

CORE COURSE II: (Biomolecules and Cell Biology)

CODE: BOTACOR02T (4 Credits) & BOTACOR02P (2 Credits)

COURSE OUTCOME: Bio-molecules and Cell Biology is the study of cells in plants, mostly at the cellular and molecular level. In Bio-molecules, the students get acquainted with the different components of a cell and bioenergetics occurring in a cell. The students get to learn about various enzymes that function in a cell, their types, their mode of actions etc.

This course will also be helpful for the students to acquire a clear knowledge on the ultrastructure of a cell along with its cell organelles and throws light on how a cell divides and how cell cycle is regulated.

In their practical paper, the students learn different techniques and methods related to cell biology and bio-molecules.

THEORY

(BOTACOR02T)

BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR BOTANY HONS)										
NAME OF THE DEPARTMENT						BOTANY				
HOD		DR. AYANA CHAKRABORTY								
INITIALS OF FACULTIES		DAY	AC	MS	SDG	SS	AB1	AB	PB	
		MORN								
PERIOD OF SEMESTER			FROM JULY 2019 TO DECEMBER 2019				HONS		GENERAL	
							√			
SEM	1	Core Course		2	CREDIT POINT		4	Course Code	BOTACOR02T	
Name of the Course			Biomolecules and Cell Biology							
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			Biomolecules							
TOTAL HOURS	20	THEORY	√	TUTORIAL				PRAC		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										
SL	LECTURE HEAD/TOPIC						HR	TEACHER	MONTH	
1	Types and significance of chemical bonds						1	MS	JULY	
2	Structure and properties of water						1	MS	JULY	
3	pH and buffers						1	AC	JULY	
4	Carbohydrates: Nomenclature and classification,						1	MS	AUG	
5	Carbohydrates: Monosaccharides and disaccharides						1	MS	AUG	
6	Carbohydrates: Oligosaccharides and polysaccharides						1	MS	AUG	
7	Lipids: Definition and major classes of storage and structural lipids						1	AC	AUG	
8	Lipids: ; Fatty acids structure and functions						1	AC	AUG	
9	Lipids: Essential fatty acids;						1	AC	AUG	
10	Lipids: Triacylglycerols structure functions and properties; phosphoglycerides						1	AC	AUG	
11	Proteins: Structure of amino acids						1	AC	AUG	
12	Proteins: levels of protein structure-primary, secondary protein						1	AC	SEPT	
13	Proteins: levels of protein structure , tertiary and quaternary						1	AC	SEPT	
14	Proteins: denaturation						1	AB1	SEPT	
15	Proteins: biological roles of proteins						1	AB1	SEPT	
16	Nucleic acids: Structure of nitrogenous bases						1	AB1	SEPT	
17	Nucleic acids: structure and function of nucleotides;;						1	AB1	OCT	
18	Nucleic acids: types of nucleic acids;						1	AB1	NOV	
19	Nucleic acids: structure of A, B, Z types of DNA						1	AB1	NOV	
20	Nucleic acids: types of RNA; structure of tRNA.						1	AB1	NOV	

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INITIALS OF FACULTIES		DAY	AC	MS	SDG	SS	AB1	AB	PB	
		MORN								
PERIOD OF SEMESTER		FROM JULY 2019 TO DECEMBER 2019					HONS		GENERAL	
							√			
SEM	1	Core Course		2	CREDIT POINT		4	Course Code	BOTACOR02T	
Name of the Course		Biomolecules and Cell Biology								
Course Co-ordinator		DR. ARUEEMA BARDHAN								
TOTAL MARKS	50	TH	√	TUT			PRAC			
TOTAL HOURS	60	TH	√	TUT			PRAC			
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC					2					
NAME OF THE UNIT/MODULE					Bioenergenetics					
TOTAL HOURS	04	THEORY	√	TUTORIAL			PRAC			
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										
SL	LECTURE HEAD/TOPIC					HR	DAY	MONTH		
1	Laws of thermodynamics					1	AB1	NOV		
2	concept of free energy, endergonic and exergonic reactions					1	AB1	DEC		
3	coupled reactions, redox reactions					1	AB1	DEC		
4	ATP structure, its role as a energy currency molecule					1	AB1	DEC		

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		MORN									
PERIOD OF SEMESTER		FROM JULY 2019 TO DECEMBER 2019					HONS		GENERAL		
							√				
SE M	1	Core Course		2	CREDIT POINT		4	Course Code	BOTACOR02T		
Name of the Course			Biomolecules and Cell Biology								
Course Co-ordinator			DR. ARUNEEMA BARDHAN								
TOTAL MARKS	50	TH	√	TUT				PRAC			
TOTAL HOURS	60	TH	√	TUT				PRAC			
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC				3							
NAME OF THE UNIT/MODULE				Enzymes							
TOTAL HOURS	06	THEORY	√	TUTORIAL				PRAC			
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)											
SL	LECTURE HEAD/TOPIC						HR	DAY	MONTH		
1	Structure of enzyme, holoenzyme, apoenzyme						1	PB	JULY		
2	Cofactors, coenzymes and prosthetic group						1	PB	JULY		
3	Classification of enzymes						1	PB	AUG		
4	Features of active site, substrate specificity, Mechanism of action (activation energy, lock and key hypothesis, induced - fit theory),						1	PB	AUG		
5	Michaelis – Menten equation and Lineweaver-Burk Plot						1	PB	AUG		
6	enzyme inhibition and factors affecting enzyme activity.						1	AB1	SEPT		

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		MORN								
PERIOD OF SEMESTER		FROM JULY 2019 TO DECEMBER 2019					HONS		GENERAL	
							√			
SEM	1	Core Course		2	CREDIT POINT		4	Course Code	BOTACOR02T	
Name of the Course			Biomolecules and Cell Biology							
Course Co-ordinator			Mr. SUBHADIP GIRI							
TOTAL MARKS	50	TH	√	TUT				PRAC		
TOTAL HOURS	6	TH	√	TUT				PRAC		
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC				4						
NAME OF THE UNIT/MODULE				The Cell						
TOTAL HOURS	4	THEORY	√	TUTORIAL				PRAC		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										
SL	LECTURE HEAD/TOPIC					HR	DAY	MONTH		
1	The Cell: Cell as a unit of structure and function					1	SDG	JULY		
2	The Cell: characteristics of prokaryotic and eukaryotic cells					1	SDG	JULY		
3	The Cell: origin of cell					1	SDG	JULY		
4	The Cell: origin of eukaryotic cell(endosymbiotic theory)					1	SDG	JULY		

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		MORN								
PERIOD OF SEMESTER		FROM JULY 2019 TO DECEMBER 2019					HONS		GENERAL	
							√			
SEM	1	Core Course			2	CREDIT POINT	4	Course Code	BOTACOR02T	
Name of the Course			Biomolecules and Cell Biology							
Course Co-ordinator			Mr. SUBHADIP GIRI							
TOTAL MARKS	50	TH		√	TUT			PRAC		
TOTAL HOURS	60	TH		√	TUT			PRAC		
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC					5					
NAME OF THE UNIT/MODULE			Cell wall and plasma membrane							
TOTAL HOURS	4	THEORY		√	TUTORIAL			PRAC		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										
SL	LECTURE HEAD/TOPIC					HR	DAY	MONT H		
1	Cell wall and plasma membrane: Chemistry, structure and function of plant cell wall;					1	SDG	AUG		
2	Cell wall and plasma membrane: overview of membrane function					1	SDG	AUG		
3	Cell wall and plasma membrane: fluid mosaic model; chemical composition of membranes.					1	SDG	AUG		
4	Cell wall and plasma membrane: membrane transport - passive, active and facilitated transport, endocytosis and exocytosis.					1	SDG	AUG		

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		MORN										
PERIOD OF SEMESTER			FROM JULY 2019 TO DECEMBER 2019						HONS		GENERAL	
									√			
SEM	1	Core Course				2		CREDIT POINT	4	Course Code	BOTACOR02T	
Name of the Course			Biomolecules and Cell Biology									
Course Co-ordinator			Mr. SUBHADIP GIRI									
TOTAL MARKS	50	TH		√		TUT				PRAC		
TOTAL HOURS	60	TH		√		TUT				PRAC		
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC				6								
NAME OF THE UNIT/MODULE				Nucleus, Cytoskeleton and Endomembrane system								
TOTAL HOURS	16	THEORY		√		TUTORIAL				PRAC		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)												
SL	LECTURE HEAD/TOPIC						HR	DAY	MONT H			
1	Nucleus: Structure - nuclear envelope,						1	SDG	AUG			
2	Nucleus: nuclear pore complex, nuclear lamina						1	SDG	AUG			
3	Nucleus: molecular organization of chromatin						1	SDG	SEPT			
4	Nucleus: nucleolus						1	SDG	SEPT			
5	Cytoskeleton: Role and structure of microtubules						1	SDG	SEPT			
6	Cytoskeleton: microfilaments and intermediary filament.						1	SDG	SEPT			
7	Chloroplast, mitochondria and peroxisomes: Structural organization; function; semiautonomous nature of mitochondria						1	SDG	SEPT			
8	Chloroplast, mitochondria and peroxisomes: Structural organization; function; semiautonomous nature of chloroplast.						1	SDG	SEPT			
9	Chloroplast, mitochondria and peroxisomes: Structural organization; function of peroxisomes.						1	SDG	SEPT			
10	Endomembrane system: Endoplasmic reticulum - structure,						1	SDG	SEPT			
11	Endomembrane system: targeting and insertion of proteins in the ER						1	SDG	NOV			
12	Endomembrane system: protein folding, processing						1	SDG	NOV			
13	Endomembrane system: smooth ER and lipid synthesis,						1	SDG	NOV			
14	Endomembrane system: export of proteins and lipids;						1	SDG	NOV			
15	Endomembrane system: Golgi apparatus - organization, protein glycosylation,						1	SDG	NOV			
16	Endomembrane system: Golgi apparatus - protein sorting and export from Golgi apparatus; lysosomes.						1	SDG	NOV			

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		MORN								
PERIOD OF SEMESTER		FROM JULY 2019 TO DECEMBER 2019					HONS		GENERAL	
							√			
SEM	1	Core Course		2	CREDIT POINT		4	Course Code	BOTACOR02T	
Name of the Course			Biomolecules and Cell Biology							
Course Co-ordinator			Mr. SUBHADIP GIRI							
TOTAL MARKS	50	TH		√	TUT			PRAC		
TOTAL HOURS	60	TH		√	TUT			PRAC		
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC					7					
NAME OF THE UNIT/MODULE					Cell Division					
TOTAL HOURS	6	THEORY		√	TUTORIAL			PRAC		
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										
SL	LECTURE HEAD/TOPIC					HR	DAY	MONT H		
1	Cell division: Phases of eukaryotic cell cycle					1	SDG	NOV		
2	Cell division: Mitosis					1	SDG	NOV		
3	Cell division: Meiosis					1	SDG	DEC		
4	Cell division: cell cycle - checkpoints,					1	SDG	DEC		
5	Cell division: regulation of cell cycle - checkpoints,					1	SDG	DEC		
6	Cell division: Role of protein kinases					1	SDG	DEC		

PRACTICAL

(BOTACOR02P)

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INITIALS OF FACULTIES		DAY	AC	MS	SDG	SS	AB1	AB	PB	
		MORN								
PERIOD OF SEMESTER			FROM JULY 2019 TO DECEMBER 2019				HONS		GENERAL	
							√			
SE M	1	Core Course					CREDI T POINT	2	Course Code	BOTACOR02P
		GE/DSC			2					
Name of the Course				Biomolecules and cell Biology						
Course Co-ordinator				Mr. SUBHADIP GIRI						
TOTAL MARKS		25	TH		TUT		PRAC		√	
TOTAL HOURS		60	TH		TUT		PRAC		√	
UNIT/ SECTION/ GROUP/ MODULE/ TOPIC										
NAME OF THE UNIT/MODULE					PRACTICAL					
TOTAL HOURS		60	THEORY		TUTORIAL		PRAC		√	
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)										
SL	TOPIC					HR	TEACHER	MONTH		
1	Qualitative tests for reducing sugar- Glucose					2	MS	JULY		
2	Qualitative tests for reducing sugar- fructose					2	MS	JULY		
3	Qualitative tests for reducing sugar- Sucrose					2	MS	AUG		
4	Qualitative tests for reducing sugar- Starch					2	MS	AUG		
5	Qualitative tests for Protein					2	MS	AUG		
6	Qualitative tests for Lipid					2	AB1	SEPT		
7	Practice class					2	AB1	SEPT		
8	Study of plant cell structure with the help of epidermal peel mount of Onion					2	PB	JULY		
9	Study of plant cell structure with the help of epidermal peel mount of <i>Rhoeo</i>					2	PB	AUG		
10	Study of plant cell structure with the help of epidermal peel mount of <i>Crinum</i> .					2	PB	AUG		
11	Practice class					2	PB	AUG		
12	Measurement of cell size by the technique of micrometry.					2	PB	AUG		
13	Practice class					2	AB1	SEPT		
14	Counting the cells per unit volume with the help of haemocytometer yeast					2	AB1	SEPT		
15	Practice class					2	AB1	NOV		
16	Counting the cells per unit volume with the help of haemocytometer pollen grain					2	AB1	NOV		
17	Practice class					2	AB1	NOV		
18	Study of cell and its organelles with the help of					2	AB1	NOV		

	electron micrographs Prokaryotic and eukaryotic			
19	Study of cell and its organelles with the help of electron micrographs Nucleus	2	AB1	NOV
20	Study of cell and its organelles with the help of electron micrographs Mitochondria	2	AB1	DEC
21	Study of cell and its organelles with the help of electron micrographs Chloroplast	2	AB1	DEC
22	Study of cell and its organelles with the help of electron micrographs ER and golgi	2	AB1	DEC
23	Study of cell and its organelles with the help of electron micrographs peroxysome	2	SDG	SEPT
24	Cytochemical staining of: DNA-Feulgen	2	SDG	SEPT
25	cell wall in the epidermal peel of onion using Periodic Schiff's (PAS) staining technique.	2	SDG	SEPT
26	Study the effect of organic solvent and temperature on membrane permeability	2	SDG	NOV
27	Practice class	2	SDG	NOV
28	Study of the different stages of mitosis	2	SDG	NOV
29	Study of the different stages of mitosis, chromosome counting and permanent slide preparation	2	SDG	DEC
30	Study of the different stages of meiosis	2	SDG	DEC