#### **SEM III: DSC- CORE COURSE III:PAPER III**

### PLANT ANATOMY AND EMBRYOLOGY

**CODE:** BOTGCOR03T (4 Credits) & BOTGCOR03P (2 Credits)

**COURSE OUTCOME: 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. **Embryology** is helpful for studying the reproductive biology.

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

their reproductive mechanism.

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.

# LESSON PLAN FOR SEMESTER: 3

**Session: July to December 2022** 

## **THEORY**

(BOTGCOR03T)

\*\* The allotted total 60 hours for the **Theory course** has been adjusted to 56 hours.

		В	ASIR	нат с	OLLE	GE LE	SSON	PLAN FO	OR CBCS	(FOR (	SENER	AL)			
NAME	OF THE	DEPAR'	TME	NT						ВО	TANY				
HOD		DR. A	ARUN	EEMA	BAF	RDHAN	١								
INITIAL	S OF	AC		AB	SDG	ĵ	SS	ABJ							
<b>FACULT</b>	TIES														
PERIOD	OF		FRC	M JUI	LY 20	)22 T(	D DEC	EMBER 2	2022	HOI	NS	0	GENER	AL	
SEMES	ΓER												√		
SEM	3	Со	ore urse OSC	3				REDIT OINT	4	Cou		В	OTGO	Ю	RO3T
Name o	of the C	ourse		Pla	nt A	nato	my a	and Em	bryolo	gy					
Course	Coordi	nator		DR.	AYA	NA CH	IAKRA	ROBTY	-						
TOTAL															
TOTAL	TAL HOURS 60 HRS TH √ TUT PRAC														
56 HRS															
					ILE/	TOPIC	_								
NAME			NODI						atic and	perma			es		
TOTAL				THE			_   √	TUTOR				AC			
		DISTRIB	UTIO	N OF			AN (N	10DULE,	/ UNIT/ S					- 1	
SL					T	OPIC				I	łR	TEA	CHER		MONTH
1	Introd										1		AB		AUG
2	•	tissue									1		SS		AUG
3	Complex tissues										1		AB		AUG
4											1		SS		AUG
5	Theori	es of Ro	ot A	pical N	∕leris	tem:	Histog	en			1		AB		AUG
6	Theori	es of Ro	ot A	pical N	∕leris	tem: l	korpei	kappe			1		SS		AUG
7	Basic (	Concep	t of S	hoot	apica	al mei	ristem	ıS			1		SS		AUG
8	Theori	es of Sh	oot /	Apical	Mer	istem:	Histo	gen, Tur	nica Corpi	us	1		AB		SEPT
								TO	TAL HOU	IRS 8	3				

UNIT/ SI TOPIC	ECTION	/ GROUP/ N	/IODULE/	2						
NAME O	F THE U	JNIT/MODU	JLE	Organs						•
TOTAL		4	THEORY	1	TUTOR	IAL		PI	RAC	
HOURS										
	DIST	RIBUTION C	OF LESSON PL	.AN (MOI	DULE/ UN	IIT/ SI	CTION	I/ TOPI	C WISE)	
SL			TOPIC				HR	TEACI	HER	MONTH
1	Struct	ure of dico	t root stem				1	Δ	λB	SEPT
2	Struct	ure of dico	t leaf				1	Δ	ΛB	SEPT
3	Struct	ure of mon	ocot root ste	em			1	Δ	ΛB	SEPT
4	Struct	ure of mon		1	Δ	λB	ОСТ			
			URS	4						

UNIT/ TOPIC		N/ GROU	P/ MODULE/	3									
NAME	OF THE	UNIT/M	ODULE	wth									
TOTAL	L	8	THEORY	IAL		PRAC							
HOUR	S												
	DIS	TRIBUTIO	N OF LESSON F	ECTIO	N/ TOPIC W	/ISE)							
SL			TOPIC	HR	TEACHER	MONTH	ł						
1	Introdu	ıction			1	SS	SEPT						
2	Vascul	ar cambi	um – structure	!			1	SS	SEPT				
3	Vascul	ar cambi	um – function				1	SS	SEPT				
4	Vascul	ar cambi	um seasonal a	ctivity			1	SS	SEPT				
5	Second	dary grov	vth in root				1	SS	NOV				
6	Second	Secondary growth in stem			Secondary growth in stem					1	SS	S NOV	
7	Wood	(heartwo	od and sapwo		1	SS	NOV						
8	Class T	est					1	SS	DEC				
					TOTAL HO	URS	8						

UNIT/	SECTION	N/ GROUP/	MODULE/	4					
TOPIC									
NAME					ve and p	rotec	tive sys	stems	
TOTAL		8 HRS	THEORY	1	TUTOR	IAL		PRAC	
HOUR	S	7 HRS							
	DIS	TRIBUTION	OF LESSON F	PLAN (MC	DULE/ U	NIT/ S	ECTIO	N/ TOPIC WIS	E)
SL			TOPIC				HR	TEACHER	MONTH
1	Introdu	uction					1	AB	NOV
2	Epider	mis					1	AB	NOV
3	cuticle						1	AB	NOV
4	stomat	ta				1	AB	NOV	
5	Genera	al account	of adaptation	ns in xero	phytes		1	AB	DEC
6	Genera	al account	of adaptation	ns in hydr	ophytes		1	AB	DEC
7	Doubt	Clearing Cla	ass		1	AB	DEC		
8									
				1	TOTAL HO	URS	7		

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/ TOPIC		N/ GROUP/	MODULE/	5						
NAME	OF THE	UNIT/MOD	ULE	nizatio	on of fl	owe	r			
TOTAL	L	<del>8 HRS</del>	THEORY	IAL			PRAC			
HOUR	OURS 7 HRS DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT									
	DIS	TRIBUTION	OF LESSON P	ECTIO	N/ TC	<b>PIC WIS</b>	E)			
SL			TOPIC		HR	TEA	CHER	MONTH		
1	Introdu	uction		1		AC	AUG			
2	Structi	ire of polle	า				1		AC	AUG
3	Structu	are of ovule	s; types of o	vules			1		AC	AUG
4	Types	of embryo s	acs				1		AC	AUG
5	Organi	zation of m	ature embry	o sac			1		AC	AUG
6	Ultrast	Ultrastructure of mature embry					1		AC	AUG
7	Doubt clearing class								AC	AUG
8										
	•			7	TOTAL HO	URS	7			•

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/ TOPIC		N/ GROUP/	MODULE/	6				
NAME	OF THE	UNIT/MOD	ULE	tion and fertil	ization	l		
TOTAL		8 HRS	THEORY	TUTORIAL		PRAC		
HOUR	S	7 HRS						
	DIS	TRIBUTION	OF LESSON F	SECTIO	N/ TOPIC WISI	≣)		
SL			TOPIC	HR	TEACHER	MONTH		
1	Introdu	ıction		1	AC	SEPT		
2	Pollina	tion mecha	nisms			1	AC	SEPT
3	Pollina	tion adapta	ations			1	AC	SEPT
4	Double	e fertilizatio	n			1	AC	SEPT
5	Seed- s	structure ap	opendages			1	AC	SEPT
6	Seed-	dispersal m	echanisms		1	AC	SEPT	
7	Doubt	clearing clas	SS		1	AC	SEPT	
					OTAL HOURS	7		

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/ TOPIC		N/ GROUP/	MODULE/	7					
		UNIT/MOD	ULE	dospe	rm				
TOTAL	•	8 HRS	THEORY	AL		PRAC			
HOUR	S								
	DIS	TRIBUTION	ECTION	N/ TOPIC WIS	SE)				
SL			TOPIC				HR	TEACHER	MONTH
1	Introdu	uction					1	AC	SEPT
2	Endos	perm types					1	AC	NOV
3	Endos	oerm struct	ure				1	AC	NOV
4	Endos	oerm functi	ons				1	AC	NOV
5	Dicot e	embryo					1	AC	NOV
6	Mono	cot embryo					1	AC	NOV
7	Embry	o endosper	m relations		1	AC	NOV		
8	Class T	est		•			1	AC	DEC
				•	TOTAL HO	URS	8		·

UNIT/ SI	CTION	/ GROUP/ I	MODULE/	8				
NAME O	F THE U	JNIT/MOD	JLE	Apomix	kis and poly	embryor	ıy	
TOTAL		<del>8 HRS</del>	THEORY	1	TUTORIAL		PRAC	
HOURS		7 HRS						
	DIST	RIBUTION (	OF LESSON PL	AN (MOI	DULE/ UNIT,	SECTION	N/ TOPIC WISE	≣)
SL			TOPIC			HR	TEACHER	MONTH
1	Introd	luction				1	AC	DEC
2	Apom	ixis - Defin	ition, Types			1	AC	DEC
3	Apom	ixis - Types	3			1	AC	DEC
4	Apom	ixis - pract	ical application	ons		1	AC	DEC
5	Polyer	mbryony –	Definition, Ty	pes		1	AC	DEC
6	Polyer	mbryony –	Practical Appl	ication		1	SS	DEC
7	Doubt	clearing cl	ass	1	SS	DEC		
8								
				T	OTAL HOUR	<b>RS</b> 7		

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

## **SEM: 3 (DSC-3)**

# PRACTICAL BOTGCOR03P

(Plant Anatomy and Embryology)

\*\*\* The allotted total 60 hours for the **Practical course** has been adjusted to 56 hours.

			BASIR	HAT	СО	LLEGE L	ES:	SON	PLAN	N FOI	R CBC	S (FOR (	GEN	ERAI	L)				
NAM	E OF THE												Bot	any					
HOD		DR	. ARUN	IEEN	1A E	BARDHA	λN												
	ALS OF	AC		MS		SDG	SS	,	Α	BJ									
	ILTIES																		
	OD OF		FROI	M JU	LY 2	2022 TO	) D	ECEN	MBER	202	2		H	ONS			GENI	ERAI	-
SEIVIE	STER															'	/		
SEN	1		DSC		3					RED		2		ours Code		ВО	TGC	ORO3	}P
	e of the C					nt Anato		•			ogy								
	se Co-ord			_		AYANA	CH	IAKR	RABO	RTY									
	L MARKS												-			PR		٧	
	L HOURS		ROUP/ MODULE/ T/MODULE  T/MODULE													PR	AC	٧	
UNIT,	-	N/ GRO	UP/ N	10DI	ULE	/	F	PRAC	CTICA	١L									
		IINIT/	MODI	II F															
	L HOURS				HFC	)PV				TIIT	CORIA				DE	RAC		٧	
1014	IL HOOKS	56 h		''	HLC	)				101	ONIA	_				AC		V	
		DISTRI	BUTIC	N O	F LE	SSON P	LA	N (N	10DL	JLE/	UNIT/	SECTIO	N/	TOP	IC WIS	E)			
SL				LEC	CTU	RE HEAD	)/T(	OPIC						HR	TEA	CHER		MON	<b>ITH</b>
	ANATOI	VIY																	
1	Study o	fmeris	tems t	hrou	ugh	perma	ner	nt sli	ides a	and p	ohoto	graphs.		2	9	SS		ΑU	G
2	Study of		••		•		ncł	nyma	a and	d scle	erencl	nyma)		2	А	.BJ		AU	G
	(Permai																		
3	Study of													2		SS		AU	
4	Study of			cerat	ted	Phloen	า el	leme	ents (	Perr	naner	nt			A	.BJ		AU	G
5	slides, p			cot:	7e(	a mavs	(or	ılv fr	om F	Perm	anen	t slides		2		SS		AU	IG
	/ photog					a mays	(Ο.	,	0	C	· · · · · · · ·	conaco						,	
6	Study of (only fro									owth	: Heli	anthus		2	A	BJ		AU	G
7	Study of			cot:	Zea	mays	(or	nly fr	rom F	Perm	anen	t slides		2	9	SS		SEI	PΤ
	/ photog	graphs)																	
8	Study of (only fro									wth:	Helia	nthus		2	A	BJ		SEI	rΤ
9	Study of									s/p	hotog	raphs)		2	9	SS		SEI	PΤ
10	Study of photogr		Monod	ot le	eaf	(only fr	om	Per	man	ent s	lides	/	$\dagger$	2	А	.BJ		SEI	PT
11	Study of		ive an	aton	ny:	Xeroph	yte	(Ne	rium	leaf	5)			2	9	SS		SEI	PT

12	Study of Adaptive anatomy: Hydrophyte (Nymphaea petiole)	2	ABJ	SEPT
	EMBRYOLOY			
13	Study of Structure of anther (young and mature) (Permanent slides / photographs)	2	SS	SEPT
14	Study of Structure of tapetum (amoeboid and secretory) (Permanent slides / photographs).	2	ABJ	SEPT
15	Study of Types of ovules: anatropous, orthotropous (from Permanent slides / photographs)	2	SS	ОСТ
16	Study of Types of ovules: circinotropous, amphitropous/campylotropous (from Permanent slides / photographs)	2	SS	NOV
17	Study of Ultrastructure of mature egg apparatus cells through electron micrographs / photographs	2	ABJ	NOV
18	Study of Pollination types (Photographs and specimens).	2	SS	NOV
19	Study of seed dispersal mechanisms (including appendages) (Photographs and specimens).	2	ABJ	NOV
20	Study of seed dispersal mechanisms (aril, caruncle) (Photographs and specimens).	2	SS	NOV
21	Dissection of embryo from developing seeds.	2	ABJ	NOV
22	Dissection of endosperm from developing seeds.	2	SS	NOV
23	Calculation of percentage of germinated pollen in a given medium.	2	ABJ	DEC
24	Practice class/ Doubt clearing class	2	SS	DEC
25	Practice class/ Doubt clearing class	2	ABJ	DEC
26	Practice class/ Doubt clearing class	2	SS	DEC
27	Practice class/ Doubt clearing class	2	ABJ	DEC
28	Practice class/ Doubt clearing class	2	SS	DEC
	TOTAL	56 HR	S	

** Total	60	hours	adju	sted	to	56	hours	•
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#### **SEM III: PAPER III: GENERIC ELECTIVE**

### PLANT ANATOMY AND EMBRYOLOGY

**CODE:** BOTHGECO3T (4 Credits) & BOTHGECO3P (2 Credits)

**COURSE OUTCOME: 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. **Embryology** is helpful for studying the reproductive biology.

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

their reproductive mechanism.

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.

# LESSON PLAN FOR SEMESTER: 3

**Session: July to December 2022** 

## **THEORY**

(BOTHGEC03T)

\*\* The allotted total 60 hours for the **Theory course** has been adjusted to 56 hours.

		BASII	RHAT C	OLLEG	E LESS	ON I	PLAN FO	OR CBCS	(FOR G	ENER	AL)		
NAME O	F THE D	EPARTME	NT						BO1	ANY	<u> </u>		
HOD		DR. ARU	NEEM/	BARD	HAN								
INITIALS	OF	AC	AB	SDG	SS		ABJ	AC					
FACULTI	ES												
PERIOD	OF	FROM	JULY 2	2022 TO	O DECE	EMB	ER 2022	2	HON	IS	GENE	RA	L
SEMESTI	ER										√		
SEM	3	Core Course GE	3				EDIT	4	Cou		вотн	IGE	СОЗТ
Name of	f the Co	urse	Pla	nt An	atom	ıy a	nd Em	bryolo	gy				
Course C	Coordina	ator	DR.	AYANA	CHAK	RAR	OBTY	•	<u>- •                                     </u>				
TOTAL N	/IARKS	50	TH		1		TUT				PRAC		
TOTAL H	IOURS	<del>60 HRS</del>	TH		1		TUT				PRAC		
		56 HRS											
	ECTION/	GROUP/	MODU	JLE/	1								
TOPIC													
		NIT/MOD				leris		c and pe	rmane				
TOTAL HO		8	THE		_   √	. / 5 4	TUTO		FOTIO		AC MUSE)		
CI	DI	STRIBUTIO	ON OF			ı (ıvı	ODULE	/ UNII/ S			PIC WISE)		NACNITU
<b>SL</b> 1	Introduc	rtion		TOF	110					HR 1	TEACHE AB	ĸ	MONTH AUG
										1	SS		AUG
	Simple t	x tissues								1	AB		AUG
			Doot o	nical m	orists	mc					SS		AUG
		oncept of s of Root A		•			'n			1	AB		AUG
		s of Root A	•							1	SS		AUG
		oncept of	•			•				<u></u>	SS		AUG
								nica Corn	ııc	1	AB		SEPT
0	Theories of Shoot Apical Meristem: Histogen, Tunica Corpus 1 AB SEPT  TOTAL HOURS 8												
							- 11	OTAL HU	ONS	0			

UNIT/ SI TOPIC	ECTION	/ GROU	P/ MODULE/	2						
NAME O	F THE U	JNIT/M	ODULE	Organs	'					- 'I
TOTAL H	OURS	4	THEORY	1	TUTORI	AL			PRAC	
	DIST	RIBUTIO	ON OF LESSON PL	AN (MOI	DULE/ UN	IT/ SI	CTION	I/ TC	OPIC WISI	<b>E</b> )
SL			TOPIC				HR	TE	ACHER	MONTH
1	Struct	ure of o	dicot root stem				1		AB	SEPT
2	Struct	ure of o	dicot leaf				1		AB	SEPT
3	Struct	ure of r	monocot root ste	em			1		AB	SEPT
4	Struct	ure of r	monocot leaf				1		AB	OCT
	TOTAL HOURS									•

UNIT/ TOPIC		N/ GROUI	P/ MODULE/	3							
NAME	OF THE	UNIT/MO	ODULE	Secon	dary Grov	wth					
TOTAL	L	8	THEORY	√ √	TUTOR	TUTORIAL PRAC					
HOUR	S										
	DIS	TRIBUTIO	ECTIO	N/ TOPIC WI	SE)						
SL			TOPIC				HR	TEACHER	MONTH		
1	Introdu	ıction					1	SS	SEPT		
2	Vascul	ar cambi	um – structure	!			1	SS	SEPT		
3	Vascul	ar cambi	um – function				1	SS	SEPT		
4	Vascul	ar cambi	um seasonal a	ctivity			1	SS	SEPT		
5	Second	dary grow	vth in root				1	SS	NOV		
6	Second	dary grow	vth in stem				1	SS	NOV		
7	Wood	(heartwo	od and sapwo		1	SS	NOV				
8	Class T	est					1	SS	DEC		
				8							

UNIT/	SECTION	N/ GROUP/	MODULE/	4							
TOPIC											
NAME	OF THE	UNIT/MOD	ULE	Adaptiv	ve and p	and protective systems					
TOTAL	•	8 HRS	THEORY	1	TUTOR	IAL					
HOUR	S	7 HRS									
	DIS	TRIBUTION	OF LESSON P	LAN (MO	DULE/ U	NIT/ S	ECTIO	N/ TOPIC WIS	E)		
SL			TOPIC				HR	TEACHER	MONTH		
1	Introdu	ıction					1	AB	NOV		
2	Epider	mis					1	AB	NOV		
3	cuticle						1	AB	NOV		
4	stomat	:a					1	AB	NOV		
5	Genera	al account o	of adaptation	s in xero	phytes		1	AB	DEC		
6	Genera	al account o	of adaptation	s in hydr	ophytes		1	AB	DEC		
7	Doubt	Clearing Cla		1	AB	DEC					
8											
	•		7								

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/ TOPIC		N/ GROUP/	MODULE/	5								
NAME	OF THE	UNIT/MOD	ULE	Structu	ral orgai	nizati	on of flower					
TOTAL	-	8 HRS	THEORY	1	TUTOR	IAL	PRAC					
HOUR	S	7 HRS										
	DIS	TRIBUTION	OF LESSON P	LAN (MO	DULE/ U	NIT/ S	SECTIO	V/ TO	PIC WISE	<b>E</b> )		
SL			TOPIC				HR	TEA	CHER	MONTH		
1	Introdu	ıction					1		AC	AUG		
2	Structu	ire of polle	n				1		AC	AUG		
3	Structu	ire of ovule	s; types of o	vules			1		AC	AUG		
4	Types	of embryo s	sacs				1		AC	AUG		
5	Organi	zation of m	ature embry	o sac			1		AC	AUG		
6	Ultrast	ructure of	mature emb	ryo sac			1		AC	AUG		
7 Doubt clearing class									AC	AUG		
8												
	TOTAL HOURS											

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/		N/ GROUP/	MODULE/	6						
		UNIT/MOD	ULE	Pollina	Pollination and fertilization					
TOTAL		8 HRS	THEORY	1	TUTORIAL		PRAC			
HOUR	S	7 HRS								
	DIS	TRIBUTION	SECTIO	N/ TOPIC WISI	Ε)					
SL			TOPIC			HR	TEACHER	MONTH		
1	Introdu	ıction				1	AC	SEPT		
2	Pollina	tion mecha	nisms			1	AC	SEPT		
3	Pollina	tion adapta	ations			1	AC	SEPT		
4	Double	e fertilizatio	n			1	AC	SEPT		
5	Seed-	structure a	opendages			1	AC	SEPT		
6	Seed-	dispersal m	1	AC	SEPT					
7	Doubt	clearing clas	SS			1	AC	SEPT		
				7						

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/ TOPIC		N/ GROUP/	MODULE/	7							
NAME	OF THE	UNIT/MOD	ULE	Embryo	Embryo and endosperm						
TOTAL	L	8 HRS	THEORY	1	TUTOR	IAL		PRAC			
HOUR	S										
	DIS	TRIBUTION	OF LESSON F	PLAN (MO	DULE/ U	NIT/ S	ECTIO	N/ TOPIC WI	SE)		
SL			TOPIC				HR	TEACHER	MONTH		
1	Introdu	uction					1	AC	SEPT		
2	Endos	perm types					1	AC	NOV		
3	Endos	perm struct	ure				1	AC	NOV		
4	Endos	perm functi	ons				1	AC	NOV		
5	Dicot e	embryo					1	AC	NOV		
6	Mono	cot embryo					1	AC	NOV		
7	7 Embryo endosperm relationship						1	AC	NOV		
8	Class T	est				•	1	AC	DEC		
	•		8	_							

UNIT/ SI	ECTION	/ GROUP/	MODULE/	8							
TOPIC											
NAME O	F THE U	JNIT/MOD	ULE	Apomi	Apomixis and polyembryony						
TOTAL		8 HRS	THEORY	1	TUTORIAL		PRAC				
HOURS		7 HRS									
	DIST	RIBUTION	OF LESSON PL	.AN (MOI	DULE/ UNIT/ S	ECTION	N/ TOPIC WISE	Ξ)			
SL			TOPIC			HR	TEACHER	MONTH			
1	Introd	luction				1	AC	DEC			
2	Apom	nixis - Defin	ition, Types			1	AC	DEC			
3	Apom	nixis - Type:	5			1	AC	DEC			
4	Apom	nixis - pract	ical application	ons		1	AC	DEC			
5	Polye	mbryony –	Definition, Ty	pes		1	AC	DEC			
6	Polyer	mbryony –	Practical Appl	ication	•	1	SS	DEC			
7	Doubt	t clearing cl		1	SS	DEC					
8			•								
			7								

<sup>\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

### **SEM: 3 (GE-3)**

# PRACTICAL BOTHGEC03P

(Plant Anatomy and Embryology)

\*\*\*Due to the **Pandemic situation**, the allotted total 60 hours for the **Practical course** has been adjusted to 30 hours. Only demonstration and procedural study method followed instead of work out.

																			_
	BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR GENERAL) NAME OF THE DEPARTMENT Botany																		
												Bot	tany						
HOD		DR.	ARUN	EEMA	BARDH	HAN	l 												
	ALS OF	AC		MS	SDG	S	SS	Α	BJ										
	JLTIES																		
	OD OF		FRON	/I JULY	2022	TO I	DECEM	/IBER	R 202	22		Н	ONS	5			NER	AL	
SEMI	ESTER															٧			
SEN	<b>VI</b> 1		GE		3			(	CRED	IT	2		Cour	se	I	BOTH	IGEC	:03P	
									POIN	IT			Cod	е					
Nam	e of the Co	urse		Pla	ant Ana	ator	ny and	l Eml	bryo	logy									
	se Co-ordir	ator			R. AYAN	IA C	CHAKR	ABO	RTY	1								1	
	AL MARKS	25		TH						TUT						PRAC		٧	
TOTA	TOTAL HOURS 60 TH TUT														PRAC		٧		
	/ SECTION,	/ GRO	UP/ M	ODUL	E/		PRAC	TICA	۱L										
TOPI	-																		
	IE OF THE U								1										
TOTA	AL HOURS	<del>60 h</del>		THE	ORY				TU	TORIA	L			Ī	PRA	C	1	<i>-</i>	_
		56 h		<u> </u>							•								
		DISTRI	BUTIO		ESSON			ODL	JLE/	UNIT/	SECTI	ON/	TOF						
SL				LECTU	JRE HEA	AD/	TOPIC						HR	_ լ	ΓEACH	IER	М	ONTH	
	ANATOM	Υ																	
1	Study of r	nerist	tems tl	hrougl	n perm	nane	ent sli	des a	and	photo	graph	s.	2		SS		/	AUG	
2	Study of T	issue	s (pare	enchyr	na, col	len	chyma	anc	d scl	erench	nyma)		2		AB.	J	/	AUG	
	(Permane	ent sli	des, pł	notogr	aphs)														
3	Study of T	issue	s: Phlo	em (P	erman	ent	slides	s, ph	otog	graphs	5)		2	t	SS		/	AUG	_
4	Study of T										•				AB.	J	/	AUG	
	slides, ph	otogr	aphs)																
5	Study of S	tem:	Mono	cot: Ze	ea may	rs (c	only fro	om F	erm	nanen	t slide:	S	2		SS		-	AUG	
	/ photogr	aphs)																	
6	Study of S								owth	n: Heli	anthus	S	2		AB.	J	,	AUG	
	(only fror	n Peri	manen	t slide	s / pho	otog	graphs	)											
7 Study of Root: Monocot: Zea mays (only from Permanent slides 2 SS SE										SEPT	_								
	/ photogr	aphs)																	
	6		<u> </u>		., -								2						
8	Study of F						-	_	wth:	Helia	nthus		2		AB.	J	5	SEPT	
	(only from								- /	ا د د د دا			2	-	CC			`CD <del>-</del>	
9	Study of L	.ear: L	NCOT (C	only tr	om Pei	rma	inent s	siiae	s/p	motog	rapns)		2		SS		3	SEPT	
10	Study of Leaf: Monocot leaf (only from Permanent slides /									/		2		AB.	J	9	SEPT	_	

	photographs)			
11	Study of Adaptive anatomy: Xerophyte (Nerium leaf)	2	SS	SEPT
12	Study of Adaptive anatomy: Hydrophyte (Nymphaea petiole)	2	ABJ	SEPT
	EMBRYOLOY			
13	Study of Structure of anther (young and mature) (Permanent slides / photographs)	2	SS	SEPT
14	Study of Structure of tapetum (amoeboid and secretory) (Permanent slides / photographs).	2	ABJ	SEPT
15	Study of Types of ovules: anatropous, orthotropous (from Permanent slides / photographs)	2	SS	ОСТ
16	Study of Types of ovules: circinotropous, amphitropous/campylotropous (from Permanent slides / photographs)	2	SS	NOV
17	Study of Ultrastructure of mature egg apparatus cells through electron micrographs / photographs	2	ABJ	NOV
18	Study of Pollination types (Photographs and specimens).	2	SS	NOV
19	Study of seed dispersal mechanisms (including appendages) (Photographs and specimens).	2	ABJ	NOV
20	Study of seed dispersal mechanisms (aril, caruncle) (Photographs and specimens).	2	SS	NOV
21	Dissection of embryo from developing seeds.	2	ABJ	NOV
22	Dissection of endosperm from developing seeds.	2	SS	NOV
23	Calculation of percentage of germinated pollen in a given medium.	2	ABJ	DEC
24	Practice class/ Doubt clearing class	2	SS	DEC
25	Practice class/ Doubt clearing class	2	ABJ	DEC
26	Practice class/ Doubt clearing class	2	SS	DEC
27	Practice class/ Doubt clearing class	2	ABJ	DEC
28	Practice class/ Doubt clearing class	2	SS	DEC
	TOTAL	56 HR	s	

** Total 60 hours ad	justed to 56 hours.
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### **SEM III: SKILL ENHANCEMENT COURSE**

### **Plant Diversity and Human Welfare**

**Course code: BOTSSEC01M (Credits 2)** 

**COURSEOUTCOME:** 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.

#### 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**

## THEORY (BOTSSEC01M)

	BASIRHAT COLLEGE LESSON PLAN FOR CBCS (FOR HONS)															
NAME	OF '	THE D	EPAI	RTMEN	Т							ВОТ	ANY			
HOD			DR.	ARUNE	EMA	BARDA	HN									
INITIA	LS O	F FAC	ULTI	ES	AC	AB	SDC	G SS	)	ABJ						
PERIO	D OF	•		FROM	JUL	/ 2022 T	O DEC	EMBER	2022	•	HON	IS				
SEME	STER										<b>-</b>   √			√		
				SEC				CDE	DIT		Con					
SEN	Λ	3				1		CRE PO		2		ırse de		В	OTSSECO	)1M
Name	- 6 1	6-				Di				/ - I f						
	ame of the Course Plant Diversity and Human Welfare  DR. ARUNEEMA BARDAHN															
	TAL MARKS 25 TH √ TUT											PR	RAC			
	OTAL HOURS   30 hrs								101					.,		
		0113		justed t	o 29	hrs)										
						•										
UNIT/	JNIT/ SECTION/ GROUP/ MODULE/ TOPIC 1															
NANAE	OE.	TUEI	INIIT /	MODU	1 5			Dlant	divorc	l ity and i	tc ccor					
TOTAL				hrs		EORY		√ V		ORIAL			PRAC			
				hrs				Y TOTORIAL								
			DIS	STRIBU	TION	OF LESS	ON PI	LAN (M	IODUL	E/ UNIT,	/ SECT	ION/	TOPI	c wis	E)	
SL							OPIC						HR	TE	ACHER	MONTH
1		netic d tem le		sity, Spe	ecies	diversity	and f	Plant di	versity	at the e	eco-		1		AB	AUG
2		obiod		itv									1		AB	AUG
	)														· .=	
3	Cult	tivate	d pla	nt taxa,	wild	taxa							1		AB	AUG
4	4 Values and uses of Biodiversity: Ethio								thetic	values			1		AB	SEPT
5	Pre	cautic	onary	princip	le								1		AB	SEPT
6	Me	thodo	logie	es for va	luati	on							1		AB	SEPT
7	Use	s of p	lants	and Us	ses of	f microb	es						1		AB	OCT
8**																
	TO	ΓΔΙ Η	OUR	ς									7 hrs			

<sup>\*\*\*</sup> Alloted total 8 hours adjusted to 7 hours.

UNIT/	SECTION/	GROUP/ M	ODULE/ TOPIC	2					
NAME	E OF THE U	NIT/MODUL	.E	Loss o	f Biodivers	ity		l l	
TOTA	L HOURS	8 hrs	THEORY	√	TUTORI	AL		PRAC	
		DISTRIBU	JTION OF LESSO	N PLAN	(MODULE/	UNIT/	SECTION		
SL			TOPIC				HR	TEACHER	MONTH
1	Loss of g	genetic diver	sity, Loss of speci	es diver	rsity		1	AB	NOV
2		cosystem di grobiodivers	•				1	AB	NOV
3	Projecte	d scenario o	f Bio-diversity los	S			1	AB	NOV
4	Manage	ment of Plai	nt Biodiversity: C	Organizations associated			1	AB	NOV
	with bio	diversity ma	nagement-Metho	dology	for executi	on-			
	IUCN, UI	NEP, UNESCO	ס						
5	Manage	ment of Plai	nt Biodiversity: C	rganiza	tions associ	ated	1	AB	DEC
	with bio	diversity ma	nagement-Metho	dology	for execution	on-			
	WWF, N	BPGR							
6	Biodiver	sity legislatio	on and conservat	ons,			1	AB	DEC
7	Biodiver	sity informat	tion managemen	t and co	mmunicatio	on	1	AB	DEC
8	Class Te	st					1	AB	DEC
	TOTAL F	IOURS					8 hrs		

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC												
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	In situ conservation							1	SDG	SEPT		
5	En situ conservation							1	SDG	SEPT		
6	Social approaches to conservation.							1	SDG	SEPT		
7	Social approaches to conservation							1	SDG	SEPT		
8	Biodiversit	ty awarenes	s programmes an	d Su	ıstainable deve	lopm	ent.	1	SDG	NOV		
	TOTAL HOURS							8 hrs				

UNIT/ SECTION/ GROUP/ MODULE/ TOPIC				4								
NAME OF THE UNIT/MODULE				Ro	Role of plants in relation to Human Welfare							
TOTAL HOURS 6 hrs THEORY					√ TUTORIAL			PRA	С			
DISTRIBUTION OF LESSON PLAN (MODULE/ UNIT/ SECTION/ TOPIC WISE)												
SL	TOPIC							HR	TEACH	IER	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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