress, Water and Salinity stress.		
05	Jan	Unit-V	Ecology and Environment		
			5.1 Concept of environment, Concept and	02	
			scope of ecology.		
			5.2 Ecological factors- Climatic- Light,	02	
			Temperature and Water.		
			5.3 Atmosphere and its composition.	03	
			5.4 Edaphic factor- Process of soil	04	
			formation, soil profile, soil biota and their		
			role.		
			5.5 Ecological Adaptations -	04	
			Morphological and Anatomical adaptation		
			in Hydrophytes, and Xerophytes		15
06	Feb	Unit-VI	Ecosystem		_
			6.1 Population Ecology- Natality and	05	
			Mortality, Community characteristics –		
			Frequency, Density and		
			Abundance		
			6.2 Ecological Succession - Hydrosere	03	
			and Xerosere		
			6.3 Ecosystem – Definition, Structure and	05	
			Function, Food chain, Food web, Energy		
			flow model (Single		
			channel model)		15
			6.4 Types of Ecosystem- Pond ecosystem,	02	
			Desert ecosystem.		

Class:	B.Sc. III			ject: Botany	
			LANT PHYSIOLOGY AND ECOLOGY		
			ABORATORY EXERCISE (PRACTICALS)	1	
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	Nov 20		Plant Physiology		
			Major experiment (Any Seven)		
		1	To study the effect of temperature and	01	
			organic solvent on permeability of plasma		
			membrane.	0.1	
		2	To study osmotic pressure of cell sap by	01	
		3	plasmolytic method.	01	
		4	To determine the path of water (ascent of sap)	01	
		4	To determine the rate of transpiration by Ganongs photometer/Screen.	U1	
		5	To determine rate of photosynthesis under	01	
		3	varying quality of light and CO2	U1	
			concentration.		
		6	Separation of chloroplast pigments by paper	01	
			chromatography/solvent extraction method.		
		7	To determine R.Q. using different substrates.	01	07
02	Jan		Plant Physiology		
			Minor experiment (Any Three)		
		8	To demonstrate fermentation.	01	
		9	To demonstrate exo and endosmosis	01	
		10	To demonstrate the phenomenon of nastic	01	
			movement with help of Mimosa pudica / or		
			Biophytum sensitivum.		03
03	Feb		Ecology: Major experiment (Any Three)		
İ		11	Study of morphological and anatomical	02	
			adaptations in hydrophytes – <i>Hydrilla</i> ,		
			Eichhornia, Typha, Vallisneria and		
		12	Nymphaea (any two)	02	
		12	Study of morphological and anatomical	02	
			adaptations in xerophytes -Asparagus,		
			Nerium, Casuarina, Euphorbia, Cycas, Opuntia (any two)		
		13	Study of community characteristics by quadrat	01	
			method.	01	05
04	Feb		Ecology: Minor experiment (Any Two)		05
~ •	~	14	Determination of pH of different soils and	01	
			water samples by pH papers/ pH meter.	. –	
		15	Study of meteorological instruments -Rain	01	
			gauge, Hygrometer, Barometer		02
05	Feb		Subject related Project & Seminar		

Teaching Plan 2020-21

Class:	B.Sc. III	MOLECUI		bject: Botany	7
Sr. No.	Month	Unit No.	AR BIOLOGY AND BIOTECHNOLOGY Topic Name	Period Required	Total Period
01	March 21	UNIT-I	Unit-I: DNA the genetic material: 1.1 Historical account – Giffith's Expt, Hershy and Chase Expt.	04	
			1.2 DNA– Chemical composition and Double Helical model,	02	
			1.3 DNA replication in Eukaryotes;	03	
			1.4 DNA Packaging - Nucleosome and Solenoid	03	
			1.5 Satellite, Repetitive DNA and Transposable element in plants (AC-DS	03	 .
02	April 21	UNIT-II	system) Unit-II: Gene Structure and Expression -		15
			2.1 Concept of gene, Fine structure of Gene	03	
			2.2 Gene Expression – Central Dogma, Types of RNA, Genetic code, Ribosome as a translation machine	03	15
			2.3 Transcription in Eukaryotes – Mechanism of Transcription and RNA Processing	03	
			2.4 Translation in Eukaryotes.	03	
			2.5 Endomembrane system (Flow of Peptide)	03	
03	May 21	UNIT-III	Unit – III : Regulation of Gene Expression		
			3.1 Regulation of Gene Expression in Prokaryotes – Operon concept with special reference to Lac Operon	03	
			3.2 Regulation of gene expression of Eukaryotes – Britton Davidson Model	03	
			3.3 Protein Folding Mechanism and Structure (Primary, Secondary, Tertiary and Quaternary)	03	15
			3.4 Protein Sorting – Targeting to proteins to organelles	03	13
			3.5 Protein Trafficking	03	
04	May	Unit-IV	Unit-IV : Genetic Engineering -		15

			4.1 Tools and techniques of recombinant	02	
			DNA technology,		
			4.2 Restriction Enzymes – Nomenclature	02	
			and Types		
			4.3 Cloning vectors – Plasmids, Phages,	03	
			Cosmids		
			4.4 Gene Source- Genomic and c-DNA	03	
			library		
			4.5 Gene Transfer Techniques – Direct -	03	
			(1) Chemical method, (2) Electroporation,		
			(3) Gene gun method		
			Indirect – Agrobacterium mediated gene		
			transfer		_
			4.6 Gene AmplificationPolymerase	02	
~=			Chain Reaction (PCR		
05	May	Unit-V	Unit-V: Plant Tissue Culture -	0.2	_
			5.1 Basic aspects of plant tissue culture	03	_
			5.2 Laboratory Requirement –	06	
			Infrastructure, Instruments (laminar air		
			flow, autoclave, growth chamber),		
			Culture Media (MS Media), Growth		
			Hormone (Auxin, Cytokinin and		
			Gibberellins) Sterilization Techniques	0.6	_
			5.3 Tissue Culture Technique - Cellular	06	
			totipotency, differentiation and		
			morphogenesis; Callus Culture; Micro		15
06	Mari	TT:4 X/T	propagation		15
06	May	Unit-VI	Unit-VI : Applications of Biotechnology	0.4	_
			6.1 Agriculture – Haploid plant	04	
			production (Anther and Pollen Culture);		
			Protoplast Culture and Somatic		
			Hybridization; Transgenic Plant - BT		
			Cotton, Synthetic seed. Salient		
			achievements of crop biotechnology	04	_
			6.2 Industry– Fermentation Technology-	04	
			Bakery Products and Alcohol Productions.		
				02	_
			6.3 Health Care – Edible Vaccines	03	
			6.4 Conservation – Cryopreservation,	04	15
			Genetically Modified Organisms: - Pros		
07	Mov		and Cons Subject related Project & Comings		
07	May		Subject related Project & Seminar		

Class: B.Sc. III			Sem VI S	ubject: Botany	
		MOLEC	CULAR BIOLOGY AND BIOTECHNOLO	GY	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	April		1) Molecular biology (Major) (Any One)		
		1	1. Isolation of DNA by crude method	02	
			2) Molecular biology (Minor) (Any One)		
		2	1. Demonstration of DNA Electrophoresis	02	
			3) Biotechnology (Any Six)		
		3	1. Working Principle and application of	02	
			Autoclave		06
02	May	4	2. Working Principle and application of	01	
			Laminar Air Flow.		
		5	3. Cleaning and Sterilization of Glassware	01	
		6	4. Sterilization of Explant	01	
		7	6. Demonstration of in vitro culture	02	
			techniques – anther and pollen culture		05
03	May	8	9. Demonstration of technique of	02	
			Micropropogation		02
			Visit to molecular biology, biotechnological		
			research institute/ industry		
04			Practical Examination		

Teaching Plan 2021-22 (Theory)

Note: Due to Covid-19 pandemic situations the teaching plan is for online mode teaching using online platforms like Zoom meeting, Google classroom, Google meet, Eduscoop

Class:	B.Sc. I	_	Sem I Subject: Botany		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Plant Diversity (15)	1	15
	·		1.1 Introduction to Plant Kingdom:	03	1
			Cryptogams		
			1.2 Diversity of plants with respect to habitat,	03	
			form, nutrition and ecological status		
			1.3 General Account of Viruses and structure	03	
			of TMV and HIV		
			1.4 Bacteria: structure, Nutrition and	03	
			reproduction		
			1.5 Role of microbes in Agriculture, Medicine	03	
			and Industries		
02	Aug- Sept	UNIT-II	Algae (15)		15
			2.1. Classification according to F. E. Fritsch	02	
			and G. M. Smith up to classes		
			2.2. General characters of algae with	02	
			reference to Habitat, Thallus organization,		
			Pigmentation, Reserve food and Reproduction		
			2.3. General characters of following classes	02	
			with special reference to examples mentioned	0.2	4
			2.3.1. Chlorophyta - Oedogonium	03	
			2.3.2. Charophyta – Chara (Thallus structure	03	
			and reproduction) 2.3.3. Phaeophyta – Sargassum (Thallus	02	-
			structure and reproduction)	02	
			2.3.4. Rhodophyta – Batrachospermum	01	
03	+	UNIT-III	Fungi (15)	UI	15
03		01411-111	3.1. General characteristics of following	03	13
			classes with special reference to examples	03	
			mentioned		
			3.1.1. Mastigomycotina : Albugo (Cystopus)	03	
			3.1.2. Ascomycotina : Aspergillus	02	
			3.1.3. Basidiomycotina : Puccinia graminis-	02	
			tritici		
			3.1.4. Deuteromycotina : General characters	03	
			3.2 Lichen-Types & Economic importance	02	1
04	Sept	Unit-IV	Bryophyte (15)		15
	~ · · ·		4.1. General characters, thallus organization	03	1
			and life cycle of		
			4.1.1. Hepaticopsida – Marchantia	03	1
			1.1.2. Bryopsida – Funaria	03	1

			4.2. Affinities of bryophytes with algae and pteridophytes4.5. Brief Account on some Indian Bryologist	03	
05	Sept-Oct	Unit-V	Pteridophyte (15)	1	15
	_		5.1. Pteridophytes as First Vascular Plants.	02	
			5.3. General characters of the following classes with special reference to examples mentioned –	02	
			5.3.1. Sphenopsida – Equisetum	03	
			5.3.2. Filicopsida – Marsilea	03	
		5.4. Stele types in pteridophytes 5.5 Heterospory and Seed Habit in Pteridophytes	02		
			03		
06	Oct	Unit-VI	Application of Microbes Cryptogams (15)		15
			6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects	03	
			6.2. Mycorrhiza – Types and Application	02	
			6.3. Role of Fungi in Industries, Medicine, Food & Agriculture	02	
			6.4. Plant Diseases –	02	
		6.4.1. Viral –TMV	6.4.1. Viral –TMV	02	
			6.4.2. Bacteria – Black arm of cotton (Xanthomonos malvacearum)	02	
			6.4.3. Fungal – Tikka disease of groundnut (Cercospora sps.)	02	

Teaching Plan 2021-22 (Practical)

Class:				ect: Botany	
	DIV	VERSITY &	APPLICATIONS OF MICROBES AND CRYPTO	OGAMS	
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	July		ALGAE Preparation of temporary mount, identification with reason of following algal materials		07
		1	1. Oedogonium,	01	
		2	2 Hydrodictyon	01	
		3	3 Chara,	01	
		4	4 Vaucheria	01	
		5	5 Ectocarpus	01	
		6	6 Sargassum	01	
		7	7. Batrachospermum	01	
02	August		FUNGI AND PLANT PATHOLOGY		06
		8	Study of following genera Albugo, Uncinula,	01	
		9	Penicillium, Agaricus,	01	
		10	Puccinia, Cercospora	01	
		11	Study of Crustose, Fruticose & Foliose Lichen	01	
		12	Study of symptoms of fungal, viral, bacterial and Mycoplasmal diseases	01	
		13	Demonstration of Mushroom Cultivation Technology	01	
03	Sept		BRYOPHYTES		05
		14	Study of external and anatomy features of vegetative and reproductive parts of following genera – <i>Marchantia</i> ,	01	
		15	Anthoceros,	01	
		16	Funaria,	01	
		17	Polytrichum	01	
		18	Sphagnum	01	
04	Sept-Oct	10	PTERIDOPHYTES Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of following genera –		07
		19	Lycopodium	01	
		20	Equisetum,	01	
		21	Osmunda,	01	
		22	Selaginella,	01	
		23	Adiantum,	01	
		24	Marsilea	01	
		25	Any one fossil specimen	01	
05	Oct		Botanical excursion		
06	Oct		Common algal, fugal, pathological, bryophytic and pteridophytic collection and excursion report must be submitted at the time of practical exam		

Teaching Plan 2021-22

Note: Due to Covid-19 pandemic situations the teaching plan is for online mode teaching using online platforms like Zoom meeting, Google classroom, Google meet, Eduscoop

Cla	ss: B.Sc. I		Sem II Subject: Botany		
	GYMNOS	SPERM,	MORPHOLOGY OF ANGIOSPERMS AND UTILIZATION OF	PLAN	NTS
01	January	UNIT-	UNIT-I: Palaeobotany (15)		15
		I	1.1. Process of plant fossilization and types of fossils	03	
			1.2. Geological Time Scale	03	
			1.3. Fossil Gymnosperms	03	
			1.3.1. Pteridospermales: Lyginopteris oldhamia	03	
			1.3.2. Bennettitales: Bennittites	03	
02	Jan-	UNIT-	UNIT-II : Gymnosperms (15)		15
	Feb	II	2.1. Classification according to D. D. Pant	03	
			2.2. General account: morphology, anatomy, life cycle and taxonomic	04	
			position of Pinus and Gnetum		
			2.3. Affinities with pteridophytes and angiosperms	04	
			2.4. Economic importance of Gymnosperms	04	
03	Feb	UNIT-	UNIT-III: Morphology (15)		15
		III			
			3.1. Diversity in Plants habits – Annual, biannual, perennials	03	
			3.2. Roots – Types of root : tap and adventitious, modification of root : for	04	
			food storage, respiration and supports.		
			3.3. Stem – Types of Stem, Characteristic features, branching,	04	
			modification of Stem – Underground and aerial		
			3.4. Leaf – Parts of leaf, types of leaves – simple and compound;	04	
			Phyllotaxy; Venation; Stipule. Modification of leaves		
04	Feb	Unit-	UNIT-IV: Morphology (15)		15
		IV	4.1. Inflorescences – Types: Racemose, Cymose and Special	06	
			4.2. Flower – Flower as modified shoot; Structure of flower – Calyx,	09	
			Corolla, Androecium and Gynoecium. Placentation; Types of Pollination.		
05	March	Unit-	UNIT-V: Morphology and Utilization of Plants (15)		15
		V	(1 F ' M 1 1 1 1 1	0.2	
			5.1. Fruits – Morphological types	03	
			5.2. Utilization of Plants	03	
			5.2.1. Food Plants – Wheat, Potato – Morphology, varieties and economic	03	
				US	
			importance. 5.2.2. Fiber Plant – Morphology, varieties and economic importance of	03	_
			Cotton.	US	
			5.2.3. Oil yielding Plant – Morphology, Varieties and economic	03	
			importance of Ground nut.	US	
06	March	Unit-	UNIT-VI: Utilization of Plants (15)		15
vv	wiai CII	VI	6.1. Spices – General account and economic importance of Black pepper,	02	- 13
		, <u>, , , , , , , , , , , , , , , , , , </u>	Clove, Cinnamon and Cardamom	02	
	l	l	Clove, Chinamon and Cardanion	l	

	6.2. General account and sources of firewood, timber and Bamboos.	02	
	6.3. Essential oils – General account, economic importance of Eucalyptus.	02	
	6.4. Pharmacognosy and Phytochemistry with respect to following		
	medicinal plants –		
	6.4.1. Aloe vera	01	
	6.4.2. Adathoda vasica	01	
	6.4.3. Asparagus racemosa	01	
	6.4.4. Azadirachta indica	01	
	6.4.5. Catharanthus roseus		
	6.4.6. Chlorophytum borivillianum	01	
	6.4.7. Emblica officinalis	01	
	6.4.8. Ocimum sanctum	01	
	6.4.9. Rauwolfia serpentina	01	
	6.4.10. Vitex negundo	01	
	6.4.11. Withania somnifera		

Class:	Class: B.Sc. I Sem II Su			ct: Botany	
GY	MNOSPERN	A, MORPH	OLOGY OF ANGIOSPERMS AND UTILIZA	ATION OF I	PLANTS
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	January		I. Gymnosperms: Morphology and anatomy of the following members –		
		1	a. Pinus: Root, Stem, Leaf	02	
		2	b. Gnetum: Root, Stem, Leaf	02	
		3	II. Preparation of double stained permanent mount of Pinus stem, needle and Gnetum stem and leaf	02	
		4	III. Study of fossil slides of Lyginopteris and Bennettites	01	07
02	February	5	IV. Detailed morphological study of types of root, stem and leaf with its modifications	04	
		6	V. Forms of corolla	01	
		7	VI. Types of placentation	01	
		8	VII. Morphology of fruits	01	07
03	March	9	VIII. Morphology of plant parts used and medicinal plants prescribed in syllabi	03	
		10	IX. Utilization of plants: Spices, fiber yielding plants and food plants prescribed in syllabi	03	06
		11	Botanical excursion		
04	March	12	Practical Examination		

Teaching Plan 2021-22

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Class: B.Sc. II				t: Botany	
C	ANGI Month		YSTEMATICS, ANATOMY & EMBRYO		Total
Sr. No.	Monu	Unit No.	Topic Name	Period Required	Total Period
01	July	UNIT-I	Angiosperm Systematics and	Required	15
V-		01,11	Biodiversity		
			1.1 Angiosperms: Origin and Evolution	02	
			(Pteridospermean and Bennititalean		
			Theory)		
			1.2 Botanical Nomenclature: Principles of	03	-
			rules, Taxonomic Ranks, Type concept,		
			Valid publication.		
			1.3 Herbarium – Concept & significance,	04	
			Royal Botanical Garden, Kolkata.		
			1.4 Concept of biodiversity, Ex situ and In	04	
			situ conservation		
			1.5 Concept & importance of	02	
			Biodiversity.		
02	August	UNIT-II	Angiosperm Systematics		15
			2.1 Systems of Classification: Bentham	03	
			and Hooker's System, Engler and		
			Prantle's system.		
			2.2 Systematic studies & economic	12	
			importance of following Families:		
			Dicotyledons (Polypetalae) : Malvaceae,		
02	A C 4	TINITE III	Brassicaceae, Leguminosae, Apiaceae,		15
03	Aug- Sept	UNIT-III	Angiosperm Systematics	10	15
			3.1 Systematic studies & economic importance of following Families:	10	
			Dicotyledons (Gamopetalae): Asteraceae,		
			Asclepiadaceae, Apocynaceae,		
			Solanaceae, Verbenaceae, Lamiaceae.		
			3.2 Dicotyledons (Monoclamydeae):	02	-
			Euphorbiaceae.		
			3.3 Monocotyledons: Liliaceae, Poaceae.	03	1
04	Sept	Unit-IV	Anatomy		15
			4.1 Types of Tissues: Meristematic –	04	1
			Types of meristems Permanent – Simple		
			and complex.		
			4.2 Characteristics of growth rings,	04	1
			Sapwood and heartwood.		

			4.3 Anatomy of root: Primary structure in dicot and monocot root, normal secondary growth in dicot root.	07	
05	Sept-Oct	Unit-V	Anatomy		15
			5.1 Anatomy of stem: Primary structure in monocot and dicot stem, normal secondary growth in dicot stem.	06	
			5.2 Anomalies in primary structure in <i>Boerhhavia</i> stem, secondary structure in <i>Bignonia</i> and <i>Dracaena</i> stem.	06	
			5.3 Leaf Anatomy: Internal structure in <i>Nerium</i> and <i>Maize</i> leaf.	03	
06	Oct	Unit-VI	Embryology		15
			5.1 Microsporangium, microsporogenesis, development of male gametophyte.	04	
			5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte monosporic, Bisporic & tetrasporic).	04	
			5.3 Double fertilization and triple fusion.	02	
			5.4 Embryo – Classification of embryo.	02	
			5.5 Endosperm types & significance, Suspended animation	03	

Teaching Plan 2021-22 (Practical)

Class	B.Sc. II		Sem III Subjection	ct: Botany	
Class.		GIOSPERN	M SYSTEMATICS, ANATOMY & EMBRYO		
	7111		ABORATORY EXERCISE (PRACTICALS)	LOGI	
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	July		Anatomy of angiosperms: Preparation of double stained slides of root, stem and leaves of angiosperms mentioned in the syllabus		
		1	Anatomy of root in Dicot & Monocot	01	
		2	Anatomy of stem in Dicot & Monocot	01	
		3	Anatomy of Leaf in Dicot & Monocot	01	03
02			Taxonomy : Description of ten plants belonging to different families in technical language and identification up to family level.		
		4	Brassiacaceae	01	
	August	5	Malvaceae	01	
		6	Fabaceae	01	
		7	Caesalpinoidae	01	
		8	Mimosoidae	01	
		9	Apiaceae	01	
		10	Apocynaceae	01	
		11	Asclepiadaceae	01	
		12	Solanaceae	01	
		13	Euphorbiacea	01	
	September	14	Lamiaceae	01	
		15	Asteraceae	01	
		16	Verbanaceae	01	
		17	Liliaceae	01	
		18	Poaceae	01	15
03			Embryology of Angiosperms	-	
		19	Observation of wide range of flowers available in the locality and methods of their pollination.	01	
		20	Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of Capsella	01	
	October	21	Mounting of T.S. of anthers, Pollen grains and pollinia.	01	03
04			Long and short excursion tour		

Teaching Plan 2021-22

Class	B.Sc. II		Sem IV Subject	: Botany	
Class.		TELL RIOL	OGY, GENETICS AND BIOCHEMISTR		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	Dec- January	UNIT-I	Unit – I : Cell Biology	•	
			1.1 Cell concept – Prokaryotic and	02	
			Eukaryotic cell		
			1.2 Cell wall –Structure and Functions	03	
			1.3 Plasma membrane –Structure	04	
			(models) and Functions		
			1.4 Nucleus – Ultra structure (nuclear	04	
			membrane, nuclear pore complex and		
			nucleolus) and functions		
			1.5 Chloroplast- Structure and Functions	02	15
02	Jan- Feb	UNIT-II	Unit-II: Cell Biology Structure and		
			functions of-		
			2.1 Endoplasmic Reticulum	03	
			2.2 Golgi complex	02	
			2.3 Vacuole	02	
			2.4 Ribosome	02	
			2.5 Perixysome	02	
			2.6 Mitochondria	02	
			2.7 Cell cycle: Mitosis and Meiosis	02	15
03	February	UNIT-III	Unit – III : Genetics		
			3.1 Chromosome- Morphology, Types,	04	
			Centromere & Telomere		
			3.2 Chromosomal aberrations –		
			3.2.1 Structural aberrations: Deletion,	05	
			Duplication, Inversion and Translocation		
			3.2.2 Numerical aberrations: Euploidy and	06	
			aneuploidy		15
04	Feb- March	Unit-IV	Unit-IV: Genetics		
			4.1 Mendellism: Mendel's law of	05	
			Dominance, Segregations and		
			Independent assortment,		
			Incomplete dominance		
			4.2 Interaction of genes- Complimentary,	05	
			Supplementary and Epistasis		
			4.3 Problems based on Mendelism and	05	
			Interaction of Genes		15
05	Feb- March	Unit-V	Unit – V Genetics		15

07			Subject related Project & Seminar		
			6.5 Structure and functions Carbohydrates: Monosaccharides (Glucose), Disaccharides (Galactose) and Polysaccharides (Starch)	03	15
			6.4 Theories for Mechanism of action of Enzymes	03	
			6.3 Concept of holoenzymes, coenzymes and cofactor	03	
			6.2 Characteristics of Enzymes	03	
			6.1 Nomenclature of Enzymes	03	
06	March	Unit-VI	Unit – VI Biochemistry		
			5.4 Extra-nuclear Genome- Mitchondrial DNA and Chloroplast DNA	04	
			5.3 Gene mutations- Spontaneous and Induced	04	
			5.2 Crossing over: Concept, Types and theories	04	
			5.1 Linkage – Concept, Types and theories	03	

Class: B.Sc. II			Sem IV Subject: Botany						
CELL BIOLOGY, GENETICS AND BIOCHEMISTRY LABORATORY EYERCISE (DRACTICALS)									
Sr.	Month	LA Practical	ABORATORY EXERCISE (PRACTICALS) Practical Name	Practical	Total				
No.		No.		Required	Practical				
01	January		I Cell Biology (Any Two)						
		1	Squash preparation for the study of various stages of mitosis	02					
		2	Smear preparation for the study of various stages of meiosis.	02	04				
02	February		II Genetics						
		3	1. To prove Mendel's Monohybrid ratio.	01					
		4	2. To prove Mendel's Dihybrid ratio	01					
		5	3. Problems based on Interaction of genes	01	03				
03	Feb-		III Biochemistry						
	March	6	1. To study the enzyme activity of catalase.	01					
		7	2. To demonstrate test for glucose in grapes,	01					
			& sucrose in cane sugar / beet root.						
		8	3. To demonstrate test for protein.	01	03				
03	March	9	4. To demonstrate the lipid test in oily seeds.	01					
		10	5. To demonstrate the test for starch / cellulose.	01					
		11	6. To demonstrate the activity of enzyme	01	03				

	amylase from germinating Wheat grains	
	Practical Examination	1

Teaching Plan 2021-22

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Class: B.Sc. III Sem V Subject: Botany						
		PLAN	T PHYSIOLOGY AND ECOLOGY			
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period	
01	July	UNIT-I	Plant Water Relations		1 01100	
			1.1 Importance of water to plant life.	04		
			Imbibition, Diffusion, Osmosis,			
			Plasmolysis.			
			1.2 Active and passive Absorption of	02		
			water.			
			1.3 Ascent of sap - Root Pressure and	03		
			Transpiration Pull Theory.			
			1.4 Transpiration - Types of transpiration,	03		
			Stomatal movements, Mechanism of			
			transpiration (Starch) sugar			
			hypothesis), Significance. Antitranspirant,			
			Guttation.			
			1.5 Mineral uptake - Active uptake -	03		
			Career Concept, Passive uptake Ion			
			Exchange.		15	
02	July-August	UNIT-II	Metabolism-	0=		
			2.1 Photosynthesis - Introduction, Role of	07		
			Light, Photosynthetic Apparatus and			
			Pigments, Two Pigment Systems,			
			Photophosphorylation, C3 and C4 cycle,			
			CAM Pathway.	08		
			2.2 Respiration - Introduction, Mitochondria as a Respiratory centre,	00		
			Types of Respiration - Aerobic and			
			Anaerobic, Mechanism of aerobic			
			respiration- Glycolysis, Kreb cycle,			
			Electron transport system and			
			Chemiosmotic ATP generation,			
			Respiratory Quotient.		15	
03	August	UNIT-III	Metabolism and growth			
			3.1 Nitrogen Metabolism- Sources of	06		
			nitrogen, Symbiotic nitrogen fixation,			
			Role of Nitrate reductase.			
			3.2 Growth - Phases of growth, Growth	06		
			curve, Physiological role of growth			
			hormones (Auxins, Gibberellins,			
			Cytokinins, Abscisic acid, and Ethylene).		15	

			3.3 Physiology of Senescence and Abscission.	03	
04	August-Sept	Unit-IV	Plant responses		
			4.1 Photoperiodism - Concept of Florigen,	04	
			Role of Phytochrome,		
			4.2 Vernalization- Concept and	02	
			Significance.		
			4.3 Plant movement- Tropic (Phototropic	05	
			and Geotropic) and Nastic (Epinasty,		
			Hyponasty and Seismonasty)		
			4.4 Stress physiology- Concept, Types of	04	
			stress, Water and Salinity stress.		15
05	Sept	Unit-V	Ecology and Environment		
			5.1 Concept of environment, Concept and	02	
			scope of ecology.		
			5.2 Ecological factors- Climatic- Light,	02	
			Temperature and Water.		
			5.3 Atmosphere and its composition.	03	
			5.4 Edaphic factor- Process of soil	04	
			formation, soil profile, soil biota and their		
			role.		
			5.5 Ecological Adaptations -	04	
			Morphological and Anatomical adaptation		
			in Hydrophytes, and Xerophytes		15
06	Oct	Unit-VI	Ecosystem		
			6.1 Population Ecology- Natality and	05	
			Mortality, Community characteristics –		
			Frequency, Density and		
			Abundance		
			6.2 Ecological Succession - Hydrosere	03	
			and Xerosere		
			6.3 Ecosystem – Definition, Structure and	05	
			Function, Food chain, Food web, Energy		
			flow model (Single		
			channel model)	0.0	15
			6.4 Types of Ecosystem- Pond ecosystem,	02	
			Desert ecosystem.		

Class:	B.Sc. III		Sem V Sub	ject: Botany	
		PI	LANT PHYSIOLOGY AND ECOLOGY		
		LA	ABORATORY EXERCISE (PRACTICALS)		
Sr. No.	Month	Practical No.	Practical Name	Practical Required	Total Practical
01	July-		Plant Physiology		
	August		Major experiment (Any Seven)		
		1	To study the effect of temperature and	01	
			organic solvent on permeability of plasma		
			membrane.		
		2	To study osmotic pressure of cell sap by	01	
			plasmolytic method.		
		3	To determine the path of water (ascent of sap)	01	
		4	To determine the rate of transpiration by	01	
			Ganongs photometer/Screen.		
		5	To determine rate of photosynthesis under	01	
			varying quality of light and CO2		
			concentration.		
		6	Separation of chloroplast pigments by paper	01	
			chromatography/solvent extraction method.		
		7	To determine R.Q. using different substrates.	01	07
02	August		Plant Physiology		
			Minor experiment (Any Three)		
		8	To demonstrate fermentation.	01	
		9	To demonstrate exo and endosmosis	01	
		10	To demonstrate the phenomenon of nastic	01	
			movement with help of <i>Mimosa pudica</i> / or		
			Biophytum sensitivum.		03
03	Aug-Sept		Ecology: Major experiment (Any Three)		
		11	Study of morphological and anatomical	02	
			adaptations in hydrophytes – <i>Hydrilla</i> ,		
			Eichhornia, Typha, Vallisneria and		
			Nymphaea (any two)		
		12	Study of morphological and anatomical	02	
			adaptations in xerophytes -Asparagus,		
			Nerium, Casuarina, Euphorbia, Cycas,		
			Opuntia (any two)		
		13	Study of community characteristics by quadrat	01	
			method.		05
04	Sept-Oct		Ecology: Minor experiment (Any Two)		
		14	Determination of pH of different soils and	01	
			water samples by pH papers/ pH meter.		
		15	Study of meteorological instruments -Rain	01	02

		gauge, Hygrometer, Barometer	
05	Oct	Subject related Project & Seminar	

Teaching Plan 2021-22

Class:	B.Sc. III			ubject: Botany	7
	_		AR BIOLOGY AND BIOTECHNOLOG		
Sr. No.	Month	Unit No.	Topic Name	Period Required	Total Period
01	January	UNIT-I	Unit-I: DNA the genetic material: 1.1 Historical account – Giffith's Expt, Hershy and Chase Expt.	04	
			1.2 DNA– Chemical composition and Double Helical model,	02	
			1.3 DNA replication in Eukaryotes;1.4 DNA Packaging - Nucleosome and Solenoid	03	
			1.5 Satellite, Repetitive DNA and Transposable element in plants (AC-DS system)	03	15
02	January	UNIT-II	Unit-II : Gene Structure and Expression -		
			2.1 Concept of gene, Fine structure of Gene	03	
			2.2 Gene Expression – Central Dogma, Types of RNA, Genetic code, Ribosome as a translation machine	03	15
			2.3 Transcription in Eukaryotes – Mechanism of Transcription and RNA Processing	03	
			2.4 Translation in Eukaryotes.	03	
			2.5 Endomembrane system (Flow of Peptide)	03	
03	February	UNIT-III	Unit – III : Regulation of Gene Expression		
			3.1 Regulation of Gene Expression in Prokaryotes – Operon concept with special reference to Lac Operon	03	
			3.2 Regulation of gene expression of Eukaryotes – Britton Davidson Model	03	
			3.3 Protein Folding Mechanism and Structure (Primary, Secondary, Tertiary and Quaternary)	03	15

			3.4 Protein Sorting – Targeting to proteins to organelles	03	
			2.5 D	02	
0.4			3.5 Protein Trafficking	03	
04	February	Unit-IV	Unit-IV : Genetic Engineering -	02	
			4.1 Tools and techniques of recombinant	02	
			DNA technology,	02	
			4.2 Restriction Enzymes – Nomenclature and Types	02	
			4.3 Cloning vectors – Plasmids, Phages,	03	
			Cosmids	0.5	
			4.4 Gene Source- Genomic and c-DNA	03	
			library		
			4.5 Gene Transfer Techniques – Direct -	03	
			(1) Chemical method, (2) Electroporation,		
			(3) Gene gun method		
			Indirect – Agrobacterium mediated gene		
			transfer		
			4.6 Gene AmplificationPolymerase	02	
		77.4.77	Chain Reaction (PCR		15
05	Feb-March	Unit-V	Unit-V: Plant Tissue Culture -	0.2	
			5.1 Basic aspects of plant tissue culture	03	
			5.2 Laboratory Requirement –	06	
			Infrastructure, Instruments (laminar air		
			flow, autoclave, growth chamber), Culture Media (MS Media), Growth		
			Hormone (Auxin, Cytokinin and		
			Gibberellins) Sterilization Techniques		
			5.3 Tissue Culture Technique - Cellular	06	_
			totipotency, differentiation and		
			morphogenesis; Callus Culture; Micro		
			propagation		15
06	March	Unit-VI	Unit-VI : Applications of Biotechnology		
			6.1 Agriculture – Haploid plant	04	
			production (Anther and Pollen Culture);		
			Protoplast Culture and Somatic		
			Hybridization; Transgenic Plant - BT		
			Cotton, Synthetic seed. Salient		
			achievements of crop biotechnology		
			6.2 Industry– Fermentation Technology-	04	
			Bakery Products and Alcohol		
			Productions.	03	
			6.3 Health Care – Edible Vaccines	03	
			6.4 Conservation – Cryopreservation, Genetically Modified Organisms: - Pros	U-1	15
			and Cons		
07	March		Subject related Project & Seminar		
07	wiai Cii		Subject related Froject & Seminal	1	

Class: B.Sc. III			Sem VI	Subject: Botany	
		MOLEC	TULAR BIOLOGY AND BIOTECHNOLO	GY	
		LA	BORATORY EXERCISE (PRACTICALS)		
Sr.	Month	Practical	Practical Name	Practical	Total
No.		No.		Required	Practical
01	January		1) Molecular biology (Major) (Any One)		
		1	1. Isolation of DNA by crude method	02	
			2) Molecular biology (Minor) (Any One)		
		2	1. Demonstration of DNA Electrophoresis	02	
			3) Biotechnology (Any Six)		
		3	1. Working Principle and application of	02	
			Autoclave		06
02	February	4	2. Working Principle and application of	01	
			Laminar Air Flow.		
		5	3. Cleaning and Sterilization of Glassware	01	
		6	4. Sterilization of Explant	01	
		7	6. Demonstration of in vitro culture	02	
			techniques – anther and pollen culture		05
03	March	8	9. Demonstration of technique of	02	
			Micropropogation		02
			Visit to molecular biology, biotechnological		
			research institute/ industry		
04			Practical Examination		