

SEM: 5 (DSE-1A)

Discipline Centric Elective Course Cell and Molecular Biology

LEARNING OUTCOMES:

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

- Know the details of Microscopy- Principles of light microscopy, electron microscopy (TEM and SEM).
- Identify the concept that explains chemical composition and structure of cell wall and membrane.
- Classify the enzymes and explain mechanism of action and structure.
- Compare the structure and function of cells & explain the development of cells.
- Differentiate the main types of prokaryotes through their grouping abilities and their characteristic.
- Analyse the structures and chemical properties of DNA and RNA through various historic experiments.
- Evaluate the experiments establishing central dogma and genetic code.
- Gain an understanding of various steps in transcription, protein synthesis and protein modification.

LESSON PLAN FOR SEMESTER: 5

Session: July to December 2022

THEORY

**Cell and Molecular Biology
BOTGDSE01T**

***** Total allotted 60 hours for this course has been adjusted to 58 hours keeping the total content unchanged.**

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR GENERAL)												
NAME OF THE DEPARTMENT						BOTANY						
HOD		DR. ARUNEEMA BARDHAN										
INITIALS OF FACULTIES			AC	AB	ABJ	SDG	SS					
PERIOD OF SEMESTER			FROM JULY 2022 TO DECEMBER 2022				HONS		GENERAL √			
SEM	5	DSE		1A			CREDIT POINT	4	Course Code	BOTGDSE01T		
Name of the Course			Cell and Molecular Biology									
Course Co-ordinator			DR. ARUNEEMA BARDHAN									
TOTAL MARKS		50	TH	√		TUT			PRAC			
TOTAL HOURS		60 hrs 58 hrs	TH	√		TUT			PRAC			
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			1									
NAME OF THE UNIT/MODULE			Techniques in Biology									
TOTAL HOURS		8 hrs 7 hrs	THEORY	√		TUTORIAL			PRAC			
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)												
SL	TOPIC					HR	TEACHER	MONTH				
1	Study of Principles of microscopy					1	AB	AUG				
2	Study of Light Microscopy Study of Phase contrast microscopy					1	AB	AUG				
3	Study of Fluorescence microscopy					1	AB	AUG				
4	Study of Confocal microscopy					1	AB	AUG				
5	Study of Sample Preparation for light microscopy					1	AB	AUG				
6	Study of Electron microscopy (EM)- Scanning EM and Scanning Transmission EM (STEM)					1	AB	SEPT				
7	Study of Sample Preparation for electron microscopy and X-ray diffraction analysis					1	AB	SEPT				
8												
TOTAL HOURS						8 HRS						

** Alloted 8 hours adjusted to 7 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			2								
NAME OF THE UNIT/MODULE			Cell as a unit of Life								
TOTAL HOURS		2 hrs	THEORY	√		TUTORIAL			PRAC		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)											
SL	TOPIC					HR	TEACHER	MONTH			
1	The Cell Theory (Prokaryotic and eukaryotic cells)					1	AB	SEPT			
2	Cell size and shape and Eukaryotic Cell components					1	AB	SEPT			
TOTAL HOURS						2 HRS					

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			3				
NAME OF THE UNIT/MODULE			Cell Organelles				
TOTAL HOURS	20 HRS	THEORY	√	TUTORIAL		PRAC	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							
SL	TOPIC			HR	TEACHER	MONTH	
1	Study of Mitochondrial structure,			1	AB	SEPT	
2	Study of Mitochondrial marker enzymes and compositions			1	AB	SEPT	
3	Mitochondria: Semiautonomous nature and Symbiotic hypothesis			1	AB	SEPT	
4	Proteins synthesized within mitochondria and mitochondrial DNA			1	AB	OCT	
5	Study of Chloroplast Structure,			1	AB	NOV	
6	Study of Chloroplast marker enzymes and composition			1	AB	NOV	
7	Chloroplast: semiautonomous nature and chloroplast DNA			1	AB	NOV	
8	ER, Golgi body & Lysosomes: Structure and roles			1	AB	NOV	
9	Peroxisomes: Structures, composition, functions in animals and plants and biogenesis			1	AB	NOV	
10	Glyoxisomes: Structures, composition, functions in animals and plants and biogenesis.			1	AB	NOV	
11	Study of Nucleus and its components			1	AB	NOV	
12	Study of Nuclear Envelope			1	AB	NOV	
13	Study of structure of nuclear pore complex			1	AB	DEC	
14	Study of Chromatin structure			1	AB	DEC	
15	Study of molecular organization of DNA packaging in eukaryotes			1	AB	DEC	
16	Study of euchromatin and heterochromatin			1	AB	DEC	
17	Study of nucleolus structure			1	AB	DEC	
18	Study of ribosome structure			1	AB	DEC	
19	Doubt clearing class			1	AB	DEC	
20	Class test			1	AB	DEC	
TOTAL HOURS				20 HRS			

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			4				
NAME OF THE UNIT/MODULE			Cell Membrane and Cell Wall				
TOTAL HOURS	6 hrs	THEORY	√	TUTORIAL		PRAC	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							
SL	TOPIC				HR	TEACHER	MONTH
1	The study of functions of membranes				1	SDG	AUG
2	Different models of membrane structure				1	SDG	AUG
3	The fluidity of membranes and membrane proteins and their functions				1	SDG	AUG
4	Carbohydrates in the membrane				1	SDG	AUG
5	Faces of the membranes and Selective permeability of the membranes				1	SDG	AUG
6	Study of Cell wall structure and composition				1	SDG	SEPT
TOTAL HOURS					6 HRS		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			5				
NAME OF THE UNIT/MODULE			Cell Cycle				
TOTAL HOURS	6 hrs 5 hrs	THEORY	√	TUTORIAL		PRAC	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							
SL	TOPIC				HR	TEACHER	MONTH
1	Study on overview of cell cycle				1	SDG	SEPT
2	Study on mitosis				1	SDG	SEPT
3	Study on meiosis				1	SDG	SEPT
4	Study of cell cycle control units				1	SDG	SEPT
5	Study of cell cycle checkpoints				1	SDG	SEPT
6							
TOTAL HOURS					5 HRS		

** Alloted 6 hours adjusted to 5 hours.

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			6				
NAME OF THE UNIT/MODULE			Genetic material				
TOTAL HOURS	6 hrs	THEORY	√	TUTORIAL		PRAC	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							
SL	TOPIC				HR	TEACHER	MONTH
1	Miescher to Watson and Crick- historic perspective				1	SDG	SEPT
2	Different experiment on DNA as genetic material(Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment)				1	SDG	OCT
3	Structure of DNA(Watson and Crick model), types of DNA, and types of genetic material.				1	SDG	NOV
4	DNA replication mechanism(bidirectional replication, semi-conservative, semi discontinuous RNA priming, θ (theta) mode of replication)				1	SDG	NOV
5	DNA replication mechanism(replication of linear, ds-DNA, replicating the 5' end of linear chromosome including replication enzymes)				1	SDG	NOV
6	Doubt clearing class				1	SDG	NOV
TOTAL HOURS					6 HRS		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			7				
NAME OF THE UNIT/MODULE			Transcription (Prokaryotes and Eukaryotes)				
TOTAL HOURS	6 hrs	THEORY	√	TUTORIAL		PRAC	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							
SL	TOPIC				HR	TEACHER	MONTH
1	Types and structures of RNA (mRNA, tRNA, rRNA)				1	SDG	NOV
2	Study on various types of RNA polymerase				1	SDG	NOV
3	Properties and experiments of genetic code				1	SDG	NOV
4	Prokaryotic Translation				1	SDG	NOV
5	Eukaryotic translation Comparison between eukaryotic and prokaryotic translation				1	SDG	DEC
6	Class Test				1	SDG	DEC
TOTAL HOURS					6 HRS		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC			8				
NAME OF THE UNIT/MODULE			Regulation of gene expression				
TOTAL HOURS	6 hrs	THEORY	√	TUTORIAL		PRAC	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)							
SL	TOPIC				HR	TEACHER	MONTH
1	Introduction to operon system				1	SDG	DEC
2	Concepts and regulation of Lactose operon				1	SDG	DEC
3	Concepts and regulation of Tryptophan operon				1	SDG	DEC
4	Concepts on Eukaryotic gene regulation system				1	SDG	DEC
5	Doubt clearing class				1	SDG	DEC
6	Doubt clearing class & QA discussion				1	SDG	DEC
TOTAL HOURS					6 HRS		

SEM: 5 (DSE-1)

**Discipline Centric Elective Course
Cell and Molecular Biology**

**PRACTICAL
BOTGDSE01P**

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR GENERAL)												
NAME OF THE DEPARTMENT						Botany						
HOD		DR. ARUNEEMA BARDHAN										
INITIALS OF FACULTIES			AC	MS	SDG	SS	ABJ					
PERIOD OF SEMESTER			FROM JULY 2022 TO DECEMBER 2022					HONS		GENERAL √		
SEM	5	DSE		1			CREDIT POINT	2	Course Code	BOTGDSE01P		
Name of the Course			Plant Anatomy and Embryology									
Course Co-ordinator			DR. ARUNEEMA BARDHAN									
TOTAL MARKS		25	TH				TUT				PRAC	√
TOTAL HOURS		60 hrs	TH				TUT				PRAC	√
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC						PRACTICAL						
NAME OF THE UNIT/MODULE												
TOTAL HOURS		60 hrs (adjusted to 58 hrs)		THEORY		TUTORIAL		PRAC		√		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)												
SL	LECTURE HEAD/TOPIC						HR	TEACHER	MONTH			
1	Study of prokaryotic cells (bacteria) with the help of light and electron micrographs /photographs.						2	SDG	AUG			
2	Study of viruses with the help of light and electron micrographs /photographs.						2	SDG	AUG			
3	Study of eukaryotic cells with the help of light and electron micrographs /photographs.						2	SDG	AUG			
4	Study of the photomicrographs of cell organelles: Study of Nucleus & Mitochondria						2	SDG	SEPT			
5	Study of the photomicrographs of cell organelles: Study of Chloroplast and ER						2	SDG	SEPT			
6	Study of the photomicrographs of cell organelles: Study of Ribosome and Lysosome						2	SDG	SEPT			
7	Study of the photomicrographs of cell organelles: Study of Golgi bodies and peroxysome						2	SDG	SEPT			
8	Study of the structure of plant cell (through temporary mounts/ Permanent slides / photographs)						2	SDG	OCT			
9	Study of mitosis (permanent slides).						2	SDG	NOV			
10	Study of mitosis (temporary mounts)						2	SDG	NOV			
11	Study of meiosis (permanent slides).						2	SDG	NOV			
12	Study of meiosis (temporary mounts).						2	SDG	NOV			
13	Doubt clearing class/ Practice class						2	SDG	DEC			
14	Doubt clearing class/ Practice class						2	SDG	DEC			

15	Doubt clearing class/ Practice class	2	SDG	DEC
16	Study of plasmolysis and deplasmolysis on <i>Rhoeo</i> leaf	2	AB	AUG
17	Study of plasmolysis and deplasmolysis on <i>Rhoeo</i> leaf.....repeat practical class	2	AB	AUG
18	Introduction to micrometry & standardization procedure	2	AB	AUG
19	Hand on practice on micrometry	2	AB	AUG
20	Hand on practice on micrometry	2	AB	SEPT
21	Measure the cell size (either length or breadth/diameter) by micrometry (through video/ ppt)	2	AB	SEPT
22	Study the structure of nuclear pore complex by photograph (from Gerald Karp)	2	AB	SEPT
23	Study of special chromosomes (polytene) either by slides or photographs.	2	AB	SEPT
24	Study of special chromosomes (lampbrush) either by slides or photographs.	2	AB	NOV
25	Study DNA packaging by micrographs.	2	AB	NOV
26	Preparation of the karyotype and ideogram from given photograph of somatic metaphase chromosome	2	AB	NOV
27	Preparation of the karyotype and ideogram from given photograph of somatic metaphase chromosome...repeat practical	2	AB	DEC
28	Doubt clearing class/ Practice class	2	AB	DEC
29	Doubt clearing class/ Practice class	2	AB	DEC
30	Doubt clearing class/ Practice class		-	-
	TOTAL	58 HRS		

**** Total 60 hours adjusted to 58 hours.**

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SEM V: 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 resources.

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

1. Know about Genetic diversity, Species diversity and Plant diversity at the ecosystem level.
2. Understand the values and uses of Biodiversity and methodologies for valuation.
3. Know about the Organizations associated with biodiversity management and Biodiversity legislation and conservations.
4. Know various utilization and commercial aspects of forestry.

LESSON PLAN FOR SEC

THEORY

(BOTSSEC01M)

Session: July to December, 2022

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)									
NAME OF THE DEPARTMENT					BOTANY				
HOD		DR. ARUNEEMA BARDAHN							
INITIALS OF FACULTIES		AC	AB	SDG	SS	ABJ			
PERIOD OF SEMESTER		FROM JULY 2022 TO DECEMBER 2022				HONS		GENERAL	
						√		√	
SEM	5	SEC		1	CREDIT POINT	2	Course Code	BOTSSEC01M	
Name of the Course		Plant Diversity and Human Welfare							
Course Co-ordinator		DR. ARUNEEMA BARDAHN							
TOTAL MARKS	25	TH	√	TUT		PRAC			
TOTAL HOURS	30 hrs (Adjusted to 29 hrs)								
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC				1					
NAME OF THE UNIT/MODULE				Plant diversity and its scope					
TOTAL HOURS	8 hrs 7 hrs	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 eco-system level					1	AB	AUG	
2	Agrobiodiversity					1	AB	AUG	
3	Cultivated plant taxa, wild taxa					1	AB	AUG	
4	Values and uses of Biodiversity: Ethical and aesthetic values					1	AB	SEPT	
5	Precautionary principle					1	AB	SEPT	
6	Methodologies for valuation					1	AB	SEPT	
7	Uses of plants and microbes					1	AB	OCT	
8**									
	TOTAL HOURS					7 hrs			

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

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC		2				
NAME OF THE UNIT/MODULE		Loss of Biodiversity				
TOTAL HOURS	8 hrs	THEORY	√	TUTORIAL		PRAC
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)						
SL	TOPIC			HR	TEACHER	MONTH
1	Loss of genetic diversity, Loss of species diversity			1	AB	NOV
2	Loss of ecosystem diversity Loss of agrobiodiversity			1	AB	NOV
3	Projected scenario of Bio-diversity loss			1	AB	NOV
4	Management of Plant Biodiversity: Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO			1	AB	NOV
5	Management of Plant Biodiversity: Organizations associated with biodiversity management-Methodology for execution- WWF, NBPGR			1	AB	DEC
6	Biodiversity legislation and conservations,			1	AB	DEC
7	Biodiversity information management and communication			1	AB	DEC
8**	Class Test			1	AB	DEC
TOTAL HOURS				8 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC		3				
NAME OF THE UNIT/MODULE		Conservation of Biodiversity:				
TOTAL HOURS	8 hrs	THEORY	√	TUTORIAL		PRAC
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)						
SL	TOPIC			HR	TEACHER	MONTH
1	Conservation of genetic diversity			1	SDG	AUG
2	Conservation of species diversity			1	SDG	AUG
3	Conservation of ecosystem diversity			1	SDG	SEPT
4	<i>In situ</i> conservation			1	SDG	SEPT
5	<i>Ex situ</i> conservation			1	SDG	SEPT
6	Social approaches to conservation			1	SDG	SEPT
7	Social approaches to conservation..... continued..			1	SDG	SEPT
8	Biodiversity awareness programmes and Sustainable development.			1	SDG	NOV
TOTAL HOURS				8 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC		4			
NAME OF THE UNIT/MODULE		Role of plants in relation to Human Welfare			
TOTAL HOURS	6 hrs	THEORY	√	TUTORIAL	PRAC
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)					
SL	TOPIC		HR	TEACHER	MONTH
1	Importance of forestry		1	SDG	NOV
2	Utilization and commercial aspects: Avenue trees and Ornamental plants of India		1	SDG	NOV
3	Alcoholic beverages through ages		1	SDG	DEC
4	Fruits and nuts: Important fruit crops their commercial importance		1	SDG	DEC
5	Wood and its uses		1	SDG	DEC
6	Class Test		1	SDG	DEC
	TOTAL HOURS		6 hrs		

**** Total allotted 30 hours for this course has been adjusted to 29 hours keeping the total content unchanged.

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