3rd SEMESTER HONOURS(CORE COURSE & SEC)

Session : July 2020 to December 2020

(COURSE CODE: BOTACOR05T, BOTACOR06T, BOTACOR07T, BOTSSEC01M)

SEM III:CORE COURSE V

Morphology and Anatomy of Angiosperms

CODE: BOTACOR05T (4 Credits)

COURSE OUTCOME: **Plant morphology** is the study of the physical form and external structure of plants, whereas **plant anatomy** is the study of the internal structure of plants, mostly at the cellular/microscopic level. In this study plant morphology mainly reflects reproductive structures of angiosperm like flower, inflorescence, fruits and seeds. On the other hand anatomy reveals apical meristem, vascular cambium, wood, and also focuses on adaptive and protective system.

This course will be helpful for the students to acquire a clear knowledge on the external and internal structure of angiosperms along with their different adaptive and protective systems.

On completion of the course, students will be able to:

1. Understand the habit of the angiosperm plant body.

2. Know the vegetative characteristics of the plant.

3. Understand the scope & importance of Anatomy.

4. Know various tissue systems.

5. Understand the normal and anomalous secondary growth in plants and their causes.

6. A parallel practical course will also help to gather a brief knowledge on various techniques used in anatomical study.

THEORY

(BOTACOR05T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRAROBTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020 TO DECEMBER 2020				**HONS** √		**GENERAL**			
SEM	3	**Core Course**	5	**CREDIT POINT**	4	**Course Code**	BOTACOR05T			
Name of the Course	Morphology and Anatomy of Angiosperms									
Course Co-ordinator	DR. AYANA CHAKRAROBTY									
TOTAL MARKS	50	TH	√	TUT		PRAC				
TOTAL HOURS	60	TH	√	TUT		PRAC				

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1						
NAME OF THE UNIT/MODULE	Inflorescence						
TOTAL HOURS	2	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Inflorescence – Types with examples	1	ABJ	JUL
2	Concept of advanced and primitive inflorescence types	1	ABJ	JUL
	TOTAL HOURS	2 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			Flower				
TOTAL HOURS	5	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Flower– Types with examples	1	ABJ	AUG
2	Aestivation	1	ABJ	AUG
3	Floral parts – various types of cohesion and adhesion with examples	1	ABJ	AUG
4	Carpel-types, advance and primitive ones and placentations	1	ABJ	AUG
5	Doubt clearing class	1	ABJ	AUG
	TOTAL HOURS	5 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3				
NAME OF THE UNIT/MODULE			Fruits and Seeds				
TOTAL HOURS	3	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Fruits –types with examples	1	ABJ	SEPT
2	Seeds –types with examples	1	ABJ	SEPT
3	Class Test	1	ABJ	SEPT
	TOTAL HOURS	3 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			Introduction and scope of Plant Anatomy				
TOTAL HOURS	3	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Introduction to scope of Plant Anatomy	1	AC	JUL
2	Applications of plant anatomy in systematics	1	AC	JUL
3	Applications of plant anatomy in forensics and pharmacognosy	1	AC	AUG
	TOTAL HOURS	3 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5				
NAME OF THE UNIT/MODULE			Structure and Development of Plant Body				
TOTAL HOURS	5	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Introduction	1	AC	AUG
2	Internal organization of plant body	1	AC	AUG
3	The three tissue systems	1	AC	AUG

4	Types of cells and tissues	1	AC	AUG
5	Class test	1	AC	AUG
	TOTAL HOURS	5 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6				
NAME OF THE UNIT/MODULE			Tissues				
TOTAL HOURS	10	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Introduction	1	AC	AUG
2	Classification of tissues	1	AC	AUG
3	Simple and complex tissues	1	AC	AUG
4	Cytodifferentiation of tracheary elements	1	AC	SEPT
5	Cytodifferentiation ofsieve elements	1	AC	SEPT
6	Pits, types , occurence, structure	1	AC	SEPT
7	Plasmodesmata with ultrastructure	1	AC	SEPT
8	Ergastic substances	1	AC	SEPT
9	Hydathodes, cavities, lithocysts and laticifers	1	AC	SEPT
10	Doubt clearing class	1	AC	SEPT
	TOTAL HOURS	10 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7				
NAME OF THE UNIT/MODULE			Apical meristems				
TOTAL HOURS	12(Reduced to 10)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction	1	AC	SEPT
2	Evolution of the concept of organization of the shoot apex (Apical cell theory and Histogen theory)	1	AC	SEPT
3	Evolution of the concept of organization of the shoot apex (Tunica Corpus theory)	1	AC	OCT
4	Types of vascular bundles	1	AC	OCT
5	Structure of dicot and monocot stem	1	AC	OCT
6	Structure of dicot and monocot leaf, Kranz anatomy	1	AC	OCT
7	Organization of root apex (Apical cell theory, Histogen theory and Korper-Kappe theory)	1	AC	DEC
8	Structure of dicot root; Quiescent centre; Root cap and structure of monocot root	1	AC	DEC
9	Question Answer Discussion	1	AC	DEC
10	Class test	1	AC	DEC
11**				
12**				
	TOTAL HOURS	10 hrs		

**** Total hours (alloted12 hours) have been compromised to 10 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			8				
NAME OF THE UNIT/MODULE			Vascular Cambium and Wood				
TOTAL HOURS	12(Reduced to 9)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction; Vascular cambium –structure(of rays and axial parenchyma) and origin	1	AB	SEPT
2	Vascular Cambium - function and seasonal activity of cambium	1	AB	SEPT
3	Secondary growth in root	1	AB	SEPT
4	Secondary growth in stem	1	AB	SEPT
5	Concept of wood – structure and function; Sapwood and heartwood; ring and diffuse porous wood	1	AB	OCT
6	Early and late wood, tyloses and Tylosoides	1	AB	OCT
7	Composition and development of Periderm, Rhytidome and lenticels	1	AB	OCT
8	Doubt clearing class	1	AB	DEC
9	Class test	1	AB	DEC
10				
11**				
12**				
	TOTAL HOURS	9 hrs		

**** Total hours (alloted12 hours) have been compromised to 9 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			9				
NAME OF THE UNIT/MODULE			Adaptive and Protective Systems				
TOTAL HOURS	8(Reduced to 7)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction; Epidermal tissue system, cuticle	1	AB	DEC
2	Trichomes (uni and multicellular, glandular and nonglandular with examples of each)	1	AB	DEC
3	Stomata (classification)	1	AB	DEC
4	Adcrustation and incrustation	1	AB	DEC
5	Anatomical adaptations of xerophytes	1	AB	DEC
6	Anatomical adaptations of hydrophytes	1	AB	DEC
7	Class test	1	AB	DEC
8**				
	TOTAL HOURS	7 hrs		

**** Total hours (allotted 8 hours) have been compromised to 7 hours.**

***** Due to the Pandemic situation, the allotted total 60 hours for this course has been adjusted to 54 hours, keeping the course content unchanged.**

SEM III: CORE COURSE VI

Economic Botany

CODE: BOTACOR06T (4 Credits)

COURSE OUTCOME: Economic Botany is the study of sustainable uses of plants for our regular civilized life. People have been using plants for thousands of years. Plants are extremely *important* in human life throughout the world. People depend upon plants to satisfy such basic human needs as food, clothing, shelter, and health care. These needs are growing rapidly because of a growing world population, increasing incomes, and urbanization.

This course will be helpful for the students to acquire a clear knowledge on the use of plants in a broad field with many applications and use of plants as food, fodder, medicine, industrial and daily uses.

On completion of the course, students will be able to:

1. Understand the role plants in human welfare.

2. Gain knowledge about various plants of economic use.

3. Know importance of plants & plant products.

4. Understand the chemical contents of the plant products.

5. Know about the utility of plant resources.

THEORY

(BOTACOR06T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRAROBTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020 TO DECEMBER 2020				**HONS** √		**GENERAL**			
SEM	3	**Core Course**	6	**CREDIT POINT**	4	**Course Code**	BOTACOR06T			
Name of the Course	**Economic Botany**									
Course Co-ordinator	DR. ARUNEEMA BARDHAN									
TOTAL MARKS	50	TH	√	TUT		PRAC				
TOTAL HOURS	60	TH	√	TUT		PRAC				
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1									
NAME OF THE UNIT/MODULE	**Origin of Cultivated Plants**									
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**				
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction	1	SS	JUL
2	Concept of centres of origin	1	ABJ	AUG
3	Importance of centres of origin with reference to Vavilov's work	1	ABJ	AUG
4	Examples of major plant introductions	1	ABJ	AUG
5	Crop domestication and loss of genetic diversity.	1	ABJ	AUG
6	Doubt clearing class	1	ABJ	AUG
TOTAL HOURS		6 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			**Cereals**				
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Wheat - origin, morphology	1	ABJ	SEPT
2	Wheat - cultivation & uses	1	ABJ	SEPT
3	Rice- origin, morphology	1	ABJ	SEPT
4	Rice- cultivation & uses	1	ABJ	SEPT
5	Brief account on millets	1	ABJ	OCT
6	Class test	1	ABJ	OCT
TOTAL HOURS		6 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	3			
NAME OF THE UNIT/MODULE	**Legumes**			

TOTAL HOURS	6 (Reduced to 5)	THEORY	√	TUTORIAL		PRAC	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Origin of Chick pea & Pigeon pea	1	ABJ	OCT
2	Morphology of Chick pea	1	ABJ	OCT
3	Morphology of Pigeon pea	1	ABJ	OCT
4	Uses of Chick pea & Pigeon pea and Importance to man and ecosystem	1	ABJ	NOV
5	Question Answer Discussion	1	ABJ	NOV
6**				
TOTAL HOURS		5 hrs		

****Total hours alloted for this unit-4 was 6 hours which has been adjusted to 5 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4			
NAME OF THE UNIT/MODULE			**Sources of sugars and starches**			
TOTAL HOURS	4	**THEORY**	√	**TUTORIAL**	**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Morphology of sugarcane	1	SS	AUG
2	Processing of sugarcane; products and by-products of sugarcane industry	1	SS	AUG
3	Potato – morphology & uses	1	SS	AUG
4	Potato – propagation	1	SS	AUG
TOTAL HOURS		4 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	5			
NAME OF THE UNIT/MODULE	**Spices**			

TOTAL HOURS	6 (Reduced to 5)	THEORY	√	TUTORIAL		PRAC	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Introduction; Listing of important spices, their family and part used	1	ABJ	DEC
2	Economic importance with special reference to fennel	1	ABJ	DEC
3	Economic importance with special reference to saffron	1	ABJ	DEC
4	Economic importance with special reference to clove	1	ABJ	DEC
5	Economic importance with special reference to black pepper	1	ABJ	DEC
6**				
TOTAL HOURS		5 hrs		

****Total hours alloted for this unit-5 was 6 hours which has been adjusted to 5 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6			
NAME OF THE UNIT/MODULE			**Beverages**			
TOTAL HOURS	4	**THEORY**	√	**TUTORIAL**		**PRAC**

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Introduction	1	SS	AUG
2	Tea and coffee – morphology	1	SS	AUG
3	Tea and coffee – processing	1	SS	AUG
4	Tea and coffee - uses	1	SS	AUG
TOTAL HOURS		4 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7			
NAME OF THE UNIT/MODULE			**Sources of oils and fats**			
TOTAL HOURS	10 (Reduced to 9)	**THEORY**	√	**TUTORIAL**		**PRAC**

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	General description	1	SS	SEPT
2	Classification	1	SS	SEPT
3	Extraction	1	SS	SEPT
4	Uses and health implications of groundnut, linseed, soybean, mustard and coconut.	1	SS	SEPT
5	Groundnut, linseed, soybean, mustard and coconut (botanical name, family & uses	1	SS	SEPT
6	Essential oils – Santalum, general account, extraction methods	1	SS	SEPT
7	Essential oils - Eucalyptus: general account, extraction methods	1	SS	SEPT
8	Comparison with fatty oils & their uses	1	SS	SEPT
9	Class Test	1	SS	OCT
10**				
TOTAL HOURS		9 hrs		

****Total hours allotted for this unit-7 was 10 hours which has been adjusted to 9 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			8				
NAME OF THE UNIT/MODULE			**Natural Rubber**				
TOTAL HOURS	3	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Para-rubber, tapping	1	SS	OCT
2	Para-rubber, processing	1	SS	OCT
3	Para-rubber, uses	1	SS	OCT
TOTAL HOURS		3 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			9				
NAME OF THE UNIT/MODULE			**Drug yielding plants**				
TOTAL HOURS	8	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Introduction	1	SS	NOV
2	Therapeutic and habit-forming drugs with special reference to C*inchona*	1	SS	NOV
3	Therapeutic and habit-forming drugs with special reference to *Digitalis*	1	SS	DEC
4	Therapeutic and habit-forming drugs with special reference to *Papaver*	1	SS	DEC
5	Therapeutic and habit-forming drugs with special reference to *Cannabis*	1	SS	DEC
6	Tobacco – Morphology	1	SS	DEC
7	Tobacco - processing, uses and health hazards	1	SS	DEC
8	Class test	1	SS	DEC
TOTAL HOURS		8 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			10				
NAME OF THE UNIT/MODULE			**Timber plants**				
TOTAL HOURS	3	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	General account with special reference to teak	1	AB	OCT
2	General account with special reference to sal	1	AB	OCT
3	General account with special reference to and pine	1	AB	OCT
TOTAL HOURS		3 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			11				
NAME OF THE UNIT/MODULE			**Fibers**				
TOTAL HOURS	4	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Classification based on the origin of fibers	1	AB	OCT
2	Cotton and Jute - morphology	1	AB	NOV
3	Cotton and Jute - extraction	1	AB	NOV
4	Cotton and Jute - uses	1	AB	NOV
TOTAL HOURS		4 hrs		

*****Due to the Pandemic situation, the allotted total 60 hours for this course has been adjusted to 57 hours, keeping the course content unchanged.**

SEM III:CORE COURSE VII

Genetics

CODE: BOTACOR07T (4 Credits)

COURSE OUTCOME

On completion of the course, students will be able to:

1. Know about a fundamentals of genetics like, concept of gene, Mendelian and non-Mendelian principle of inheritance, extra-chromosomal inheritance, linkage, crossing over, gene mutation, population genetics etc.

2. Know the phenomenon of dominance, laws of segregation, independent assortment of genes.

3. Understand the different types of genetic interaction, incomplete dominance, codominance, inter allelic genetic interactions, multiple alleles and quantitative inheritance etc

4. Acquire a clear-cut knowledge about different genetical analysis like, deciphering different genetical disease, variation of gene pool among different organism's population, applying genetical understanding to analyze and manipulate traits of living organisms etc.

5. A parallel practical course will also help to gather a brief knowledge on techniques of chromosome morphological study, statistical analysis of different types of inheritance and different normal and abnormal stages of cytological behaviour and human genetic disorders.

THEORY

(BOTACOR07T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRAROBTY									
INITIALS OF FACULTIES	DAY	AC	AB	ABJ	SDG	SS				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020 TO DECEMBER 2020						**HONS** √		**GENERAL**	

SEM	3	**Core Course**	7	**CREDIT POINT**	4	**Course Code**	**BOTACOR07T**

Name of the Course	**Genetics**						
Course Co-ordinator	**DR. AYANA CHAKRAROBTY**						
TOTAL MARKS	50	TH	√	TUT		PRAC	
TOTAL HOURS	60	TH	√	TUT		PRAC	

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1			
NAME OF THE UNIT/MODULE	**Mendelian genetics and its extension**			

TOTAL HOURS	16	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/ TOPIC	HR	TEACHER	MONTH
1	Mendelism: Principles of inheritance	1	SDG	JULY
2	Chromosome theory of inheritance	1	SDG	AUG
3	Autosomes and sex chromosomes	1	SDG	AUG
4	Probability analysis	1	SDG	AUG
5	Problems of probability analysis	1	SDG	AUG
6	Pedigree analysis	1	SDG	AUG
7	Problems of pedigree analysis	1	SDG	AUG
8	Incomplete dominance and codominance	1	SDG	AUG
9	Multiple alleles and lethal alleles	1	SDG	AUG
10	Epistasis,	1	SDG	AUG
11	Pleiotropy	1	SDG	AUG
12	Recessive and dominant traits	1	SDG	SEPT
13	Penetrance and expressivity, numericals	1	SDG	SEPT
14	Polygenic inheritance	1	SDG	SEPT
15	Doubt clearing class	1	SDG	SEPT
16	Class test	1	SDG	SEPT
	TOTAL HOURS	16 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2					
NAME OF THE UNIT/MODULE			**Extra-chromosomal Inheritance**					
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/ TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Chloroplast mutation: Variegation in Four o'clock plant	1	AB	JUL
2	mitochondrial mutations in yeast	1	AB	JUL
3	maternal effects-shell coiling in snail	1	AB	AUG
4	Infective heredity- kappa particles in *Paramecium*	1	AB	AUG
5	Doubt clearing class	1	AB	AUG
6	Class test	1	AB	AUG
TOTAL HOURS		6 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3					
NAME OF THE UNIT/MODULE			**Linkage, crossing over and chromosome mapping**					
TOTAL HOURS	12	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/ TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Linkage and crossing over	1	SDG	SEPT
2	cytological basis of crossing over	1	SDG	SEPT
3	recombination frequency	1	SDG	SEPT
4	Two factor and three factor crosses	1	SDG	SEPT
5	interference and coincidence	1	SDG	OCT
6	Numerical based on gene mapping	1	SDG	OCT
7	Problem solving two and three point crosses	1	SDG	OCT
8	Problem solving two and three point crosses	1	SDG	OCT
9	sex Linkage	1	SDG	OCT
10	Sex linked pedigree analysis	1	SDG	OCT
11	Doubt clearing class	1	SDG	OCT
12	Class test	1	SDG	OCT
TOTAL HOURS		12 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			**Variation in chromosome number and structure**				
TOTAL HOURS	8	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/ TOPIC	HR	TEACHER	MONTH
1	Deletion and duplication	1	AB	AUG
2	Inversion	1	AB	AUG
3	Translocation	1	AB	AUG
4	Position effect	1	AB	AUG
5	Euploidy	1	AB	AUG
6	Aneuploidy	1	AB	SEPT
7	Doubt clearing class	1	AB	SEPT
8	Class test	1	AB	SEPT
TOTAL HOURS		8 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5				
NAME OF THE UNIT/MODULE			**Gene mutations**				
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/ TOPIC	HR	TEACHER	MONTH
1	Types of mutations and molecular basis of mutations	1	AB	SEPT
2	mutagens – physical and chemical	1	AB	SEPT
3	detection of mutations	1	AB	SEPT
4	ClB method	1	AB	SEPT
5	Role of transposons in mutation	1	AB	SEPT
6	DNA repair mechanisms	1	AB	SEPT
TOTAL HOURS		6 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6					
NAME OF THE UNIT/MODULE			**Fine structure of gene**					
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/ TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Classical vs molecular concepts of gene	1	SDG	NOV
2	Cis-Trans complementation test for functional allelism	1	SDG	NOV
3	structure of phage T4	1	SDG	NOV
4	Structure of rII locus	1	SDG	NOV
5	Doubt clearing class	1	SDG	DEC
6	Class test	1	SDG	DEC
TOTAL HOURS		6 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7					
NAME OF THE UNIT/MODULE			**Population and Evolutionary Genetics**					
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/ TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Allele frequencies	1	SDG	DEC
2	genotype frequencies	1	SDG	DEC
3	Hardy-Weinberg Law, role of natural selection, mutation	1	SDG	DEC
4	Role of natural selection, mutationgenetic drift	1	SDG	DEC

5	Genetic variation and speciation	1	SDG	DEC
6	Doubt clearing class	1	SDG	DEC
TOTAL HOURS		6 hrs		

SEM III: SKILL ENHANCEMENT COURSE

Plant Diversity and Human Welfare

Course code: BOTSSEC01M (Credits 2)

COURSE OUTCOME: The course deals with plant diversity and human welfare. Now a day's loss of biodiversity is a major problem which is threatening the earth. Through this course student will come to know the causes of diversity loss and also about the organization who have been continuously working for biodiversity management and sustainable development. We are hopeful enough that the course will be helpful in growing student's awareness about conservation of nature and natural recourses.

THEORY

(BOTSSEC01M)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRAROBTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020TO DECEMBER 2020						**HONS** √		**GENERAL** √	

SEM	3	**SEC**	1	**CREDIT POINT**	2	**Course Code**	**BOTSSEC01M**

Name of the Course	**Plant Diversity and Human Welfare**						
Course Co-ordinator	DR. AYANA CHAKRAROBTY						
TOTAL MARKS	25	TH	√	TUT		PRAC	
TOTAL HOURS	30	TH	√	TUT		PRAC	

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1			
NAME OF THE UNIT/MODULE	Plant diversity and its scope			

TOTAL HOURS	8(Reduced to 4)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Genetic diversity, Species diversity and Plant diversity at the ecosystem level	1	ABJ	JUL
2	Agrobiodiversity; Cultivated plant taxa, wild taxa	1	ABJ	AUG
3	Values and uses of Biodiversity: Ethical and aesthetic values	1	ABJ	AUG
4	Precautionary principle, Methodologies for valuation, Uses of plants and Uses of microbes	1	ABJ	AUG
5**				
6**				
7**				
8**				
	TOTAL HOURS	4 hrs		

***** Alloted total 8 hours adjusted to 4 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			**Loss of Biodiversity**				
TOTAL HOURS	8(Reduced to 5)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**TOPIC**	**HR**	**DAY**	**MONTH**
1	Loss of genetic diversity, Loss of species diversity AND Loss of ecosystem diversity	1	ABJ	SEPT
2	Loss of agrobiodiversity, Projected scenario of Bio-diversity loss	1	ABJ	SEPT
3	**Management of Plant Biodiversity:** Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO	1	ABJ	SEPT
4	**Management of Plant Biodiversity:** Organizations associated with biodiversity management-Methodology for execution-WWF, NBPGR	1	ABJ	SEPT
5	Biodiversity legislation and conservations, Biodiversity information management and communication	1	ABJ	SEPT
6**				
7**				
8**				
	TOTAL HOURS	5 hrs		

***** Alloted total 8 hours adjusted to 5 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3				
NAME OF THE UNIT/MODULE			**Conservation of Biodiversity:**				
TOTAL HOURS	8(Reduced to 3)	**THEORY**	√	**TUTORIAL**		**PRAC**	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							

SL	TOPIC	HR	DAY	MONTH
1	Conservation of genetic diversity, species diversity and ecosystem diversity	1	ABJ	OCT
2	*In situ* conservation and *ex situ* conservation	1	ABJ	OCT
3	Social approaches to conservation, Biodiversity awareness programmes and Sustainable development.	1	ABJ	OCT
4**				
5**				
6**				
7**				
8**				
	TOTAL HOURS	3 hrs		

***** Alloted total 8 hours adjusted to 3 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			**Role of plants in relation to Human Welfare**				
TOTAL HOURS	6(Reduced to 3)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	DAY	MONTH
1	Importance of forestry, Utilization and commercial aspects: Avenue trees and Ornamental plants of India	1	ABJ	DEC
2	Alcoholic beverages through ages, Fruits and nuts: Important fruit crops their commercial importance	1	ABJ	DEC
3**	Wood and its uses	1	ABJ	DEC
4**				
5**				
6**				
	TOTAL HOURS	3 hrs		

***** Alloted total 6 hours adjusted to 3 hours.**

******Due to pandemic situation, Total allotted 30 hours for this course has been adjusted to 15 hours keeping the total content unchanged.**

5th SEMESTER HONOURS (CORE COURSE & DSE)

SESSION: July 2020 to December 2020

COURSE CODE: BOTACOR11T, BOTACOR12T, BOTADSE01T, BOTADSE03T

SEM V: CORE COURSE XI

REPRODUCTIVE BIOLOGY OF ANGIOSPERMS

CODE: BOTACOR11T (4 Credits)

COURSE OUTCOME: **Angiosperms reproduce** sexually by means of flowers. After fertilization, ovaries within flowers develop into fruits that surround, protect, and help disperse the seeds. **Angiosperms** are also known as flower plants because that is their reproductive organ which mature to seed-containing fruit. The fruit covering on the seed gives **angiosperms** an **advantage** over gymnosperms because they have better protection. The fruit of **angiosperms** are adapted to facilitate seed dispersal.

On completion of this course, the students will be able to:

1. Recall the history of reproductive biology of angiosperms & recognize the importance

of genetic and molecular aspects of flower development

2. Understand structure and functions of anther wall and pollen wall

3. Evaluate the special structures of Ovule

4. Solve Self-incompatibility in Pollination and fertilization & relate between Embryo,

Endosperm and Seed

5. Comprehend the causes of Polyembryony and apomixes with its classification

THEORY

(BOTACOR11T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRAROBTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020 TO DECEMBER 2020						**HONS** √		**GENERAL**	

SEM	5	**Core Course**	11	**CREDIT POINT**	4	**Course Code**	BOTACOR11T

Name of the Course	Reproductive Biology of Angiosperms
Course Co-ordinator	DR. AYANA CHAKRAROBTY

TOTAL MARKS	50	TH	√	TUT		PRAC	
TOTAL HOURS	60	TH	√	TUT		PRAC	

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1			
NAME OF THE UNIT/MODULE	**Introduction**			

TOTAL HOURS	4(Reduced to 2)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction, History Reproductive Biology of Angiosperms	1	AC	JUL
2	Scope and Molecular aspects of Reproductive Biology of Angiosperms	1	AC	AUG
3**				
4**				

TOTAL HOURS	2 Hours

**** Alloted total 4 hours adjusted to 2 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			**Reproductive development**				
TOTAL HOURS	6(Reduced to 3)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Induction of flowering, Flower as a modified determinate shoot	1	ABJ	JUL
2	Flower development, morphological aspects of Flower development	1	ABJ	JUL
3	Genetic aspects and Molecular aspects of Flower development	1	ABJ	JUL
4**				
5**				
6**				
	TOTAL HOURS	3 Hours		

**** Alloted total 4 hours adjusted to 2 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	3			
NAME OF THE UNIT/MODULE	**Anther and pollen biology**			

TOTAL HOURS	10(Reduced to 6)	THEORY	√	TUTORIAL		PRAC	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Anther wall: Structure and functions and Microsporogenesis	1	AC	AUG
2	Callose deposition and its significance, Microgametogenesis	1	AC	AUG
3	Pollen wall structure	1	AC	AUG
4	MGU (male germ unit) structure, NPC system	1	AC	AUG
5	Palynology and scope	1	AC	AUG
6	Pollen wall proteins, pollen viability	1	AC	AUG
7**				
8**				
9**				
10**				
	TOTAL HOURS	6 Hours		

**** Alloted total 10 hours adjusted to 6 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			**Ovule**				
TOTAL HOURS	10(Reduced to 7)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction to ovule and it's structure	1	AC	AUG
2	Types of ovule, structure of female gametophyte	1	AC	AUG
3	Megasporogenesis (Details of Monosporic and Bisporic type)	1	AC	SEPT
4	Megasporogenesis (Tetrasporic type)	1	AC	SEPT
5	Megagametogenesis (details of *Polygonum* type)	1	AC	SEPT
6	Organization of mature embryo sac	1	AC	SEPT
7	Doubt clearing class	1	AC	OCT
8**				
9**				
10**				
	TOTAL HOURS	7 Hours		

**** Alloted total 10 hours adjusted to 7 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5				
NAME OF THE UNIT/MODULE			**Pollination and fertilization**				
TOTAL HOURS	6(Reduced to 5)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Pollination: types(in brief) and significance	1	ABJ	AUG
2	Pollination: characteristics of each type (Anemophily, Hydrophily, Zoophily, Malacophily,Ornithophily)with examples.	1	ABJ	AUG
3	Adaptations of pollination mechanism	1	ABJ	AUG
4	Structure of style and stigma	1	ABJ	AUG
5	Path of pollen tube in pistil, Double fertilization	1	ABJ	AUG
6**				
	TOTAL HOURS	5		

**** Alloted total 6 hours adjusted to 5 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6				
NAME OF THE UNIT/MODULE			**Self incompatibility**				
TOTAL HOURS	10	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Basic concepts of Sel- incompatibility	1	ABJ	AUG
2	Interspecific, Intraspecific, Homomorphic, Heteromorphic self-incompatibility	1	ABJ	SEPT
3	GSI and SSI	1	ABJ	SEPT
4	Methods to overcome self-incompatibility	1	ABJ	SEPT
5	Mixed pollination	1	ABJ	SEPT
6	Bud pollination	1	ABJ	SEPT
7	Stub pollination	1	ABJ	SEPT
8	Intra-ovarian and *in vitro* pollination	1	ABJ	OCT
9	Parasexual hybridization	1	ABJ	OCT

10	Cybrids and *in vitro* fertilization.	1	ABJ	OCT
	TOTAL HOURS	10		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7					
NAME OF THE UNIT/MODULE			**Embryo, Endosperm and Seed**					
TOTAL HOURS	10	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Structure and types of Embryo and Endosperm	1	AC	OCT
2	Structure and types of seed	1	AC	OCT
3	General pattern of development of Dicot embryo and endosperm	1	AC	NOV
4	General pattern of development of monocot embryo and endosperm	1	AC	NOV
5	Suspensor - structure and functions	1	AC	NOV
6	Embryo-endosperm relationship, Nutrition of embryo	1	AC	NOV
7	Unusual features; embryo development in *Capsella bursa-pastoris*seed structure	1	AC	DEC
8	Importance of Embryo and Endosperm	1	AC	DEC
9	Seed dispersal mechanisms.	1	AC	DEC
10	Class test	1	AC	DEC
	TOTAL HOURS	10 Hours		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			8					
NAME OF THE UNIT/MODULE			**Polyembryony and apomixis**					
TOTAL HOURS	6(Reduced to 4)	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	TOPIC	HR	TEACHER	MONTH
1	Introduction to Polyembryony and apomixis	1	AC	DEC
2	Classification and causes of Polyembryony	1	AC	DEC
3	Classification and causes of apomixis	1	AC	DEC
4	Applications of Polyembryony and apomixis	1	AC	DEC
5**				
6**				

TOTAL HOURS	4 Hours

**** Alloted total 6 hours adjusted to 4 hours.**

****Due to the Pandemic situation, the allotted total 60 hours for this course has been adjusted to 45 hours, keeping the course content unchanged.**

SEM V:CORE COURSE XII

PLANT PHYSIOLOGY

CODE: BOTACOR12T (4 Credits)

COURSE OUTCOME: At the end of this course students will be able to:

- Discuss plant water relations, i.e. how plants acquire, utilize and regulate the flow of water between plant and environment;
- Outline the mineral nutrients plants require, and how they are obtained, metabolized, transported and their role in plants;
- Explain how plant growth regulators regulate the growth and development in plants;
- Describe the physiology of flowering, light responses and seed dormancy in plants

THEORY

(BOTACOR12T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR BOTANY HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRABORTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020 TO DECEMBER 2020						**HONS** √		**GENERAL**	

SEM	5	**Core Course**	12	**CREDIT POINT**	4	**Course Code**	BOTACOR12T

Name of the Course	PLANT PHYSIOLOGY (CC12)						
Course Co-ordinator	DR. ARUNEEMA BARDHAN						
TOTAL MARKS	50	TH	√	TUT		PRAC	
TOTAL HOURS	60	TH	√	TUT		PRAC	

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1			
NAME OF THE UNIT/MODULE	Plant-water relations			

TOTAL HOURS	10(Reduced to 8)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/TOPIC	HR	TEACHER	MONTH
1	Water potential and its components	1	AB	JULY
2	Water absorption by roots	1	AB	JULY
3	Aquaporins	1	AB	AUG
4	Pathway of water movement, symplast, apoplast	1	AB	AUG
5	Transmembrane pathways	1	AB	AUG
6	Root pressure, guttation	1	AB	AUG
7	Ascent of sap-cohesion -tension theory	1	AB	AUG
8	Transpiration and factors affecting transpiration, antitranspirants	1	AB	AUG
9**				
10**				
	TOTAL	8 Hours		

*** Alloted total 10 hours adjusted to 8 hours

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			Mineral Nutrition				
TOTAL HOURS	8(Reduced to 5)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Essential and beneficial elements, macro- and micronutrients	1	AB	AUG
2	Methods of study and use of nutrient solutions	1	AB	SEPT
3	Criteria for essentiality, Mineral deficiency symptoms	1	AB	SEPT
4	Roles of essential elements	1	AB	SEPT
5	Chelating agents	1	AB	SEPT
6**				
7**				
8**				
		5 Hours		

*** Alloted total 8 hours adjusted to 5 hourS.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3				
NAME OF THE UNIT/MODULE			Nutrient Uptake				
TOTAL HOURS	8(Reduced to 6)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Soil as a nutrient reservoir, transport of ions across cell membrane, Passive absorption	1	AB	SEPT
2	Electrochemical gradient	1	AB	SEPT
3	Facilitated diffusion, active absorption	1	AB	SEPT
4	Role of ATP, carrier systems, Proton ATPase pump and ion influx	1	AB	SEPT
5	Uniport, co-transport, symport, antiport	1	AB	SEPT
6	Unit class test	1	AB	SEPT
7**				
8**				
		6 Hours		

*** Alloted total 8 hours adjusted to 6 hours

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4					
NAME OF THE UNIT/MODULE			Translocation in the phloem					
TOTAL HOURS	8(Reduced to 4)	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Experimental evidence in support of phloem as the site of sugar translocation	1	SDG	AUG
2	Pressure flow model	1	SDG	AUG
3	Phloem loading and unloading, Source -sink relationship	1	SDG	SEPT
4	Questions & answers discussion	1	SDG	SEPT
5**				
6**				
7**				
8**				
		4 Hours		

*** Alloted total 8 hours adjusted to 4 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5					
NAME OF THE UNIT/MODULE			Plant Growth Regulators					
TOTAL HOURS	14(Reduced to 12)	**THEORY**	√	**TUTORIAL**		**PRAC**		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Discovery, chemical nature (basic structure) of auxin	1	SDG	SEPT
2	Bioassays of auxin, Molecular aspects of the physiological roles of auxin,	1	SDG	SEPT
3	Discovery, chemical nature (basic structure) of gibberellins	1	SDG	SEPT
4	Bioassays of gibberellins, Molecular aspects of the physiological roles of gibberellins	1	SDG	SEPT
5	Discovery, chemical nature (basic structure) of cytokinins	1	SDG	OCT
6	Bioassays of cytokinins, Molecular aspects of the physiological roles of cytokinins	1	SDG	OCT
7	Discovery, chemical nature (basic structure) of abscissic acid	1	SDG	OCT
8	Bioassays of abscissic acid, Molecular aspects of the physiological roles of abscissic acid	1	SDG	OCT
9	Discovery, chemical nature (basic structure) of ethylene	1	SDG	OCT

10	Bioassays of ethylene, Molecular aspects of the physiological roles of ethylene	1	SDG	NOV
11	Brief account of Brassinosteroids and Jasmonic acid	1	SDG	NOV
12	Unit class test	1	SDG	DEC
13**	.			
14**				
		12 Hours		

*** Alloted total 14 hours adjusted to 12 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6					
NAME OF THE UNIT/MODULE			Physiology of flowering					
TOTAL HOURS	6(Reduced to 5)	THEORY	√	TUTORIAL		PRAC		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Photoperiodism	1	SDG	DEC
2	Flowering stimulus	1	SDG	DEC
3	Florigen concept, Vernalization	1	SDG	DEC
4	Seed dormancy and germination	1	SDG	DEC
5	Question Answer discussion	1	SDG	DEC
6**				
		5 Hours		

*** Alloted total 6 hours adjusted to 5 hours

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7					
NAME OF THE UNIT/MODULE			Phytochrome, cytochromes and phototropins					
TOTAL HOURS	6	THEORY	√	TUTORIAL		PRAC		

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Discovery, chemical nature of phytochrome, cytochrome and phototropins	1	AB	DEC
2	Role of phytochrome, cytochrome	1	AB	DEC
3	Role of phototropins in photomorphogenesis	1	AB	DEC
4	low energy responses (LER) and high irradiance responses (HIR)	1	AB	DEC

5	Mode of action of phytochrome, cytochrome and phototropins	1	AB	DEC
6	Unit class test	1	AB	DEC
		6 Hours		

***Due to the Pandemic situation, the allotted total 60 hours for this course has been adjusted to 46 hours, keeping the course content unchanged.

SEM V: DISCIPLINE SPECIFIC ELECTIVE COURSE

(NATURAL RESOURCE MANAGEMENT)

CODE: BOTADSE01T (4 Credits)

COURSE OUTCOME: At the end of this course students will be able to:

- Demonstrate an advanced understanding of the application of fundamental principles of ecological studies to the conservation of biodiversity;
- Discuss and cite theories and case studies as prerequisites for success in sustainable utilization and effective species conservation;
- Translate theoretical aspects of contemporary practices to recommendations for environmental management;
- Communicate effectively in the form of written reports and spoken presentations.

THEORY

(BOTADSE01T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR BOTANY HONS)										
NAME OF THE DEPARTMENT					BOTANY					
HOD	DR. AYANA CHAKRABORTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY 2020TO DECEMBER 2020					**HONS** √		**GENERAL**		

SEM	5	**DSE**	01	**CREDIT POINT**	4	**Course Code**	BOTADSE01T

Name of the Course	NATURAL RESOURCE MANAGEMENT						
Course Co-ordinator	DR. ARUNEEMA BARDHAN						
TOTAL MARKS	50	TH	√	TUT		PRAC	
TOTAL HOURS	60	TH	√	TUT		PRAC	

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1			
NAME OF THE UNIT/MODULE	Natural Resources			

TOTAL HOURS	2	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Definition and types of Natural Resources	1	SDG	JUL
2	Q & A discussion class	1	SDG	JUL
		2 Hours		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			Sustainable Utilization				
TOTAL HOURS	8(Reduced to 6)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Concept of sustainable utilization	1	ABJ	AUG
2	Economic approaches of sustainable utilization	1	ABJ	AUG
3	Ecological approaches of sustainable utilization	1	ABJ	AUG
4	Social approaches of sustainable utilization	1	ABJ	AUG
5	Cultural approaches of sustainable utilization	1	ABJ	AUG
6	Doubt clearing class	1	ABJ	AUG
7				
8				
		6 Hours		

*** Alloted total 8 hours adjusted to 6 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3				
NAME OF THE UNIT/MODULE			Land				
TOTAL HOURS	8(Reduced to 6)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Utilization of agricultural land	1	SDG	AUG
2	Utilization of pastoral land	1	SDG	AUG
3	Utilization of horticultural land	1	SDG	AUG
4	Utilization of silvicultural land	1	SDG	AUG
5	Soil degradation and Soil Management	1	SDG	AUG
6	Q & A discussion class	1	SDG	AUG
7				
8				
		6 Hours		

*** Alloted total 8 hours adjusted to 6 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			Water				
TOTAL HOURS	8(Reduced to 6)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Freshwater-rivers, lakes, ground water	1	AB	OCT
2	Fresh water-aquifers, watershed	1	AB	OCT
3	Marine water, Estuarine water	1	AB	OCT
4	Wetlands	1	AB	OCT
5	Threats and management strategies of water	1	AB	NOV
6	Questions & answers discussion/ Unit class test	1	AB	NOV
7				
8				
		6 Hours		

*** Alloted total 8 hours adjusted to 6 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5				
NAME OF THE UNIT/MODULE			Biological Resources				
TOTAL HOURS	12(Reduced to 9)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Biodiversity-definition and types	1	ABJ	SEPT
2	Significance of biodiversity	1	ABJ	SEPT
3	Threats and management strategies of biological resources	1	ABJ	SEPT
4	Bioprospecting	1	ABJ	SEPT
5	IPR; CBD	1	ABJ	SEPT
6	Nation Biodiversity Action Plan	1	ABJ	SEPT
7	Nation Biodiversity Action Plan-Contd.	1	ABJ	OCT
8	Doubt clearing class	1	ABJ	OCT
9	Unit class test	1	ABJ	OCT
10				

11				
12				
	Total Hours	9 Hours		

*** Alloted total 12 hours adjusted to 9 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6				
NAME OF THE UNIT/MODULE			Forests				
TOTAL HOURS	6	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/TOPIC	HR	TEACHER	MONTH
1	Definition of Forest and Cover	1	AC	OCT
2	Significance of forests with special reference to India	1	AC	OCT
3	Major and minor forest products	1	AC	OCT
4	Depletion of forests	1	AC	OCT
5	Management of forests	1	AC	OCT
6	Unit class test	1	AC	OCT
	Total Hours	6 Hours		

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UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7				
NAME OF THE UNIT/MODULE			Energy				
TOTAL HOURS	6(Reduced to 3)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/TOPIC	HR	TEACHER	MONTH
1	Renewable sources of energy	1	ABJ	OCT
2	Non-renewable sources of energy	1	ABJ	NOV
3	Doubt clearing class/ QA discussion	1	ABJ	NOV
4				
5				
6				
	Total Hours	3 Hours		

***** Alloted total 6 hours adjusted to 3 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			8				
NAME OF THE UNIT/MODULE			Contemporary practices in resource management				
TOTAL HOURS	8(Reduced to 5)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	EIA, GIS	1	ABJ	DEC
2	Participatory Resource Appraisal	1	ABJ	DEC
3	Ecological footprint with emphasis on carbon footprint; Resource accounting	1	ABJ	DEC
4	Waste management	1	ABJ	DEC
5	Doubt clearing class/ Q & A discussion	1	ABJ	DEC
6				
7				
8				
	Total Hours	5 Hours		

***** Alloted total 8 hours adjusted to 5 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			9				
NAME OF THE UNIT/MODULE			National and international efforts in resource management and conservation				
TOTAL HOURS	4(Reduced to 2)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/TOPIC**	**HR**	**TEACHER**	**MONTH**
1	IUCN, UNESCO, UNEP, IBIN	1	ABJ	DEC
2	WBBDB, BSI, ZSI	1	ABJ	DEC
3**				

4**				
	Total hours	2 Hours		

***** Alloted total 4 hours adjusted to 2 hours.**

*****Due to the Pandemic situation, the allotted total 60 hours for this course has been adjusted to 45 hours, keeping the course content unchanged.**

SEM V: DISCIPLINE SPECIFIC ELECTIVE COURSE

(Industrial and Environmental Microbiology)

CODE: BOTADSE03T (4 Credits)

COURSE OUTCOME: Industrial Microbiology is a branch of applied microbiology in which microorganisms are used for the production of important substances, such as antibiotics, food products, enzymes, amino acids, vaccines, and fine chemicals. With respect to the scope, objectives, and activities, students have the opportunity to learn and practice applications of microbiology by learning this subject. Studying and practicing this course also promotes the cognizance over socioeconomic exercises.

At the end of the course the students will be able to:

1. Understand the concept and role of microbes in industry and environment.

2. Analyze the types of bioreactors and the fermentation process.

3. Evaluate the role of microorganisms in industry and microbes in agriculture.

4. Develop skills on the remediation process of contaminated soils.

THEORY

(BOTADSE03T)

NAME OF THE DEPARTMENT				BOTANY						
HOD	DR. AYANA CHAKRAROBTY									
INITIALS OF FACULTIES	DAY	AC	AB	SDG	SS	ABJ				
	MORN									
PERIOD OF SEMESTER	FROM JULY2020 TO DECEMBER 2020						**HONS** √		**GENERAL**	
SEM	5	**DSE**	03	**CREDIT POINT**	4		**Course Code**	**BOTADSE03T**		
Name of the Course	**Industrial and Environmental Microbiology**									
Course Co-ordinator	DR. AYANA CHAKRAROBTY									
TOTAL MARKS	50	TH	√	TUT		PRAC				
TOTAL HOURS	60	TH	√	TUT		PRAC				

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC	1						
NAME OF THE UNIT/MODULE	**Scope of microbes in industry and environment**						
TOTAL HOURS	6(Reduced to 3)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/ TOPIC	HR	TEACHER	MONTH
1	Introduction to Industrial and Environmental microbiology	1	SS	JULY
2	Scope of microbiology in industry	1	SS	AUG
3	Scope of microbiology in environment	1	SS	AUG
4**				
5**				
6**				
	TOTAL HOURS	3		

**** Alloted total 6 hours adjusted to 3 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2				
NAME OF THE UNIT/MODULE			**Bioreactors/Fermenters and fermentation processes**				
TOTAL HOURS	12(Reduced to 6)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/ TOPIC	HR	TEACHER	MONTH
1	Fermentation: Solid-state and liquid-state (stationary and submerged) fermentations	1	AC	SEPT
2	Batch and continuous fermentations	1	AC	SEPT
3	Components of a typical bioreactor	1	AC	SEPT
4	Types of bioreactors-laboratory, pilot scale and production fermenters	1	AC	SEPT
5	Types of bioreactors-Constantly stirred tank fermenter, tower fermenter	1	AC	SEPT
6	Types of bioreactors-fixed bed and fluidized bed bioreactors and air-lift fermenter	1	AC	SEPT
7**				
8**				
9**				
10**				
11**				
12**				
TOTAL HOURS		6		

A visit to any educational institute/ industry to see an industrial fermenter, and other downstream processing operations (likely to be negotiated after the Pandemic situation is over).

**** Allotted total 12 hours adjusted to 6 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3				
NAME OF THE UNIT/MODULE			**Microbial production of industrial products**				
TOTAL HOURS	12(Reduced to 10)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)

SL	LECTURE HEAD/ TOPIC	HR	TEACHER	MONTH
1	Microorganisms involved in industrial production process and media used.	1	SS	NOV
2	fermentation conditions, downstream processing and uses	1	SS	DEC
3	Filtration, centrifugation	1	SS	DEC
4	Solvent extraction,, cell disruption	1	SS	DEC
5	Precipitation and ultrafiltration	1	SS	DEC
6	Lyophilization, spray drying	1	SS	DEC
7	Hands on microbial fermentations for the production and estimation (qualitative and quantitative) of Enzyme: amylase or lipase activity	1		DEC
8	Hands on microbial fermentations for the production and estimation (qualitative and quantitative) of Organic acid: citric acid or glutamic acid	1	SS	DEC
9	Hands on microbial fermentations for the production and estimation (qualitative and quantitative) of alcohol (Ethanol)	1	SS	DEC
10	Hands on microbial fermentations for the production and estimation (qualitative and quantitative) of antibiotic Penicillin	1	SS	DEC
11**				
12**				
TOTAL HOURS		10 hrs		

**** Allotted total 2 hours adjusted to 10 hours**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			**Microbial enzymes of industrial interest and enzyme immobilization**				
TOTAL HOURS	8	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/ TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Microorganisms for industrial applications	1	SS	AUG
2	Hands on screening microorganisms for casein hydrolysis;	1	SS	AUG
3	Hands on screening microorganisms starch hydrolysis	1	SS	AUG
4	Hands on screening microorganisms cellulose hydrolysis	1	SS	AUG
5	Methods of immobilization, advantages and applications of immobilization,	1	SS	AUG
6	large scale applications of immobilized enzymes (glucose isomerase**).**	1	SS	AUG
7	large scale applications of immobilized enzymes (penicillin acylase**).**	1	SS	AUG
8	Doubt clearing class	1	SS	AUG
TOTAL HOURS		8		

***** Due to Pandemic situation Screening methodology to be practiced using online platform/ and video mode.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5				
NAME OF THE UNIT/MODULE			**Microbes and quality of environment**				
TOTAL HOURS	6(Reduced to 4)	**THEORY**	√	**TUTORIAL**		**PRAC**	

DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)				
SL	**LECTURE HEAD/ TOPIC**	**HR**	**TEACHER**	**MONTH**
1	Distribution of microbes in air	1	SS	AUG
2	Isolation of microorganisms from soil	1	SS	AUG

3	Isolation of microorganisms from air	1	SS	SEPT
4	Isolation of microorganisms from water	1	SS	SEPT
5**				
6**				
	TOTAL HOURS	4		

**** Alloted total 6 hours adjusted to 4 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6					
NAME OF THE UNIT/MODULE			**Microbial flora of water**					
TOTAL HOURS	8(Reduced to 7)	**THEORY**	√	**TUTORIAL**		**PRAC**		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)								
SL	**LECTURE HEAD/ TOPIC**					**HR**	**TEACHER**	**MONTH**
1	Water pollution					1	SS	SEPT
2	Role of microbes in sewage water treatment systems					1	SS	SEPT
3	Role of microbes in domestic waste water treatment systems					1	SS	SEPT
4	Determination of BOD, COD of water samples					1	SS	SEPT
5	Determination of TDS and TOC of water samples					1	SS	SEPT
6	Microorganisms as indicators of water quality,					1	SS	SEPT
7	Check coliform and faecal coliform in water samples					1	SS	SEPT
8**								
					TOTAL HOURS	7		

**** Alloted total 8 hours adjusted to 7 hours.**

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7					
NAME OF THE UNIT/MODULE			**Microbes in agriculture and remediation of contaminated soils.**					
TOTAL HOURS	8	**THEORY**	√	**TUTORIAL**		**PRAC**		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)								
SL	**LECTURE HEAD/ TOPIC**					**HR**	**TEACHER**	**MONTH**
1	Brief idea about microbes in agriculture and remediation process					1	SS	SEPT
2	Biological fixation					1	SS	SEPT
3	Mycorrhizae					1	SS	OCT

4	Bioremediation of contaminated soils	1	SS	OCT
5	Isolation of root nodulating bacteria	1	SS	OCT
6	Arbuscular mycorrhizal colonization in plant roots	1	SS	OCT
7	Doubt clearing class	1	SS	OCT
8	Class test	1	SS	NOV
	TOTAL HOURS	8		

*****Due to the Pandemic situation, the allotted total 60 hours for this course has been adjusted to 46 hours, keeping the course content unchanged.**

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