ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMME

BACHELOR OF SCIENCE IN BIOTECHNOLOGY THREE YEARS /

BACHELOR OF SCIENCE (HONOURS) IN BIOTECHNOLOGY FOUR YEARS

Learning Outcome Based Curriculum Framework (LOCF)

Choice based Flexible Credit System Academic Year 2023 – 2024



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956) Kattankulathur, Chengalpattu

District 603203, Tamil Nadu, India

DEPARTMENT OF BIOTECHNOLOGY

	Department Vision Statement
Stmt - 1	Creating the most conducive environment for imparting quality education in Biotechnology
Stmt - 2	Contributing effectively to produce globally competent quality professionals in the field of life science
Stmt - 3	Contributing towards preparing young minds to serve community

2. Dep	artment Mission Statement
Stmt - 1	Impart student's essential knowledge and skills required for a successful career in life science
Stmt - 2	Instill confidence in the students to take up new challenges by grooming them appropriately
Stmt - 3	Inculcate in the students a sense of commitment to professional ethics, moral values with emphasis on team work and leadership qualities
	Instill the students with a clear awareness of environmental issues and their relevance to their profession
Stmt - 5	Impress upon the students the impact of their work on the nation's economic and social progress

3. Program Education Objectives (PEO)
PEO - 1 Offer the students those skill sets and domain knowledge based on needs of current trends in biotechnology
PEO - 2 Provide the students with the capabilities in the areas of analysis, design, development and testing
PEO - 3 Kindle the minds of students to take up research and development in life science with missionary zeal
PEO - 4 Train the students to become effective communicators in professional as well as general aspects of life
PEO - 5 Prepare the students into balanced individuals who are keen to leave a mark by excelling in their profession

4. Con	sistency of	f PEO's with Mission o	of the Department		
	Mission Stmt. – 1	Mission Stmt 2	Mission Stmt 3	Mission Stmt 4	Mission Stmt. – 5
PEO - 1	Н	Н	M	Н	M
PEO - 2	Н	M	Н	Н	н
PEO - 3	М	Н	M	Н	// H
PEO - 4	Н	Н	Н-3	L	M
PEO - 5	L	> L HOAD	M	Н	H/

H – High Correlation, M – Medium Correlation, L – Low Correlation

1. D	Discipline Specific Core Courses (C) (20 Courses)							
Course Code	Course Title		Hours/ Week					
		L	Т	Р	0	С		
	Cell Biology	3	0	3	2	4		
	Microbiology	3	0	3	2	4		
UBT23103J	Genetics	3	0	2	2	4		
	Biochemistry	3	0	3	2	4		
UBT23202J	Molecular Biology	3	0	3	2	4		
UBT23203J	Computational Biology	3	0	2	2	4		
UBT23301J	Biophysics & Bioinstrumentation	3	0	3	2	4		
UBT23302J	Enzymology	3	0	3	2	4		
UBT23303J	Bioprocess Technology	3	0	3	2	4		
UBT23401J	Food Biotechnology	3	0	3	2	4		
UBT23402J	Genetic Engineering	3	0	3	2	4		
UBT23403J	Nanobiotechnology	3	0	3	2	4		
UBT23501J	Cheminformatics	3	0	3	2	4		
UBT23502J	Plant Biotechnology	3	0	3	2	4		
UBT23503T	Signal Transduction	4	0	0	2	4		
UBT23601J	Animal Biotechnology	3	0	3	2	4		
UBT23602J	Immunology	3	0	3	2	4		
UBT23603T	Research Methodology	4	0	0	2	4		
UBT23701J	Biotechnology	3	0	3	2	4		
UBT23801J	Biopython	2	0	4	2	4		
	Total Learning Credits					80		

	Discipline Specific Elective Courses (D) (10 Courses)										
	Course	Course	Hours/ Week								
	Code	Title	L	т	Р	0	С				
	UBT23D01T	Biofertilizer Technology									
	UBT23D02T	Pharmaceutical Biotechnology	4	0	0	2	4				
	UBT23D03T	Forensic Science	4	0	0	2	4				
	UBT23D04T	Bioenergy	4	U	U	2	4				
	UBT23D05J	Stem cell Biology	3	0	3	2	4				
	UBT23D06J	Algal Biotechnology	3	U	3	2	4				
	UBT23D07T	Human Physiology	4	0	0	2	4				
	UBT23D08T	Medical Biotechnology	4	U	U	2	4				
	UBT23D09T	Cancer Biology	4	0	0	0	4				
i	UBT23D10T	Diagnostic Tools	4	0	0	2	4				
		Total Learning Credits					20				

3. Generic Elective Courses (G) (6 Course) Hours

Course	Course	ourse Hours/ Week																									
Code	Title	L	Т	Р	0	С																					
ULT23G01J	Tamil-I																										
ULH23G01J	Hindi-I	2	2	2	2	0	2	2	3																		
ULF23G01J	French-I																										
ULT23G02J	Tamil-II																										
ULH23G02J	Hindi-II	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2 0	2 (2	2	2 0	0	2	2	2	2	3
ULF23G02J	French-II																										
UBT23G01J	Microbial physiology	2	0	4	2	4																					
UBT23G02T	Developmental Biology	4	0	0	2	4																					
UBT23G03J	Mushroom Cultivation	0	0	8	2	4																					
UBT23G04T	Tissue Engineering	4	0	0	2	4																					
UBT23G05T	Marine biotechnology	4	0	0	2	4																					
UBT23G06T	Biomaterials	4	0	0	2	4																					
UBT23G07T	Disease management	4	0	0	2	4																					
	Total Learning Credits					34																					

4. Ski	I Enhancement Courses(S) (5	Со	urs	ses	5)	
Course Code	vveek		Course Title			
Code	Title	L	Т	Р	0	С
UCD23S01L	Quantitative Aptitude and Logical Reasoning	0	0	2	2	1
UCD23S02T	Verbal Ability and Skill Development	2	0	0	2	2
UBT23S01T	Mathematical Calculations in Biology	1	0	0	2	1
UBT23S02T	Entrepreneurship in Biotechnology	2	0	0	2	2
UBT23S03T	Bioethics & IPR	1	0	0	2	1
	Total Learning Credits					20

5. Ability Enhancement Courses (AE) (10 Courses)

(10 Courses)								
Course	Course		Course Wee			week		
Code	Title	L T P 4 0 0	0	С				
ULE23AE1T	English	4	0	0	2	4		
ULT23AE1J	Applied Tamil – I							
ULH23AE1J	Applied Hindi – I	1	0	2	2	2		
ULF23AE1J	French for specific purpose-							
ULT23AE2J	Applied Tamil – II							
ULH23AE2J	Applied Hindi – II	1	0	2	2	2		
ULF23AE2J	French for specific purpose-			1		_		
UES23AE1T	Environmental Studies	3	0	0	2	3		
	Total Learning Credits					20		

6. Value Addition Course (V) (4 Courses)								
Course Course Hours/ Week								
Code	Title	L	т	Р	0	С		
UCD23V01T	Universal Human Values	2	0	0	2	2		
UEN23V01L	Communication Skills	0	0	4	2	2		
UCD23V02T	Industry Oriented Employability Skills for Science	2	0	0	2	2		
UCD23V05T	Career Readiness and Professional Skills	2	0	0	2	2		
	Total Learning Credits					8		

7. Internship/Apprenticeship / Project/ Community Outreach (IAPC) (6 Courses)							
Course Course Hours/ Week							
Code	Title	L	Т	Р	0	С	
UBT23P01L	Internship - 1					1	
UBT23P02L	Internship - 2					1	
UBT23P03L	Internship - 3					2	
UBT23P04L	Mini Project			4	2	2	
UBT23P05L	Project Phase-I			8	2	4	
UBT23P06L	Project Phase-II			12	2	6	
Т	otal Learning Credits	S				16	

8. Mandatory Courses(M) (2 Courses)									
Course Code	Course Title	Hours/ Week							
Code	ritie	L	Т	Р	0	С			
UNS23M01L	NSS								
UNC23M01L	NCC								
UNO23M01L	NSO								
UYG23M01L	YOGA								
UMI23M01L	My India Project								
Т	otal Learning Credits								



STRUCTURE OF UG COURSES IN BIOTECHNOLOGY DISTRIBUTION OF DIFFERENT COURSES IN EACH SEMESTER WITH THEIR CREDITS FORB.sc. BIOTECHNOLOGY

Semester	Discipline Specific Core Courses (C)	Discipline Specific Elective (D)	Ability Enhancement Courses (AE)	Skill Enhancement Course (S) Value Addition Course (V)	Generic Elective (G)	Internship/ Project / Apprenticeship / Community Outreach (IAPC)	Total Credits
Semester I	C-1 C-2 C-3 (12)		AE-1 (4)	S-1 (1) V-1 (2)	(3)	9	22
Semester II	C-4 C-5 C-6 (12)	all the	AE-2 (3)	S-2 (2) V-2 (2)	G-2 (3)	Ve	22
Semester III	C-7 C-8 C-9 (12)		AE-3 (2)	S-3 (1) V-3 (2)	G-3 (4)	IAPC-1 (1)	22
SemesterIV	C-10 C-11 C-12 (12)		AE-4 (2)	S-4 (2) V-4 (2)	G-4 (4)		22
Semester V	C-13 C-14 C-15 (12)	D - 1 (4)		S-5 (1)	G-5 (4)	IAPC-2 (1)	22
Semester VI	C-16 C-17 C-18 (12)	D -2 (4)	RN · I	EAP.	G-6 (4)	IAPC (2)	22
SemesterVII	C-19 (4)	D -3 (4)			G-7 G-8 (8)	IAPC-3 (6)	22
SemesterVIII	C-20 (4)	D -4 D 5 (8)			G-9 (4)	IAPC (6)	22
Total Credits	80	20	11	15	34	16	176

	SEMESTER	MU 12					
Code	Course Title	Hours/ W	Hours/ Week				
	A Contract of the Contract of	L	T	Р	0	С	
ULT23G01J	Tamil-I	100	180				
ULH23G01J	Hindi-I	2	0	2	2	3	
ULF23G01J	French-I	(大)	w \ \				
ULE23AE1T	English	4	0	0	2	4	
UBT23101J	Cell Biology	3	0	3	2	4	
UBT23102J	Microbiology	3	0	3	2	4	
UBT23103J	Genetics	3	0	2	2	4	
UCD23S01L	Quantitative aptitude and Logical reasoning	0	0	2	2	1	
UCD23V01T	Universal Human Values	2	0	0	2	2	
Total Learning Credits		17	0	12	14	22	
Total number of hours /weel					7	29	
	LEARIV-LE	AP-IEA	DE			1	

	SEMESTER II					
Code	Course Title	Hours/ Week				
		L	Т	Р	0	С
ULT23G02J	Tamil-II	2	0	2	2	3

ULH23G02J	Hindi-II	Aa.				
ULF23G02J	French-II	-4V				
UES23AE1T	Environmental Studies	3	0	0	2	3
UBT23201J	Biochemistry	3	0	3	2	4
UBT23202J	Molecular Biology	3	0	3	2	4
UBT23203J	Computational Biology	3	0	2	2	4
UCD23S02T	Verbal Ability and Skill Development	2	0	0	2	2
UEN23V01L	Communication Skills	0	0	4	2	2
Total Learning Credits		16	0	14	14	22
Total number of hours /week						30

1	SEMESTER III		7,9					
Code	Course Title		Hours/ Week					
		L	T	P	0	С		
UBT23301J	Biophysics and Bioinstrumentation	3	0	3	2	4		
UBT23302J	Enzymology	3	0	3	2	4		
UBT23303J	Bioprocess Technology	3	0	3	2	4		
ULT23AE1J	Applied Tamil – I	1	0	2	2	2		
ULH23AE1J	Applied Hindi – I							
ULF23AE1J	French for specific purpose-I							

Microbial physiology	2	0	4	2	4		
Mathematical Calculations in Biology	1	0	0	2	1		
Internship – I		⁴ 2). \			1		
Industry Oriented Employability Skills for Science	2	0	0	2	2		
	15	0	15	14	22		
Total number of hours /week							
	Mathematical Calculations in Biology Internship – I	Mathematical Calculations in Biology 1 Internship – I Industry Oriented Employability Skills for Science 2	Mathematical Calculations in Biology 1 0 Internship – I Industry Oriented Employability Skills for Science 2 0	Mathematical Calculations in Biology 1 0 0 Internship – I Industry Oriented Employability Skills for Science 2 0 0	Mathematical Calculations in Biology 1 0 0 2 Internship – I Industry Oriented Employability Skills for Science 2 0 0 2		

	SEMESTER IV						
Code	Course Title		Hours/ Week				
		L	Т	P	0	С	
UBT23401J	Food Biotechnology	3	0	3	2	4	
UBT23402J	Genetic Engineering	3	0	3	2	4	
UBT23403J	Nanobiotechnology	3	0	3	2	4	
ULT23AE2J	Applied Tamil – II	1	0	2	2	2	
ULH23AE2J	Applied Hindi - II						
ULF23AE2J	French for specific purpose-II	EAL		. /			
UBT23G02T	Developmental Biology	4	0	0	2	4	
UBT23S02T	Entrprenurship in Biotechnology	2	0	0	2	2	
UCD23V05T	Career Readiness and Professional Skills	2	0	0	2	2	

Total Learning Credits	a Sullanue	18	0	11	14	22
Total number of hours /week		VV				29
	The same of the sa		25.			

SEMESTER V									
Code	Course Title		Hours/ Week						
		, L	Т	Р	0	С			
UBT23501J	Cheminformatics	3	0	3	2	4			
UBT23502J	Plant Biotechnology	3	0	3	2	4			
UBT23503T	Signal transduction	4	0	0	2	4			
UBT23D01T	Biofertilizer Technology	4	0	0	2	4			
UBT23D02T	Pharmaceutical Biotechnology		1/ 5						
UBT23G03J	Mushroom Cultivation	0	0	8	2	4			
UBT23S03T	Bioethics & IPR	AD TRAT	0	0	2	1			
UBT23P02L	Internship – II	TEAL		. /		1			
Fotal Learning Credits		15	0	14	12	22			
Total number of hours /wee	k			•	•	29			

	SEMESTER VI	CAL						
Code	Course Title		Hours/ Week					
	The Mary	L	Т	P	0	С		
UBT23601J	Animal Biotechnology	3	0	3	2	4		
UBT23602J	Immunology	3	0	3	2	4		
UBT23603T	Research Methodology	4	0	0	2	4		
UBT23D03T	Forensic Science	4	0	0	2	4		
UBT23D04T	Bioenergy	La constant	2 (
UBT23G04T	Tissue Engineering	4 - 2	0	0	2	4		
UBT23P04L	Mini Project			4	2	2		
Total Learning Credits		18	0	10	12	22		
Total number of hours /week	2. 11/1	-	7 4			28		

	SEMESTER VII		5/					
Code	Code Course Title			Hours/ Week				
		L	Т	P	0	С		
UBT23701J	Environmental Biotechnology	3	0	3	2	4		
UBT23D05J	Stem cell biology	2	0		2	4		
UBT23D06J	Algal Biotechnology	3	0	3	2	4		

		OTENOS					
UBT23G05T	Marine Biotechnology	SCHERE	4	0	0	2	4
UBT23G06T	Biomaterials		4	0	0	2	4
UBT23P03L	Internship – III	And Wiles		3 5. 1			2
UBT23P05L	Project Phase- I	ATTEND		62	8	2	4
Total Learning Credits			14	0	14	10	22
Total number of hours /week	8/		. N.	10			28
	55 3	Sales Mass	200	7	4		•

	SEMESTER VIII	100				
			Hours/V	Veek		
Code	Course Title	L	To	P	0	С
UBT23801J	Biopython	2	0	4	2	4
UBT23D07T	Human Physiology	1	70	0	2	4
UBT23D08T	Medical Biotechnology	4	50	0	2	4
UBT23D09T	Cancer Biology	LEAD	0	0	2	4
UBT23D10T	Diagnostic Tools	4	0	0	2	4
UBT23G07T	Disease management	4	0	0	2	4
UBT23P06L	Project Phase – II			12	2	6
Total Learning Credits	***************************************	14	0	16	10	22

Total number of hours /week	SCHEET LE	30
-----------------------------	-----------	----

Courses for earning Additional Credits

Course Code	Course Tible		Hou	rs/ Week		
Course Code	Course Title	L	Т	Р	0	С
Semester – II						
UCD23P01L	Internship Report- I					
UCD23P02L	Project Work – I	0	0	8	0	4
UCD23P03L	Apprenticeship – I					
Semester – IV						
UCD23P04L	Internship Report- II					
UCD23P05L	Project Work – II	0	0	8	0	4
UCD23P06L	L Apprenticeship – II					
	Total Learning Credits	0	0	8	0	4

Note: Those students who decide to exit at the end of the First year shall register for any one of the courses mentioned under Semester – II; and decide to exit at the end of the Second year shall register for any one of the courses mentioned under Semester – IV in the above list.

Programme A	Articulation Matrix												
Course Code	Course Name	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	Independent and lifelong learning	PSO-1	PS0-2	PSO-3	PSO-4	PSO-5
ULT23G01T	Tamil-I	Н	Н	I	M	Н	I	M	ェ	M	I	Ŧ	I
ULH23G0T	Hindi-I	I	I	ェ	I	I	エ	Σ	I	I	I	I	I
ULF23G01J	French-I	I	I	エ	Σ	I	I	Σ	I	Н	エ	I	I
ULE23AE1T	English	Н	Н	М	Н	Н	Н	Н	Н	М	Н	Н	Н
UBT23101J	Cell Biology	Н	Н	М	Н	Н	Н	Н	Н	М	Н	Н	Н
UBT23102J	Microbiology	Н	Н	М	Н	М	L	М	М	L	L	М	Н
UBT23103J	Genetics	Н	Н	М	М	М	L	M	М	L	М	L	Н
UCD23S01L	Quantitative Aptitude and Logical Reasoning	Н	Н	Н	Н	Н	Н	М	Н	Н	M	L	Н
UCD23V01T	Universal Human Values	Н	Н	М	М	М	Н	L	М	Н	M	L	Н
ULT23G02J	Tamil-II	Н	Ξ	М	M	M	Н	Μ	M	L	М	L	Н
ULH23G02T	Hindi-II	Н	М	М	M	M	Н	М	Н	M	M	L	Н
ULF23G02J	French-II	Н	M	М	M	M	Н	Τ	M	М	M	L	Н
UES23AE1T	Environmental Studies	I	Ξ	М	М	М	Н	Ή	М	М	M	Н	Н
UBT23201J	Biochemistry Biochemistry	Н	Н	Н	Н	М	Н	Н	М	М	Н	М	Н
UBT23202J	Molecular Biology	Н	Н	М	Н	M	Н	M	М	Н	Н	L	Н
UBT23203J	Computational Biology	H	Н	Н	Н	М	Н	M	Н	М	М	М	Н
UCD23S02T	Verbal Ability and Skill Development	Н	Н	Н	Н	M	Н	Н	Н	Н	Н	Н	Н
UEN23V01L	Communication Skills	Н	H	М	Н	М	Н	М	Н	Η	Н	L	Н
UBT23301J	Biophysics & Bioinstrumentation	Н	Н	М	М	М	Н	M	Н	Ξ.	Н	М	Н
UBT23302J	Enzymology	Н	Н	Н	Н	M	Н	L	Н	M	Н	M	Н

LIDTOOOOC	Discussion Technology	1.11		1.4	ш	N /	-			N.4	N/I	N /	ш
UBT23303J	Bioprocess Technology	Н	Н	M	Н	M	H	-	L	M	M	М	Н
ULT23AE1J	Applied Tamil – I		Н	M	Н	M	_	L	L	M	M	L	Н
ULH23AE1J	Applied Hindi – I	H	H	M	M	Н	T	Н	M	M	M	M -H	H
ULF23AE1J	French for specific purpose-I							L	L				
UBT23G01J	Microbial physiology	Н	Н	M	М	M	L.	Ļ.	L	M	M	L	Н
UBT23S01T	Mathematical Calculations in Biology	Н	Н	М	Н	М	L	L	Ļ	М	М	L	Н
UBT23P01L	Internship – 1	Н	Н	Н	М	Н	H	M	. Т	Н	Н	M	Н
UCD23V02T	Industry Oriented Employability	Н	Н	М	Н	М	L	L	L	M	M	М	Н
	Skills for Science	L.											
UBT23401J	Food Biotechnology	Н	Н	М	М	Η:	Н	Н	М	M	M	L	Н
UBT23402J	Genetic Engineering	Н	Н	Н	Н	Н	Н	M	Н	Н	Н	Н	Н
UBT23403J	Nanobiotechnology	Н	М	М	М	М	Н	М	М	М	М	H.	Н
ULT23AE2J	Applied Tamil – II	Н	М	М	М	М	L	М	L	М	М	М	Н
ULH23AE2J	Applied Hindi – II	Н	Н	М	М	М	L	L	L	М	М	M	M
ULF23AE2J	French for specific purpose-II	Н	М	М	М	М	H	М	М	М	М	Н	Н
UBT23G02J	Developmental Biology	Н	M	М	М	M	Н	M	M	М	M	Н	Н
UBT23S02T	Entrprenurship in Biotechnology	Н	Н	Н	Н	М	L	L	L	М	L	М	Н
UCD23V05T	Career Readiness and Professional Skills	Н	Н	М	Ŧ	M	L	M	М	Ш	ш	Μ	Н
UBT23501J	Cheminformatics	Н	Н	М	Н	М	L	L	L	М	M	M	Н
UBT23502J	Plant Biotechnology	Н	Н	М	М	Η	Н	Н	М	М	M	L	Н
UBT23503T	Signal transduction	Н	Н	М	М	, L	L	L	L	L	L	L	Н
UBT23D01T	Biofertilizer Technology	Н	Н	М	М	М	L	L	L	L	L	L	Н
UBT23D02T	Pharmaceutical Biotechnology	Н	М	М	М	М	L	М	L	М	M	M	Н
UBT23G03J	Mushroom Cultivation	Н	Н	М	М	M	L	L	L	M	M	M	M
UBT23S03T	Bioethics & IPR	Н	Н	Н	Н	Н	Η	Н	Н	Н	Н	Н	Н
UBT23P02L	Internship – 2	Н	Н	М	Н	Н	Н	Н	Н	М	Н	Н	Н
UBT23601J	Animal Biotechnology	Н	Н	М	Н	Н	Н	Н	Н	М	Н	Н	Н
UBT23602J	Immunology	Н	Н	Н	Н	М	L	Ŀ	L	М	М	М	М
UBT23603T	Research Methodology	Н	Н	Н	Н	М	L	L	Ĺ	Н	L	М	Н
UBT23D03T	Forensic Science	Н	М	Н	М	L	L	L	М	М	-	Н	
UBT23D04T	Bioenergy	Н	М	М	Н	Н	Н	М	М	М	-	Н	
UBT23G04J	Tissue Engineering	Н	М	М	М	L	E	L	М	М	-	Н	-
UBT23P04L	Mini Project	Н	М	М	М	Ū	L	Ĺ	М	М	-	Н	
UBT23701J	Environmental Biotechnology	Н	М	Н	М	L	L	L	М	М		Н	-
UBT23D05T	Stem cell biology	Н	Н	М	Н	Н	М	Н	Н	Н	-	Н	-
UBT23D06T	Algal Biotechnology	Н	М	Н	М	L	L	L	М	М	-	Н	-
UBT23G05J	Marine Biotechnology	Н	M	М	Н	Н	Н	M	M	М	-	Н	-
UBT23G06J	Biomaterials	Н	М	М	М	L	Ĺ	L	M	M	Н	Н	Н
UBT23P03L	Internship – 3	Н	Н	М	М	H	Н	H	M	М	Н	Н	Н
UBT23P05L	Project Phase-I	Н	M	M	M	L	Ĺ	L	M	M	M	М	M
UBT23801J	Biopython	Н	M	Н	M	Ė	L	L	M	M	L	M	Н
UBT23D07T	Human Physiology	Н	Н	M	Н	Н	М	Н	Н	Н	-	Н	-
001230071	riuman i nysiology	1					141						Ь

UBT23D08T	Medical Biotechnology	Н	М	Н	М	L	L	L	М	М	-	Н	-
UBT23D09T	Cancer Biology	Н	М	М	Н	Н	Н	М	M	М	-	Н	
UBT23D10T	Diagnostic Tools	Н	M	М	М	L	L	L	M	М	Н	Н	Н
UBT23G07J	Disease management	Н	M	Н	М	L	L	L	М	М	Н	Н	Н
UBT23P06L	Project Phase-II	Н	Н	М	Н	Н	М	Н	Н	Н	М	M	M
	Program Average	Н	Н	М	Н	М	L	L	L	М	M	M	Н





















SEMESTER I

SLO-1 புதுக்கவிதை உருவாக்கம்

SLO-2 புதுக்கவிதை வளர்ச்சிநெறிகள்

S-4

பெண் கவிஞர்கள்

கவிதையில் <mark>நாட்டுப்புற வடிவம்</mark>

Cours	1111	T23G01J	Course Name	Tamil - I		Course Ca	tegory		G	10	Gene	ric Ele	ective	e Cou	ırse			L		T 0	P 2	0 2		C 3
Co	requisit ourses	IVII		Co-requisite Courses	:1	والألاة			essive Irses	Nil	7	9		١										
Course	Offering	g Department	Tamil	Data Book	c / Code	s/Standards	1						4		Nil									
Course	Learnin	ng Rationale (CLR): The purpose of le	arning this course is to:	3/14			Lear	ning			7		Prog	jram L	.earn	ing C	Outcor	nes (PLO)				
CLR-1	் மர	பிலிருந்து மா	ரற்றம <mark>் பெற்ற பு</mark> துக்கவிதை ம	மரபின் சிந்தனைகளை அறியச் செய்தல்			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 CLR-3 CLR-4 CLR-5	3 : சிற் 1 : நவ	நிலக்கியங்க பீன தமிழ் இவ	ள், க <mark>ாப்பியங்</mark> கள் கற்பிக்கும் லக்க <mark>ிய வளர்ச்</mark> சி வரலாற்றை	ழுமியங்களைத் தெரியச் செய்தல் தமிழ்ச் சமூகத்தின் வாழ்வியலை அறியச் ப் புரியச் செய்தல் பு நுட்பங்களைத் தெரியச் செய்தல்	் செய்த	ல்	of Thinking	Expected Proficiency	Expected Attainment	imental	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	tical Skills	-	-2	3
Course CLO-1		ng Outcomes		urse, learners will be able to: எகக் களங்களை அறிந்துகொள்ளுதல்		34.1	Fevel 2	Ded X3	Expec	Funda	- Applic	H Link with Re	Proce	H Skills	H Ability to Uti	- Skills	≥ Analy	H Invest	M Proble	- Comn	± Analytical		PSO -	PSO-3
LCLO-			- F F F F F F F F F F F F F F F F F F F	ம் மானுட விழுமியங்களைத் தெரிந்துகெ.	ாள்ளுக	ல்	2	80	70	Н	M	Н	L	М	H	L	Н	M	L	Н	Н	-	-	-
CLO-3				முறைகளை உணர்ந்துகொள்ளுதல்	٠,	20 1 7 7	2	70	65	Н	L	Н	M	Н	Н	М	Н	L	Н	М	Н	-	-	-
CLO-4		ரீன இலக்கிய சிந்துகொள்		ி வரலாறு, சமூக வரலாறு பெற்ற வளர்ச்சி	ி நிலை	களைத்	2	70	70	Н	М	Н	L	Н	М	М	Н	Н	L F	Н	Н	-	-	-
CLO-5	் : பெ	ாழியின் நுட்	பங்க <mark>ளை அறிந்</mark> து மொழி ஆ	_{பு} ளுமையோடு செயல்பட அறிந்துகொள்ளு	ருதல்	17777	2	80	70	Н	М	Н	Н	М	Н	L	М	Н	L	Н	Н	-	-	_
Durat (hou			12	12			12				7		12		7		T			1	12			
		தமிழ் இலக்கி போக்குகள்	ியத்தின் <mark>வளர்ச்சிப்</mark>	நவீன கவிதை தோற்றம்	த	மிழரின் வீரமரபு				சிற்றி	லக்கிய	பத் தே	ரூற்ற	ம்			த	மிழ் உ	உரை	நடை	மரபி	ல் உ.(3ഖ.	₽/T.
S-1 S	LO-2	இலக்கிய உத்	திகள்	நவீன கவிதை வரலாறு	G	பார் விழுமியங்க	ள்			சிற்றி	லக்கிய	ப வன	கபை	۵			J	ாஜ ை	வத்தி	ியம்				
	LO-1	தமிழ்க் கவிை	த மரபு	நவீன கவிதை செல்நெறிகள்	ப	ரணி அறிமுகம்	D.	ī	T	சிற்றி	லக்கிய	பங்கள	ī				ଶ	வத்த	பெர்க	ளின்	சிறப்ப	4		
S-2 S	LO-2	காலந்தோறும்	ம் கவிதையின் கரு	செல்நெறிகளில் கோட்பாடுகள்	Ш	ரணி இலக்கியங்	கள்	1	Æ	முத	ள்மைச்	சிற்றி	லக்கி	யெங்க	கள் –		க	ழனியூ	பூரன்	– அறி	முகப	å		
	LO-1	காலந்தோறும்	ம் கவிதையின் கட்டமை <mark>ப்பு</mark>	<mark>கவிதை</mark> மொழி	க	லிங்கத்துப்பரணி	477,49	0		பிள்	ளைத்த	மிழ் - ச	உலா	- தூ	5 J		F	றுதெ	ய்வ	வழிப	ாடு			
S-3 S	LO-2	தற்கால இலக்	ந் கியம்	நவீன கவி ஆளுமைகள்	த	லைவனின் வீரம்				புதுக்	ക്ഷി െ	தயில்	சமூச	கம்			6	பான்	காத்த	த ஐய	னார்			

தமிழ் இலக்கிய மரபில் தூது

தூது இலக்கியங்கள்

Biotechnology 25

<mark>புதுக்கவிதையு</mark>ம் இதழ்களும்

<mark>மணிக்</mark>கொடி இதழ்

விருந்து – கள்ளர் செயல்கள்

பிழை நீக்கி எழுதுதல்

5-5	SLO-1	பாரதியார் – புதுக்கவிதையின் அடையாளம்	இ <mark>ளம்பி</mark> றை – அம்மா	தமிழ் விடு தூது (184 – 186)	எழுத்து இ <mark>தழ்</mark>	எழுத்துப் பிழை
-5	SLO-2	பாரதியார் பன்முக ஆளுமைத் <mark>திறன்</mark>	பெண்களின் கல்வி நிலை	தமிழின் பெருமை	வானம்பாடி இதழ்	தொடர்பிழை
	SL0-1	பாரத தேசம்	பெண் அடக்குமுறை	செய்யுள் மரபில் கலம்பகம்	சிறுகதை தோற்றம்	உயர்திணை, அஃறிணை
-6	SLO-2	பாரததேசத்தின் வளம்	ப. கல்பனா – கீறல் விழுந்த மாலைக் காலங்கள்	கலம்பக இலக்கியங்கள்	சிறுகதை வளர்ச்சி	பிறமொழிச் சொற்கள் வரலாறு
.7	SL0-1	வெள்ளிப் பனிமலை <mark>யின்</mark> மீதுலவுவோம்	ஆண் பெண் சமத்துவம்	நந்திக் கலம்பகம்-வானுறு மதியை (110)	சிறுகதை – வரலாறு	பிறமொழிச் சொற்களை நீக்கி எழுதுதல்
'	SLO-2	20 ஆம் நூற்றாண்டு <mark>க் கவிதை</mark> மரபில் பாரதிதாசன்	விளிம்புநிலை வாழ்வியல்	கையறுநிலை	சிறுகதை ஆசிரியர்கள்	<mark>ஷ</mark> , ஜ, ஸ, ஹ மாற்றொலிகள்
	SLO-1	பாரதிதாசன் - அழ <mark>கின் சிரிப்</mark> பு	திருநங்கை குணவதி - சமூகப்பார்வை	குறவஞ்சி அறிமுகம்	இதழ்களும் சிறுகதையும்	<mark>தமி</mark> ழ் இலக்கண நுட்பங்கள்
8	SLO-2	ஆல் - ஆயிரம் கி <mark>ளைகள் க</mark> ொண்ட அடிமரம்	திருநர்களும் சாதனைகளும்	குறவஞ்சி இலக்கியங்கள்	புதினம் தோற்றம்	<mark>இல</mark> க்கணமும் பயன்பாடும்
.9	SLO-1	இயற்கையின் அ <mark>ழகியல்</mark>	புலம்பெயர் வாழ்வியல்	குற்றாலக் குறவஞ்சி – ஆடுமர வீனுமணி (3)	தொடக்கக்காலப் புதினங்கள்	<mark>தமிழி</mark> ல் சொல் வகைகள்
,	SLO-2	வானம்பாடியில <mark>் மு.மேத்</mark> தா	ஸர்மிளா ஸெய்யித் – புராதன ஊர்	மலையும் வாழ்வும்	புதினம் வளர்ச்சி	<mark>சொல்</mark> லும் பயன்பாடும்
	SL0-1	மு.மேத்தா - கவி <mark>தையின்</mark> தனித்தன்மைகள்	புலம் பெயர் வாழ்வின் வலியும் நம்பிக்கையும்	காப்பிய இலக்கணம்	புதினத்தின் வகைமை	<mark>பெய</mark> ர்ச்சொற்கள்
10	SLO-2	மனிதனைத்தேடி <mark>– கவிதை</mark>	காலந்தோறும் கவிதை வடிவில் மாற்றங்கள்	காப்பிய வகைமைகள்	புதின ஆசிரியர்கள்	<mark>பெ</mark> யர்ச்சொற்கள் அறிதல்
11 -	SLO-1	மனிதநேயம்	ஹைக்கூ, லிமரைக்கூ, சென்ரியூ – தேர்ந்தெடுத்த கவிதைகள்	சிலப்பதிகாரம் – அறிமுகம்	தமிழ் இலக்கியத்தில் உரைநடைக்கூறுகள்	வினைச்சொற்கள்
11	SLO-2	தமிழ்க் கவிதையில் சு <mark>ற்றுச்சூழலி</mark> யல்	ஹைக்கூ – மு.முருகேஷ்	கட்டுரைக்காதை	உரைநடையின் தோற்றம்	வினைச்சொற்கள் அறிதல்
	SL0-1	பழனிபாரதியின் காடு	லிமரைக்கூ – ஈரோடு தமிழன்பன்	ஊழ்வினை	தமிழில் உரைநடை	தமிழில் பெயரடை, வினையடை
12	SLO-2	இயற்கையும் சமூக சமத்து <mark>வ</mark> வாழ்வியலும்	- சென்ரியூ – மாமதயானை	கோவலனின் முற்பிறப்பு வரலாறு	உரைநடை வளர்த்த அறி <mark>ஞர்கள்</mark>	- பெயரடை, வினையடை அறிதல்

Learning Resources	1. முல்லைக்காடு, <mark>தொகுப்பும்</mark> பதிப்பும் - தமிழ்த்துறை ஆசிரியர்கள், எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல் <mark>விநிறுவனம்,</mark> காட்டாங்குளத்தூர், 603203, 2023 2. வல்லிக்கண்ணன், பு <mark>துக்கவிதை தோற்</mark> றமும் வளர்ச்சியும், ஆழி பதிப்பகம், சென்னை, 2018	4. தமிழ் இணையக் <mark>கல்விக்கழகம்</mark> - <u>http://www.tamilvu.org/</u> 5. மதுரை த <mark>மிழ் இலக்</mark> கிய மின் தொகுப்புத் இட்டம் - https://www.projectmadurai.org/
	3. கா. சிவத்தம்பி, தமிழில் <mark>சிறுகதை தோ</mark> ற்றமும் வளர்ச்சியும், என்.சி.பி.எச்., சென்னை, 2013	nups.//www.projecunaduran.org/

	Dlaam/a			Continuou	us Learning As	sessment (5	0% weightage)				Final Ever	mination (FOO/ waightogs)
	Bloom's Level of Thinking	CLA -	- 1 (10%)	CLA -	2 (10%)	CLA -	3 (20%)	CLA -	4 (10%)#		Final Exal	nination (50% weightage)
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		Theory	Practice
ovol 1	Remember	30%	30%	30%	30%	20%	20%	20%	20%		200/	
evel 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	1	30%	-
evel 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%		50%	
evel 2	Analyze	4070	3076	3076	4070	30%	3076	30%	3076		3076	-
evel 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%		20%	
evel 3	Create	30%	20%	20%	30%	30%	30%	30%	30%	. 700	20%	-
	Total	1(00 %	10	00 %	10	00 %	1	00 %		7.	100 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director <mark>, Mozhi Tr</mark> ust, Thiruvanmiyur, Chennai – 600 041.	1. Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, Pondicherry University, Pondicherry	1. Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR.
		2. Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
		3. Mr. G. Ganesh, Assistant Professor,
		Dept. of Tamil, FSH, SRMIST, RMP.
		4. Dr. T.R.Hebzibah beulah Suganthi,
		Assistant Professor, Dept. of Tamil,
		FSH, SRMIST, KTR.
	F-12	5. Dr. S.Saraswathy, Assistant Professor,
	107	Dept. of Tamil, FSH, SRMIST, KTR.

Code	11111	123G01J Course Name	HINDI-I	Cours Catego		4	G	١,			Ger	neric E	lective	Cours	ie				L 2	T 0	P 2	0 2	C 3
	Pre-requisite(Courses	Co-requisiteCourses	Nil		Progre	ssiveCo	urses	T							N	il						
	Course Offerin		HINDI	Data Book / Codes/Standards										Nil		IV	11						
	Course Chemi	g Doparation		Butta Book / Godes/Grandards					п														
(Course Learning	Rationale (CLR):	The purpose of learning this co	ourse is to:		Learr	ning			Y					Pr	ogram	Learni	ing Οι	ıtcom	es (PL	.0)		
CLF		municate in Hindi without any inhibi		1 2 m 1 = m.	1	2	3	-		2	3	4	5	6	7	8	9	10	11	12	13	14	15
		eciate the Hindi <mark>Language</mark> in its var	ious forms	THE RESIDENCE OF THE PARTY.	evel of Thinking (Bloom)	8	(%	0	n D	ts													
CLF		yze the differe <mark>nt writing st</mark> yles		Company of the Company	360	5	ı tı	7	ng l	Concepts		dge	ion			Data		₩	Skills				
CLF			ld of social Responsibility and Integrity	La Maria and St.) pi	ie.	me		2	Son	p	wle	izat		þ	et	SIIIS	J St	Š				
CLF	R-5 : <i>To be w</i>	illing listener <mark>s and Tran</mark> slators-wher	e need be	A STATE OF THE STA	声	offic	tain	2	2		late	Show Show	cial	İze	Jeilir	l die	S	Vin.	tion	Skills			
					直	P	AAt	3	2	on (Re	<u>a</u>	Spe	∄	Noc	Ĕ	Itive	Sol	ica	IS			
			- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	W. J.	of	Expected Proficiency (%)	Expected Attainment (%)		rundamental Nilowieuge	Application of	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	nvestigative Skills	Problem Solving Skills	Communication	Analytical (<u> </u>	-2	က
Cours	e Learning Ou	itcomes (CLO): At the end of this	course, learners will be able to:		eve	xpe	xpe	9	2	ppli	nk)	000	K∭S	l ≣	S S S S	nal	Nes	恴		nal	PS0 -1	PS0 -2	PS0-3
CLC)-1 : To Unde	erstand the Philosophy of life and liv	ing through Stories		2	ш				∀ H	H	M	L	∀ :	S	M	L	<u></u>	Н				
CLC		nine Travelo <mark>que writin</mark> g and Sketch	ing trilough Stones	The second	2					Н	Н	M	L	Н	Н		L	I	Н		+ -	+-	
CLC		tify Irony and essay based writing		The second of the second	2				_	Н	М	IVI	Н	Н	М		M	M	Н		-	-	+-
			in the proce		2				-	Н	L	Н	M	Н	L	Н	Н	M	_	Н	+-	-	+-
				2					Н	M	Н	IVI	Н	Н	1	Н	M			-	-	+	
CLC)-5 : 10 UNA	Evaluate the various social issues depicted in the prose To Understand the basic and fundamental principal of Translation					90	I	//	П	IVI	Н	L	П	П	L	П	IVI	П	П	-	-	
Dur	ation (hour)	12	12	12							12		+		Н				1	12			
S-1	SLO-1	KAHANI	REKHACHITRA &YATRAVITRANT	NIBANDH			NA	ΓΑΚ		T					/	ANUVA	D& PA	RIBHA	SHIK.	SHAB	DAVA	LI	
	SLO-2	AVDHARNA	VDHARNA	IBANDH KI AVDHARNA)HARNA								RTH							
S-2	SLO-1	SWARUP	WAROOP	WARUP				K KA SV		IP	77					ARIBH/							
	SLO-2	PARIBHASHA	HUMIKA	ARIBHASHA				IBHASH.	Α		7					NARUI							
S-3	SLO-1	KAHANI KE TATVA	AHATVA	AHATVA			AT									RAKAF							
	SLO-2	KAHANI KA MAHATVA	DDESHYA	DDESHYA			PRA.									AHATI							
	SLO-1	PARIKSHA- PREMCHAND	ISHA- EKHACHITRA	UTAJ- NIBANDH			UDD	ESHYA							I	DDESF	łΥΑ						
S-4	01.0.0	WALLANII WA BABIOLIAY	FWWW DADIOUAY	AJARI PRASHAD DIVEDI			D44	1014410		DAD	210114	\ /			1		// D	241/0					
	SLO-2	KAHANI KA PARICHAY	EKHIKA PARICHAY	EKHIKA PARICHAY				IGMANC			RICHA	Υ				VUVAD							
S-5	SLO-1 SLO-2	VISLESHAN EMANDARI KA MAHATVA	ATH KA VISHLESHAN URU SHISHYA KAAMBANDH	ATH KA MAHATVA IPRIT PARISHTHITIYON ME JEEVAN KIS	11			AK KA N AYOJAN		IVA						NUVAD HROT E				ı			
3-0	SL0-2 SL0-1	HONHARI KA PARICHAY	GURU KE PRATI SMARPAN	MANAV KI AKANKSHAYEN	П					NATA	IV) DI	JADTE	MDH										
S-6	SLU-I	HONDAKI KA PAKIUDAT	INIAIVAV NI ANAIVNONATEIV	ANDHER NAGRI-(NATAK) BHARTENDU HARISHCHAND							LAKSHYA BHASHA KA GYAN												
3-0	SLO-2	UDDESHYA	BHAVANA PATH KA MAHATVA	SHANGHARSHIL JEEVAN				HAK PAR		1Y						NUVAL) ΚΑ Γ	ΑΥΙΤΙ	/A				
	SLO-2	MALBE KA MALIK- MOHANRAKESH	HELE PAR HIMALAY	SANGHARSH KA PARINAM				AK KA V			I					NUVAL							
S-7	1220 /	in also for the left more with the sort	(YATRAVITRANT)	3.1.3.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1			,,,,,,,		JLLC		•				ľ			۰,,,,	011				
	SLO-2	LEKHAK PARICHAY	LEKHAK PARICHAY	BHOLARAM KA JEEV-(VYANGYA)HARISH PARSHAI	IANKAF	?	NAT	AK ABHI	VAY						A	NGRE	II SE I	HINDI					

	SLO-1	BATWARE KA YATHARTHVARNAN	YATRAVITRANT KAMAHATVA	VYANGYA KI AVADHARNA	LALCH KA DUSHPARINAM	HINDI SE ANGREJI
S-8	SLO-2	TATKALIN PARISHTHITI KAVARNAN	YATRA KA YATHARTHCHITRAN	MAHATVA	SHISHYA KI AGYANTA	ANUVAD PRIYOJNA KARYA
	SLO-1	APNI MITTI SE LAGAV	PATH KA VISLESHAN	LEKHAK PARICHAY	GURU SHISHYA SAMBANDH	PUNRIKSHAN
S-9	SLO-2	RAJNITIK VIDWESH KA PARINAM	HIMALAY KA VARNANA	PATH KA VIHLESHAN	HASHYA VYANGY SE AVAG <mark>ATKARANA</mark>	VIVIDH PRAYOG
	SLO-1	PROPKAR KI BHAVANA	HIMALAY KA LOK JEEVAN	MADHYAVARGI PARIVAR KI STHITI	DURDRISHTIHIN	PARIBHASHIK SHABDAVALI
S-10	SLO-2	KAHANI PATH	LOK SAMASYA	SARKARI TANTRA KA KHOKHLA RUP	MAHATTAKANKSHI KADUSHPAR <mark>INAM</mark>	ATI MAHTVAPURN SHABD
	SLO-1	KAHANI KA VISHLESH <mark>AN</mark>	UDDESHYA	PAURANIK KATHA KA CHITRAN	GURU KI AVAGYA KADUSHPARINAM	TAKANIKI SHABDAVALI KA MHATVA
S-11	SLO-2	PRASHO KI CHARCHA	PRASHNA ABHYASH	SANVEDANSHIL BHAVANA	TATKALIN SAMAJIK VYAVASTHA KICH <mark>ARCHA</mark>	HINDI SE ANGREZI SHABD
	SLO-1	PRASHN ABHYASH	PATH PRICHARCHA	PARICHARCHA	PARICHARCHA	ANGREZI SE HINDI SHABD
S-12	SLO-2	KAHANI KA UDD <mark>ESHYA</mark>	MAHATVAPURN BIBDUONKI CHARCHA	PRASHANA ABHYASH	PRASHNABHYASH	SHABDAVALI KI AVSHYAKTA

Learning Resources	Edited Book: "	"ς ΔΜΔΝΥΔ ΗΙΝΟΙ"	SRI IONI OK P	I IRI ICATION	2023	New Delhi

- 1. KABIR HAZARI PRASAD DWEDI
- 2. SURD<mark>AS RAM C</mark>HANDRA SHUKL

- 3. BHAKTI ANDOLAN AUR SURDAS KA KAVYA MANAGER PANDEY
- 4. BIHARI VISHVNATH PRASAD MISHR
- 5. Aadhunik Vigyapan aur Jansampark Taresh Bhatia

Learning As	ssessment Bloom's			Continuous Le	earning Assessmer	nt (50% weightag	۹)	100		Final Examination	n (50% weightage)
	Level of Thinking	CLA - 1	I (10%)	CLA - 2		CLA - 3		CLA - 4	(10%)#	T mar Examinate	ii (oo70 iioiginago)
	ů .	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
evel 1	Remember	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand				6.25, 57mm	Marie Control		-			
_evel 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze			Princes			A				
	Evaluate	200/	2007	200/	200/	200/	200/	200/	200/	2007	
_evel 3	Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	Total		100 %	1	100 %	1.000.1	100 %		100 %		100 %

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Shri. Santosh Kumar Editor :	DATE TO STATE OF THE PARTY OF T	3/11
Srijanlok Magazine	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi, CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
Place: Vashishth Nagar, Ara – 802301	/ Limiter Linkle	FALL
		2. Dr. Md.S. Islam Assistant Professor, SRMIST
		3.Dr. S. Razia Begum, Assistant Professor, SRM IST
		4, Dr.Nisha Murlidharan Assistant Professor, VDP,SRM IST

Cours Code	11111	23G01J Course Name	French-I	Cour Catego		G	V	A			Gei	neric	Electiv	e Cou	rse			L 2	T 0	P 2	0 2	C 3
Pi	re-requisite Courses	Nil	Co-requisiteCourses	Nil		Pro	ogressi	veCourses	7	5.					ı	Nil						
C	ourse Offering	Department	French	Data Book / Codes/Standards					٣.	7			Nil									
				- C - 1 2 SEC 10 2																		
Co	urse Learning	Rationale (CLR):	The purpose of learning this c	ourse is to:	æ	Learn	ning							Pro	gram L	.earnii	ng Out	comes	(PLO)			
			The state of the s							1								,				
CLR-1		nd expand their sa <mark>voir-faire thro</mark> ugh the		The West State of the Con-	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2			eaking a foreign language and take position as a fore	eignerspeaking French		1																
CLR-3		m learn the basi <mark>c rules of Fren</mark> ch Gran		277 LTS 184 185 185	Œ	9	9	e e			-		adge									
CLR-4		trategies of co <mark>mprehension o</mark> f texts of		1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1	B00	5)	nt (9	led /	cept		dge	tion	owle		Data		Skills	Skills				
CLR-5	: Strengthe	n the language <mark>of the stude</mark> nts both in	oral and written	THE PARTY OF THE P		Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	99	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	bu	Analyze, Interpret Data	Investigative Skills	lg SI	N SK	S			
				the state of the s	iz	Srofi	∕ttai	ta k	of	Selat	Ϋ́	Deci	tilize	odeli	nterp	le S	olvir	ation	S			
			27 77 1. 11	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	of TH	Expected F	eq	mer	ation	Link with Related	dura	l S	to L	Skills in Modeling	e, II	igati	Problem Solving	Communication	Analytical Skills	_	2	3
Course	Learning Ou	itcomes (CLO): At the end of	this course, learners will be able to:		ivel	bec	bed	pur	plic	¥	ю.	S	oility	SIIS	zdlyz	vest	eldo.	Julic	nalyt	PS0 -1	PS0 -2	PS0-3
CL O 1	. To occur	e knowledge a <mark>bout French</mark> language		make the first factories that	2	75		H	M	Н	Н	M	H	H	A	M	M	Н	Ā	۵.	<u>a.</u>	
CLO-1			re, civilization and translation of French	to the second		80			Н	П	Н	H	М	Н	M	IVI	IVI	Н	M	-	-	
CLO-2		then the knowledge on concept, cultur op content using <mark>the features</mark> in French			2	85	75	M H	Н	L	М	Н	M	П	Н	M	M	Н	Н	-	-	-
CLO-3			0 0						П	L				L		IVI			П	-		
CLO-4		et the French la <mark>nguage into o</mark> ther lang			2	75		Н	L	М	Н	М	Н	Н	М	L	Н	М	L	-	-	-
CLO-5	i: 10 impro	ve the communica <mark>tion, intercultu</mark> ral ele	ements in French language		2	80	75	М	Н	Н	L	М	М	Н	Н	М	L	Н	М	-	-	
Duratio	n (hour)	12	12	12						12	-							12				
24.4	SLO-1	Contacts	Les verbes du premier groupe	Qu'est-ce qu'ils font ?				Portraits		Ħ				Les	verbes	s du d	euxièm	e arou	pe –			
S-1	SLO-2	Emma la championne	Les exemples	Les exemples				Un casting		7					exemp							
	SL0-1	Les nombres à partir de 31	La liaison	Où est mon sac				Les exemple	!S					Les	pronoi	ms pei	rsonnel	ls tonic	lues			
S-2	SLO-2	Les activités	Les activités	Les exemples				Les activités	7	٠				Les	exemp	oles						
	SL0-1	Les pays	Entrer en contact	Quelques objets				Le Petit Spi	rou	20				Le	s verbe	s faire	et lire					
S-3	SLO-2	les nationalités	Les activités	Les exemples		Т		Les activités							exemp	oles						
	SL0-1	Les jours de la semaine	Présenter et se présenter	Les professions		Ш	E.	L'aspect phy						Les	Sons							
S-4	SLO-2	Les jours	Les activités	La fiche d'identité				Les activités					F	_	exemp							
S-5	SLO-1	Les mois de l'année	Demander et dire la date	La formation du féminin	` '			Le caractère							crire l'a			ue				
	SLO-2	Les activités	Les activités	La phrase interrogative	partielle	-		Les exemple							crire le							
S-6	SLO-1	Les animaux domestiques	une rencontre.	Qu'est-ce que c'est ?				les états d'á							mander		e l'heur	re				
	SLO-2	Les activités	Les activités	Qui est-ce ?				Les activités						_	exemp							
	SLO-1	La famille (1)	Contacts	C'est / II est (1)				Les préposit	ions de	lieu (1)			Elle	e est co	mmen	t?					
S-7	SLO-2	Les activités	Les activités	Les exemples				Les exemple	!S					Les	exemp	oles						
C 0	SL0-1	La formation du féminin (1)	Emma la Championne	La phrase négative (1)				La famille (2))					Po	rtraits							
S-8	SLO-2	Les activités	Les activités	Les exemples				Les activités						Ιρς	exemp	nles						

	SLO-1	Les adjectifs possessifs	Mots et expressions	Les verbes aller et venir	La formation du féminin	Mots et Expressions
S-9	SLO-2	Les exemples	Les activités	L'élision	Les activités	Les activités
	SL0-1	La phrase interrogative	Grammaire -	Les formules de politesse	La formation du pluriel (2)	Grammaire.
S-10	SLO-2	Les exemples	Les exemples	Demander des informationspersonnelles	Les activités	Les exemples
C 11	SLO-1	Les activités	Communication	C'est qui ?	llya	Les activités
S-11	SLO-2	Les nombres	Les activités	Qu'est-ce qu'ils font ?	Les activités	Communication
S-12	SLO-1	intonation et est-ce que	Les verbes du ER –groupe	Mots et Expressions	Les articles contractés	Les activités
0 12	SLO-2	Les exemples	Les exemples	Grammaire – Communication	Les exemples	Les exemples

	Theory:	4. htt	ttps://www.elearningfrench.com/learn-french-gramm <mark>ar-online-free</mark> .html
	1. "" N <mark>ouvelle Génération-Al</mark> " Méthode de français, Marie-Noëlle COCTON, P.DAUDA, L.GIACHINO, C.BARACCO,	5. htt	ttps://www.lawlessfrench.com/grammar
Learning Resources	Le <mark>s éditions Didi</mark> er, Paris, 2018.	6. htt	ttps://blog.gymglish.com/2022/12/15/basic-french-grammar
ŭ	2. Cahier d'activités avec deux discs compacts.	3.00	
	3. https://www.fluentu.com/blog/french/french-grammar		

	Bloom'sLevel of		(Continuous Lea	rning Assessmer	nt (50% weighta	ige)	. 10 7		Final Examination (50% w	eightage)
	Thinking	CLA - 1	(10%)	CLA - 2	(10%)	CLA - 3	3 (20%)	CLA -	4 (5%)#		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
evel 1	Remember	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
	Understand			The said	F 1985	-		4000			
evel 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	-
	Analyze						17////			4 7 7	
evel 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	-
	Create										
	Total	1	00 %	1	00 %	1	00 %		100 %	100 9	6

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
Mr. Kavaskar DanasegaraneProcess Expert	1. Dr. C.Thirumurugan Professor, Department of French, Pondicherry University	1. Mr. Kumaravel K. Assistant Professor & Head, SRMIST, KTR
Maersk Global Service Center Pvt. Ltd		KALIF
2.Mr. Sharath Raam PrasadCharacter		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP
Designer, Animaker Company Pvt.		

Course Code	U	LE23AE1T	Course Name	English	SCIENC	Cours		L _X	ΛE	1		A	bility E	nhance	ment o	course		4	T 0	P 0	0 2	C 4
	uisite Cour		Nil	Co-requisite Courses	Nil	Prog	gressiv	veCourse	es l						N	lil						
Course Off	feringDepa	rtment	Departmen	nt of English, FSH, SRMIST	Data Book / Codes/Standards				74				ı	Vil								
				AY	- ile Yile	_																
Course L	earningRati	onale (CLR):		The purpose of learning this cou	rse is to:	L	_earni	ing	L			<u>}_</u>	Prog	gram Le	arning	Outco	mes (P	LO)				
CLR-1:	Develop	an understandii	ng and <mark>sensibility of</mark> hum	an consciousness through gender inclusive curric	culum	1	2	3	1	2	3	4	5	6 7	8	9	10	11	12	13	14	15
CLR-2:	Enhance	the abilities of	deep <mark>er understandi</mark> ng to	stay with integrity with the fellow human beings		1.5																
CLR-3:	Develop	the overall lang	uag <mark>e competency</mark> of the	learner		3055																
CLR-4:	Develop	proficient langu	age skills		1 1 1 1 1 1 1 1 1				1					به			рū	l lo	S			
CLR-5:	Learn to	express the tha	ou <mark>ghts clearly, d</mark> evelop lo	gical arguments and enhance the overall commu	nication skills.		-		-undamental	n of		<u>a</u>		Ability to Utilize		nvestigative	Solving	Communication	Skills			
					A THE THE PARTY OF	of	Expected	Expected	am	Application of	AH.	Procedural	.⊑	<u>ء</u> ج	⊒ d	Investiga	em (Analytical	-	-5	5.
Course Le	arning O	utcomes (CL	O): At the end of the	his course, learners will be able to:	The state of the state of	eve	xpe	xbe	Ē	pplic	ink with	20.	Skills in	Ability to) Ve	Problem	l lio	naly	- 08c	SO -2	PS0-3
CLO-1:		•		esentation of issues related to gender, and class		2	75	60	Н	M	М		~	<u> </u>	M	_	I	Н	1	-	-	-
CLO-2:			kills to analyze and respo		The state of the s	2	80	70	M	Н	1	- 1			М	_	Н	Н	M	-	_	-
CLO-3:				ues through online articles.	1 4 1 1 1 1 1	2	70	65	M	M	M	- H	L	_	Н		Н	Н	L	-	-	-
CLO-4:	,	eir general writi		ace ameagh entire andrees	A P. S. S. S. Stand C.	2	70	70	Н	М	1		M F	- H -		-	1 -	Н	1	-	_	-
CLO-5:	_		application skills		Att and the same of the same o	2	80	70	Н	Н	-	М		И -	1	1	М	Н	M	_	_	<u> </u>
OLO J.	Improve	inon language t	application skins				00	70		1				.,			111	1	141			
Duration (hour)		12		12	12	12					7	12	Т									
S-1	SLO-1	Introduction to Sukirtharani	the poetry andthe poet-	Introduction to Short stories. Introducing the short story writer KatherineMansfield.	Introduction to Creative Writing. Explaining the elements of creative writing.	Building to conversal the points	tion ar		elements	of disc	ourse a		flecting	the lear	ningI	Review	writing					
	SLO- 2	Reading and I Debt	recitatio <mark>n of thepoem</mark> -	Reading the story- TheDoll's House	Stand-up comedy show -translate the audio content in English. (any regional language)	Lee Mock	kobe's ransge	ation in dig A Poweri ender. TE	ul Poem	of what			hoosing	the sub	ject for	<mark>r</mark> review	ring.					
S-2	SLO-1	Analysis and the poem.	Critical interpretation of	Explaining the story throughdepiction of characters and representation of injustices.	Students- groups -Students belonging to States other than Tamilnadu	Reflecting	g on th	ne style ar	d the ton	e of the	poem.	Pla	anning t	o choos	e.							
	SLO- 2		the poet Kalki	Analysis and critical interpretation of the short	Practice the writing activity -creative ways	Practicin	ng con	versation	w			Un	derstan	<mark>d th</mark> e re	view pi	rocess	how effe	ectively	areviev	v of any	/ work	
		Subramaniya		story Doll's House.	of engaging in translation.								n be do									
	SLO-1	Reading and I Phallus I cut.	recitation of thepoem	Introduction to the writerHaruki Murakami.	Correction of errors- attempting totranslate.			ntent writii ontent wri		al Medi	ia-the	Int	roducin	g the stu	idents	to the r	eview o	theva	rious w	orks.	_	
S-3 -S-4	SLO- 2	Analysis and (the poem.	Critical interpretation of	Reading the Confessionsof a Shinawaga monkey.	Identifying equivalent terms to certainregional words - learn the art of translation.	.BLOG V Inclusion: Salik Ans	WRITII : Menta sari	NG - Subt al Health	leties Of And Quee	r Comr	nunity-		J	ı -record	·				. 0			
S-5	SLO-1	Introduction to Dharker	the poet Imtiaz	Discussion and analysis ofthe Confessions of a Shinawaga monkey.		writer's o other blog		sation with les	the read	lers - th	neblog i			l conver cial medi				memb	er post	the san	ne in t	he

			-01	WarPablo Picasso- Guernica Edward Munch- The Scream Pieter Bruegel- The Tower of Babel	EAA.	
				Preter brueger- The Tower of Baber		
	SLO- 2	Reading and reciting thepoem Purdah 1	Introduction to CrystalWilkinson	creative and/ or thoughtful writing - contemporary themes of modern dayrelevance	Practice blog writing	Choosing the team based on the abilities that arecomfortable to match the peer members
	SL0-1	Analysis and Critical interpretation of the poem-Purdah 1	Reading Endangered Species: Case 47401.	Students -writing abilities- buildingstories- a visual treat of variety of pictures.	Apprehending Life by reading the texts of influence- Chimamanda Ngozi Adiche's Notes on Grief- A BRIEF NOTE, We shouldall be Feminists-An Essay.	Choosing the topics for a thoughtful conversation
i-6	SLO- 2	Reading and reciting thepoem Purdah 2	Discussion and analysis of Endangered Species: Case47401.	Elements of writing	Discussion- essay by the author -subjective depiction of life. Understand -subjective opinions - perspectives -	Planning and preparation for the script ofconversation with a team member
	SLO-1	Analysis and Critical interpretation of the poem-Purdah 2	Introduction to C.S Lakshmialso known as Ambai.	Incorporate the elements of story in story writing.	Class discussion	Drafting , editing and revising the script of conversation and enacting the conversation withthe team members
5-7 <i>-S-8</i>	SLO- 2	Introduction to the poet Arundathi Subramanian	Reading the short story- Ina Forest, A Deer.	Practice -write stories -pictures given or shown.	Practising the task multiple times with all the students in the classroom.	Enactment -proper rehearsal -final performance -conversation- whole performance should be recorded.
-9	SLO-1	Reading and reciting the poem- Home	Discussion and Analysis ofln a Forest, A Deer.	A writing task to write a script isintroduced in the classroom.	Interposing opinions in famous interviews-	The recording should be posted in the officialmedia page and social handles of SRMIST.
	SLO- 2	Analysis and Critical interpretation of the poem-Horne	Retrospecting the writing styles of the authors- Katherine Mansfield, HarukiMurakami, Crystal Wilkinson and Ambai.	creative scripts inspiring from the dialogues of their favourite films by changing the scenario to their own wish according to their own whims and fancies.	Interposing opinions in famous interviews-FII Interviews: Tasveer Co-Founder And Filmmaker Rita Meher On The Seattle Legislation, Minority Rights And The Fight Against Oppression- INTERVIEW	work for this social post - reflect on their experience of learning communicative English course and the testimonial has to be recorded andposted in the social media pages of SRMIST
:-10	SLO-1	Recollection of study of the writing styles and intentions ofthe poets prescribed in the syllabus.	Revision- The Doll's House	Creative writing -writing news reports. recreated with new characters, places, scenes, incidents.	Students -enact as interviewer and interviewee and practice building the discourse.	Involving the students for the project work. Introducing what is project work and inculcating theinterest -Giving instructions to do the project works-
	SLO- 2	Revision of the poems Debtand Phallus I cut	Revision- Confessions of aShinawaga Monkey	Watch debate shows - summarising the arguments Enhance -descriptive writing skill.	Certain role plays like celebrity personalities, political personalities -conduct the interview and be the interviewer and interviewee.	Discussion of ideas and generation of creativeideas
11 12	SLO-1	Revision of the poems Purdah1 and 2	Revison- EndangeredSpecies: Case 47401	Practice the improvement of writing skill.	The art of conversation and the ability tobuild a discourse	 Assignment on any piece of creativewriting (OR) Presentation- Mastering the art of Public Speaking. (OR) Project on compiling the real life influential events on gender
12					LEAD	inclusive issues and apresentation of the same. Interview Scripting /Blogwriting.
	SLO- 2	Revision of the poem Hiome.	Revision- In a Forest, ADeer.	Repetitive practice and continuous assessment -writing skills-master the writing skill.	The evaluation and assesment of the conversation -constructive feedbacks to the students.	Students can opt any of the project from the givenchoice.

	D	Continuous Le	arning Assessment (50%	weightage)						Final Examination	(50% weightage)
15	oms el of nkin	CLA-1 (10%)		CLA-2 (10%)	CLA-2 (10%)		1 / 24	CLA-4 (10	%)		
	Bloo	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
	Remember	30%	1	30%	-	30%		30%		30%	-
	Understand		A 100 m								
	Apply	40%		40%	of the Willer	40%		40%		40%	-
	Analyze							40.			
	Evaluate	30 %		30%	1 3 546.7	30%		30 %		30%	-
	Create		/ /		W 22 3 3 3 4 4	1 1 1					
	Total	100 %		100 %	250-11-27	100 %		100 %		100 %	*

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Krishna RajSutherland Krishna.Raj1@sutherlandglobal.com	Dr. J Mangayarkarasi Associate Professor and Head, Dept. of English Ethiraj College for WomenChennai jmbwilson97@gmail.com	Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST
Ann Mariya Thomson RA2232105010015 II M.A English LiteratureCSH,	Dr. K S Antonysamy Associate Professor and Head, Dept. of English Loyola CollegeChennai antonysamyks@loyolacollege.edu	Dr. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH, SRMIST Dr Anchal Sharma, Prof & Hod EFL SRMIST NCR Campus Dr T Sridevi, Assistant Professor English, FSH Ramapuram SRMDr Shanmuga Priya,
SRM IST az1160@srmist.edu.in	amony sarry is a consideration of the constant	Assistant Professor SRMIST Trichirapalli Campus

Course Code	UE	ST23101J Course Name	CELL BIOLOGY		Co Cate	urse gory	С	1			Discipli	ne Speci	fic Core C	Courses		L T 3 0	P 3	2	C 4
Pre-requis	siteCourse	S Nil	Co-requisiteCourses	Nil			Progres	ssiveCours	es	4				Nil					
Cour	se Offering	Department Biote	chnology Da	ata Book / Codes/Standard	ls							N	Jil						-
			The state of the s	1000															
Course Le	earning Rati	onale(CLR): The purpos	e of learning this course is to	Learnii	ng	Į.				Y			Program	Learning O	utcomes	(PLO)			
CLR-1:	Understan	d the organization <mark>of cells</mark>	2 H 1 1 1 1	0.335	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Understan	d the functions of cell organelles	67753	B.A.S. Carlo							173		×						
CLR-3:	Gain know	rledge on cell cycle and cell division	TA - A	Mary Harry	(mo	(%)	(%)	gge	62				mple						
CLR-4:	Gain know	rledge on specia <mark>lized cells an</mark> d its types		11 N. N. S.	(Bic	sucy	Expected Attainment (%)	owle	t Dat				ofcomplex I ideas	ing					
CLR-5:	Learn abo	ut cell signaling <mark>pathways a</mark> nd cell biology technique	s	C 1200 1070	king	oficie	tainn	X	erpre	billty	ices		io la	nt learr					
			1000 1000		_ <u>:</u>	P.	d At	enta	Ę	ing a	Prac	/ork	nicat	nder			3	4	2
Course Lea		At the end of this course, learners	will be able to:		evel of Thinking (Bloom)	Expected Proficiency (%)	pecte	undamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication ofcom viotechnological ideas	ndependent and lifelong learning	PS0 - 1	20 - 2	- 0Sc	- OSc	- 0Sc
Outcomes				-1-0-6						Re		_	S :S	and		PS	PS	PS	PS
CLO-1:		ut prokaryotic and eukaryotic cell organization	FR 11 / 12 / 1	I to the training	2	85	80	Н	М		M	Н	-	-	-	-	-		
CLO-2:		yledge on struc <mark>ture and func</mark> tions of cellular organelle	25		2	85	80	Н	-		М	Н	L	-	-	-	-		
CLO-3:		wledge on cell cycle and its regulation			3	80	75	H	Н		-		M	-	-	-	-		
CLO-4:		ut specialized cells and its functions	The same of the sa		3	80	75	H	Н			H	M	-	-	-	-		
CLO-5:	Apply cond	cepts on cell signaling processes and techniques			3	85	80] [Н	Н		М	Н	M	-	-	-	-		
Duration (h	our)	18	18		18						18					18			
S-1	SLO-1	Cell Biology – Introduction andoverview	Introduction to cell organelles	Lysosomes				Mitosis			1		7 :	Cells of Vision	on				
S-2	SLO-1	Classification of cell	Plasma membrane	Vacuoles			Mitosis Pancreatic cells –							ells – Typ	s – Types				
S-3	SL0-1	Development of cell theory	Nucleus	Cytoskeleton		Meiosis Pancreatic cells – Func													
S 4-6	4-6 SLO-1 Introduction to cell biology laboratory Estimation of hemoglobin bySahli's method			Cell Counting and viability			Protoplast isolation							Preparation and Observation ofpolytene chromosomes					
S-7	SL0-1	Prokaryotic cell organization	Endoplasmic reticulum Centrioles			-	Meiosis							PI3K/Akt signaling pathway					
S-8	SL0-1	Eukaryotic cell organization	Golgi Apparatus Extracellular matrix				Specialized cells - Introduction						PI3K/Akt signaling pathway						
S-9				Cell cycle - Introduction	Cell cycle - Introduction			Nerve cells						JAK/STAT signaling pathway					
S 10-12 SLO-1 Lab Safety and GLP Estimation of hemoglobin bySahli's method			Enumeration of RBC count			Protoplast isolation						Preparation and Observation ofpolytene chromosomes							
S-13 SLO-1 Cell Transport Chloroplast			Phases of cell cycle			Structure and function of neurons						JAK/STAT signaling pathway							
S-14 SLO-1 Active Transport Ribosomes			Cell cycle check points				Muscle cells – Types						AMPK signaling pathway						
S-15				Regulation of cell cycle		-	Muscle cells - Functions AMPK signaling pathw					iay							
S 16-18 SLO-1 SLO-2 Blood Smear Preparation Cell Counting and viability			Enumeration of WBC co	unt			Observation of Barr bodies Model Examination												

	1.	"Molecular Biology of Cell", Bruc <mark>e Alberts, 7th Editio</mark> n, WW Norton & Co, 2022.
Learning	2.	"Karp's Cell and Molecular Bi <mark>ology: Concepts</mark> and Experiments", Gerald Karp, 8 th Edition, 2015.
Resources	3.	"Cell and Molecular Biolo <mark>gy", De Robertis</mark> , 8 th Edition, Lea & Febiger,2017.
	4.	"The Cell: A Molecular <mark>Approach, Coope</mark> r GM, 6 th Edition, ASM Press, 2013.

	DI .	Continuous Learning Assessment (50% weightage)										
	Bloom's	CLA - 1	(10%)	CLA – 2 (10%)		CLA - 3	(20%)	CLA - 4	(10%)	Final Examination(50% weightage)		
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
	Understand	20%	20%	13%	13%	13%	1370	13%	1376	1376	1376	
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
evel 2	Analyze	2070	2070	2070				2070			2070	
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Create	1076	1070	1370	1376	1370	1370	1370	1370	1370	1370	
	Total	1	00 %	Transfer 1	00 %	100 %		100 %		10	00 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chenna	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. G. Swamynathan, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Cours Cod		UBT23102J	Course Name		MICROBIOLOGY	CLE.			Course	С	L				Profess	sional Core	Course		L 3	T 0	3 2) C 2 4
Pr	e-requisite	eCourses	Nil		Co-requisiteCourses	Nil				Prog	ressiveCo	ourses					١	Vil				
C	ourse Off	ering Department		Biote	echnology	Data Book / Code:	s/Standards	S					7	١,		Nil						
Cours	e Learnin	g Rationale(CLR):		The	purpose of learning this course is to				Learnin]				P	Progra	ım Learning	Outcomes	s (PLO)				
CLR-1: CLR-2: CLR-3:	Knowle	edge on structure all edge on structure all	ues used for visualizin nd organization of bact nd organization of virus reparation and steriliza	teria ses and fungi	microorganism			1 (E)	2 (%)	3	<u>1</u>	2	3	4	5	6	Fearning 7	8	9	10	11	12
CLR-5	undersi		ues used for visualizin	g and identifying	microorganism ourse, learners will be able to:		id)	Level of Thinking (Bloom)	Expected Proficiency (9	Expected Attainment (%)	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	nmunication of complex biotechnological ideas	spendent and lifelong learning	PSO - 1	PSO - 2	PSO-3	PSO-4	PS0-5
CLO-1			an <mark>ism based o</mark> n taxono		Bearing 1			3	80	70	Н		7 -	Н	-	- Í.	ji.	-	-	М	Н	Н
CLO-2			s f <mark>or identifying</mark> microo				7. TE	3	85	75	Н	Н	Н	Н	Н	-	М	-	-	М	Н	Н
CLO-3	: Apply	ing knowledge to ic	de <mark>ntify bacteria</mark> based (on structure and	functionalorganelles			3	75	70	Н	-	-	Н		7 - 1	М	-	-	М	Н	Н
CLO-4	: Apply	ing knowledge to ic	den <mark>tify viruses a</mark> nd funç	gi based on struc	cture and functionalorganelles			3	85	80	Н	_		Н		_			_	М	Н	Н
CLO-5	: Havin	g knowledge on me	edia <mark>preparation</mark> and s	terilization in mic	robiology formaintaining GLP			3	85	75	Н	Н	Н	Н	Н	М	М	-	М	М	Н	Н
		1					L.															
Durat (ho			18		18		1	18						18					18			
S-1	SLO-1		Definition and Scopeof	Microbiology	Principles of Microscopy	Handling path	hogens		1		structui	re	/	O S	cteria Ba	cterial	Structure	and orga	nization o	of viruses		
S-2	SLO-1	Biogenesis vs Ab			Applications of Microscopy	Importance of	f Sterilization	n			Cell wa	III of Gra	m negativ	re bacter	ia		General p	property o	f viruses			
S-3	SL0-1		Anton VanLeewe <mark>nhoe</mark>		Bright field & Dark Field	Sterilization to		4	\mathbf{n}		Cell wa	all of Gra	m-positiv	e bacteri	а		Viral Rep					
S 4-6	SLO-1 SLO-2		ion and basic instr <mark>um</mark> Lab., Wet preparation		Lab 4- Preparation of media (Solid,Liquid).	Lab 7- Gram	's staining te	echniq	ue		Lab 10		ration of	Bacteria	-Serial		Lab 12: E	Biochemic	al tests-	TSI		
S-7	SLO-1	Louis Pasteur, Ro	obert Koch, JosephLis	ter	Fluorescence microscope	Nutrients and growth factor		cro, M	acroand		Cell wa	ll synthe	sis				Ultra stru	cture-Bac	cteriophag	ges		
S-8	SL0-1	Koch Postulation			Phase contrast microscope	Growth curve)				Archae	bacterial	Cell wall				Life cycle	of Bacter	riophages			
S-9	SLO-1	Classification – F kingdoms.	ive kingdoms andThre	2 e	Staining methods and principles	Microbiologica		-			Capsul	e types,	composit	ion, func	tion		Sub viral	•				
S	SLO-1					Lab 8: Spore	staining tec	chniqu	ie								Lab 13: A	\ntibiotics	sensitivit	y test]
10-12	SLO-2	Lab 2: Cleaning rules	of Glassware andlab	oratory	Lab 5: Inoculation techniques: Pourplate, Spread plate, Streak plate,	****					Lab 11	: Bioche	nical tesi	ts- IMViC								

S-13	SLO-1	Taxonomy: Artificial and naturalclassification	Smear preparation and simplestaining	Different culture methods	Flagella structures and types	Structure and organization of fungi
S-14	SLO-1	Classical characters used in taxonomy	Spore and flagellar staining,	Techniques of pure culture	Cell membranes and Inclusion bodiesand Ribosomes	cell wall structure and composition
S-15	SLO-1	Molecular characters used intaxonomy	Acid-fast staining.	Preservation of culture	FUGUSDOIP-SUBCIDE & FUDURIOU	Microbiology for public health and Detection methods
S 16-18		Lab 3: Principles and method of sterilization– Heat, Filtration and Radiation	Lab 6: Smear preparation and simplestaining	Lab 9: Staining of Fungi – LPCB	Lab 11: Biochemical tests- IMViC	Lab 13: Antibiotics sensitivity test

	Text Books:		3.	Jacquelyn G.Black, "Microbiology -Principles and Explorations" Wiley publications 2008
Learning	1.	M.J. Peleza <mark>r, E.C.S. Ch</mark> an and N.R. Krieg "Microbiology"– Krieg Tata McGraw Hill Publications,2007.	7,000	
Resources	2.	Prescott, Harley and Klein, "Microbiology", McGraw Hill publications, Fifth edition, 2003.		
			4.77	

Learning As	ssessment				4 400 1	1. 12	100 10				
	Discourt			7 7 7 7	ontinuous Learning Ass	essment (50% weighta	ge)	_	7.	Final Exam	ination(50%
	Bloom's	CLA - 1 ([10%]	CLA – 2	(10%)	CLA - 3	(20%)	CLA - 4 ((10%)#	weightage)
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Analyze Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
Level 3	Create Total		10%	20 M Table 1	00 %		00 %		00 %		00 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chenna	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. S. Thanigaivel Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR
	LEARN · LEAP · LEAD	

Course Code	UBT	23103J	Course Name	GENETICS			Cou		С	4	/>	Disci	ipline S	Specific	Core	Course	es		L 3	T I	P 0	
	isite Cours	ses Departmer	Nil nt	Co-requisite Courses Biotechnology		Nil Codes/Standa	rds	Pro	gressiv	ve Cou	ırses		Ŋ.		Nil		Nil					
Course	Learning	Rationale (The purpose of learning this cours	se is to		L	earnin.	g					Prog	ram Le	earning	Outcor	nes (P	LO)			
CLR-1:				cs and the deviations from Mendel theo	, , , , , , , , , , , , , , , , , , , ,	407 7	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2 :	Introduce		s about the organization of	dependent assortment and mapping to f Genome inside the cell and what are		rariation	Ê	(%)	(9)		afe.		1			plex	gi					
CLR-4:	Focus on	he different	mutagens and how the co				Blool	()	ent (9		wledc	Data		7		com	felon					
CLR-5 :	Comprehe of HW equ		erical ability and analysis	skill of students by explaining the limita	ations and ass	sumptions	of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	2	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	ork	Communication of complex biotechnological ideas	dent and lifelong					
	_	comes (CLC		urse, learners will be able to:	10%	1. 1. 1.	Level								Team Work	Commur biotechn	Independent a learning	PS0-1	PS0-2	PS0-3	PS0-4	PS0-5
CLO-1:			work and their deviation				2	80	75		Н	M	М	Н	M	-	-	L	-	-	-	
CLO-2:	Conceptual between to	alize about l wo genes in	_inkage and how characte determining the trait throu	ers determined using Sex and also aboung the services and also aboung the services are the services.	ut the influence	e of distance	3	80	75		Н	-	М	Н	Н	L	-	L	-	-	-	-
CLO-3:	Know abo		en <mark>t mechanis</mark> ms through v	which the genes are exchanged and the	e abnormalitie	es associated	3	85	80		Н	Н	-	T	Н	М	-	М	-	-	-	L
CLO-4:			gene <mark>tics conce</mark> pt and gene			111/4	2	80	80		Н	M	-	Н	-	М	-	L	-	-	-	L
CLO-5:		out the gen t and found		nomenon that influences them to unde	erstand the cor	ncept of bottle	2	85	80		М	Н	М	Н	-	М	/ -	-	-	-	-	L
Duratio	n (hour)		18	18		-	18							8					18	3		
S-1	SLO-1	the field of	genetics	Non allelic interactions: Interaction s in producing new phenotype complementary genes, epistasis (dominant & recessive)	Chron	mosome morph romatin and het				E/	Fragil	e-X-sy	ndrome	e and cl	hromos	some (Cytoplas	smic inh	neritano	ce		
S-2	SLO-1	experiment significance		Duplicate genes and inhibitory gen	chrom	aging of DNA m			:hromo:	somes		fluenc expres		inance	, sex li	mited	Organell	e hered	dity			
S-3	SLO-1	Control poi	Mitosis and Meiosis: ints in cell-cycle progression ole of meiosis in life cycles ns.	s sequence composition –unique & repetitive DNA	otide polypo exons	otype, giant chro eptide hypothe s, introns, gene	sis, co	ncept o	f cistro	n,			nheritar				Evolution		•			
S 4-6	SLO-1	Lab GLP		Permanent and temporary mount of meiosis	Blood	d grouping							yploidy eatmer		n root	tip by	Mechani	sms of	sex de	etermina	ation	

S-7	SLO-1	Mendelian genetics: Mendel's experimental design, monohybrid, di- hybrid, and tri hybrid crosses	Satellite DNA	Chromosome and gene mutations: Definition and types of mutations, causes of mutations	Genetic linkage, crossing over and chromosome mapping	In breeding and out breeding
S-8	SLO-1	Law of segregation & Principle of independent assortment	Centromere and telomere DNA sequences, middle repetitive sequences-VNTRs & dinucleotide repeats,	Ames test for mutagenic agents, screening procedures for isolation of mutants and uses of mutants	Linkage and Recombination of genes in a chromosome crossing over	Hardy Weinberg law (prediction, derivation)
S-9	SLO-1	Verification of segregates by test and back crosses	Repetitive transposed sequences- SINEs & LINEs	Variations in chromosomes structure - deletion, duplication, inversion and translocation (reciprocal and Robertsonian)	Cytological basis of crossing over, Molecular mechanism of crossing over	Allelic and genotype frequencies
S 10-12	SLO-1	Permanent and temporary mount of mitosis	Permanent and temporary mount of meiosis	Sub cellular fractionation	Barr Body	Cytoplasm staining
S-13		Chromosomal theory of inheritance, Allelic interactions: Concept of dominance, recessiveness	Middle repetitive multiple copy genes, noncoding DNA	Position effects of gene expression, chromosomal aberrations in human beings, abnormalities– Aneuploidy and Euploidy	Crossing over at four strand stage	Changes in allelic frequencies
S-14	SLO-1	Incomplete dominance, co-dominance, semi-dominance	Middle repetitive multiple copy genes, noncoding DNA. Genetic organization of prokaryotic and viral genome	Sex determination and sex linkage:	Multiple crossing overs Genetic mapping	Systems of mating
S-15	SLO-1	Pleiotropy, Multiple alleles, pseudo- allele, essential and lethal genes, penetrance, and expressivity	Structure and characteristics of bacterial and eukaryotic chromosome	Environmental factors and sex determination, sex differentiation Barr bodies, dosage compensation, genetic balance theory	Extra chromosomal inheritance: Rules of extra nuclear inheritance, Maternal effects, maternal inheritance	Evolutionary genetics, Natural selection.
S 16-18	SLO-1	Permanent and temporary mount of meiosis	Karyotyping with the help of photographs		Nuclear staining	Model Examination

Lograina	1. Gene <mark>s- IX, 9th E</mark> d., Benjamin Lewin. Jones and Bartlett Publishers, 2008	4. Genetics, 2nd Edition, by Weaver, R.F. and Hendrick, P.W. (1992). W.C. Brown.
Learning	2. Princi <mark>ples of Ge</mark> netics, 7th Edition, Robert H. Tamarin. 2002. Tata- Mc Graw Hill publications	5. Instant notes in Genetics by P. C. Winter, G.I. Hickey and H. L. Fletcher (2003) Viva Books Pvt
Resources	3. Theory and Problems of Genetics. W. D. Stansfield. 2002. Mc Graw Hill publications	Ltd.

Learning A	Assessment					7-					
	Dloom/s			Conti	inuous Learning Ass	essment (50% weig	ghtage)			Final Ex	amination
	Bloom's Level of Thinking	CLA -	1 (10%)	CLA -	2 (10%)	CLA –	3 (20%)	CLA -	4 (10%)	(50% w	eightage)
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	10	0 %	10	00 %	10	0 %	10	0 %	10	0 %

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens	Dr. G.Swamynathan, Assistant Professor, Dept. of
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	College, Chennai.	Biotechnology, FSH, SRMIST, KTR

				CIE	N	C,	E			•											
Cours Code	-	UCD23S01L	Course Name Quantitative Aptitude	e and Logical Reasor	ning		Cou Cate		S	1			Skill	Enhanc	cement (Course		L 1	T P 0	0 2	C 2
(quisite Courses Nil	Co-requisite Courses Career Guidance Cell Data	Nil Book / Codes/Standa	ırds		Pro	ogressive	e Course	es	7	7				Nil					
Cou	rse Learnii	ng Rationale (CLR):	The purpose of learning this course	e is to	-11	L	earnir	ng]				Prog	gram L	earnin	g Outc	omes (F	PLO)			
CLR-1	: Critically		mathematical concepts lated to profit, loss, interest calculations, average and in	nterpret data		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-3 CLR-4 CLR-5	: Use the : Acquire	basic mechanics of Grammar time management skills and expose stude Outcomes (CLO): At the end of the	nts to the requirements of the job market			evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Application of Concepts	ink with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	nvestigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills
CLO-1	: Develop	, solve, analyze, a <mark>nd use simple</mark> mathema	proportions, percentages and approach questions in assitical models that are relevant to daily life.	impler and innovative	e method	3	80 80	70 75		Н	M M	-	M	- L	M	- SKi	H	<u>8</u> M	Н	-	M M
CLO-3 CLO-4	: Underst	roblems on reasoning and the different parts <mark>of speech a</mark> nd use			177.7	3	85 85	70 80		- Н	М -	-		-	M -	M	H M	-	H -	-	Н
CLO-5	: Instill co	onfidence in students a <mark>nd develop s</mark> kills ne	cessary to face the audience		+	3	85	75		-		М	H	-	М	-	-	М	-	Н	М
Duration	n (hour)	6	6		6						6	A						6			
S-1	SLO-1 SLO-2	Speed Maths and Simplification Simplification Techniques and Tricks	Profit and Loss-Introduction Profit and Loss- Basic Problems	Number Series –	Solving Pr	oblems	N	lost Logid lost Logid roblems	cal Choic		ng	7					luction – I luction - S				
S-2	SLO-1 SLO-2 SLO-1	Divisibility Power cycle, Reminder cycle Problems On H.C.F and L.C.M	Simple Interest-Introduction, Formulas&Problems Compound Interest-Introduction,Formulas &Problems Averages-Introduction& Basics	Word Series Word Series – So	olving Probl	lems	L	ogical Ori ogical Ori	der – tips	s and tric	ks	7	1		9	Self-Introd	luction - S luction - S luction - S	Session 3	}		
S-3	SL0-1	Problems On H.C.F and L.C.M Solving problems	Averages-Tricky Problems	Missing number a	Ü			ynonyms ntonyms		브		1		7			luction - S				
S-4	SLO-1 SLO-2	Linear and Simultaneous Equation Linear and Simultaneous Equation – solving problems	Algebra -Introduction Algebraic Expressions Concepts	Image Based Pro Image Based Sol				ssential P arts of Sp		/orkshee	ts						luction - S luction - S				
S-5	SLO-1 SLO-2	Ratio and Proportions-Introduction Ratio and Proportions-Basics Problems	Data Interpretation – Bar chart, PieChart Data Interpretation – Table, Line Graph	Inequalities Inequalities - meti			Sp	ootting Err ootting Err age, Usa	ror –Con ige of Ari	ticles	•				E N	Basics of Methods		ommunic			
S-6	SLO-1 Percentage -Introduction Quadratic Equations Coding - Decoding-Introduction			ng-Introduc	tion	Se	entence C	Correction	1 – Voca	bularyba	ased			1	Time Man	agement	Skills				

SLO-	2 Percentage- Basic problems	Quadratic Equations – Formulas and Methods	Coding – Decoding-Differen	Sentence Correction – Grammar Based	Time Management Skills – Activity
Learning Resources	, .	for Competitive Examinations, Tata McGraw Hill, 5th L titude for Competitive Examinations, S. Chand and C		prope, Test of Reasoning for Competitive Examin	nations, Tata McGraw Hill, 6th Edition Discussion and Interview, S Chand &Company, 2014
Resources		of Aptitude for Placement Readiness, Oxford Universi		ar R P, English for Competitive Examinations, Tr	

Learning Assessment		Continuous Learning Assessment (100% weightage)									
Level	Bloom's Level of Thinking	CLA – 1 (20%)	CLA – 2 (20%)	CLA - 3 (30%)	CLA - 4 (30%)#						
		Practice	Practice	Practice	Practice						
	Remember	30%	30%	30%							
evel 1	Understand	Beer to make	SS . 1		10%						
evel 2	Apply	30%	30%	30%	50%						
	Analyze	State And Advantage	· 同心學學等								
evel 3	Evaluate	40%	40%	40%	40%						
	Create	E-1 11 1 1 1	Harris Control								
	Total	100 %	100%	100%	100%						

CLA-1, CLA-2 and CLA-3 can be from any combination of these: Online Aptitude Tests, Classroom Activities, Case Studies, Poster Presentations, Power-point Presentations, Mini Talks, Group Discussions, Extempore, etc. # CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, CognizantTechnology Solutions India Pvt. Limited, Chennai	Dr. G. Saravana Prabu, Asst. Professor, Department of English,Amrita Vishwa Vidhyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST Ms. Deepalakshmi S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST

Course Code		UCD23V01T	Course Name		Universal Human Valu	oc	Coton		4	,					/alue Ad	ldition C	ourco.		L	Т Р	0	С
Code		UCDZ3V011	Name		Universal Human Value	rs .	Categ	UIY	,		1/2				raiue Au	union C	uuise		2	0 0	2	2
	Pre-red	juisite Courses	Nil	Co-requisite Courses				Pro	gressive	Cours	es						Nil					
Co		ng Department		reer Guidance Cell	-	odes/Standards		110	grossivo	Oddis	03											
Cours	e Learnin	ng Rationale (CLR):		The purpose of learni	ng this course is to		Ħ	Learnir	ng		È	_		Proç	gram L	earnin	g Outco	mes (P	LO)			
CLR-1:				ation, appreciate the essential comp the core aspirations of all human		and 'skills' and to	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Help stu	dents initiate a proce <mark>ss o</mark>	f dialog within them:	selves to know what they really wa	nt to be' in their lifeand proi	fession.	2.7		1													
CLR-3:	basis of	Universal Human Values	and movement tow	ss and prosperity for a human being vards value-based living ina natura	l way.	100 000	-18		-1	H		1		-								
CLR-4:	live acc	ordingly.	· ·	eality and the rest of existence, har	1.38		(E	(%	(%		je		plines			edge						
CLR-5:		t plausible implicat <mark>ions of</mark> and mutually enri <mark>ching</mark> ir		erstanding in terms of ethical huma e.	an conduct, trustful and mutu	ually fulfilling human	Thinking (Bloom)	iciency (inment (9	FX	Knowledo	Concept	ted Disci	owledge	alization	e Knowle	ling	pret Data	Skills	ng Skills	ın Skills	S
Course L		` '		course, learners will be able	Property and the second		Level of Thin	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills
CLO-1:	Evaluate	e the significance of <mark>value</mark>	<mark>inputs i</mark> n formal ed	ucation and start applying them in a	their life and profession		3	80	70		М	-		Н	-	-	-	-	-	-	М	-
CLO-2:		ish between values a <mark>nd s</mark> tence of an individual, e		l accumulation of physical facilities,	the Self and the Body, Inte	ention and	3	80	75		-	М		Н	-	L	-	-	-	-	-	-
CLO-3:	,			on trust and respect in their life and	d profession	1/1//	3	85	70		-	-		Н	-	-	-	М	L	-	-	-
CLO-4:	Examine	the role of a human be <mark>i</mark> l	<mark>ng in ensurin</mark> g harm	ony in society and nature.			3	85	80		-	-	11	Н	- 1	-	L	-	L	L	-	L
CLO-5:	Apply the	e understanding of ethica	l <mark>condu</mark> ct to formula	nte the strategy for ethical life and p	orofession.		3	85	75			-	L	Н	L	-	-	-		-	-	-
							100	٠.														
Duration (hour) SLO	Right Understanding, R Facility	6 elationship andPhy	sical Understanding Human b of the Self and the Body	eing as the Co-existence	Harmony in the Fami Interaction	6 ly – the Ba	asic Unito	of Human	n U	Inderstand	ding Hari	mony in	the Natur	re	٨	latural Ac	ceptance	of Hum	an Value	is	-
S-2	SLO	Understanding Value E	ducation	Distinguishing between the Body		Trust – the Foundation Relationship	onal Value	in	LI		nterconne nd Mutua				urOrders		efinitiven)	ess of (Et	hical) H	umanCo	nduct	

Relationship

Respect – as the Right Evaluation

Other Feelings, Justice in Human-to-Human

The Body as an Instrument of the Self

Understanding Harmony in the Self

S-3

S-4

SLO

SLO

Education

Self-exploration as the Process forValue

Continuous Happiness and Prosperity - the Basic Human Aspirations

Biotechnology 43

Nature

Exploring the Four Orders of Nature

Realizing Existence as Co-existence atAll Levels

A Basis for Humanistic Education, Humanistic

Constitution and Universal Human Order

Competence in Professional Ethics

S-5	SLO	Happiness and Prosperity - CurrentScenario	Harmony of the Self with the Body	Understanding Harmony in the Society	The Holistic Perception of Harmony inExistence	Holistic Technologies, Production Systems and Management Models-Typical Case Studies
S-6	SLO	Method to Fulfill the Basic Human Aspirations	Programme to ensure self-regulationand Health	Vision for the Universal Human Order	Exploring Co-existence in Existence	Strategies for Transition towardsValue- based Life and Profession

Learning Resources	 Gaur R.R., Sangal R., Bagaria G.P., 2019 (2nd Revised Edition), A Foundation Course inHuman Values and Professional Ethics, Excel Books, New Delhi. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain. 	 A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak. A N Tripathy, 2003, Human Values, New Age International Publishers.
-----------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Learning Assessment		P. S. S. C. L. B. S.	, + 1 Duss 6.3								
		Continuous Learning Assessment (100% weightage)									
Level	Bloom's Level of Thinking	CLA - 1 (20%)	CLA – 2 (20%)	CLA – 3 (30%)	CLA - 4 (30%)#						
		Theory	Theory	Theory	Theory						
	Remember	30%	30%	30%							
evel 1	Understand	THE RESERVE AND THE PARTY OF TH	THE REPORT OF THE PARTY.		30%						
vel 2	Apply	40%	40%	40%	40%						
	Analyze		A SECULATION								
vel 3	Evaluate	30%	30%	30%	30%						
	Create		P. Carrier and P. Carrier								
	Total	100 %	100%	100%	100%						

CLA-1, CLA-2 and CLA-3 can be from any combination of these: MCQ Tests, Classroom Activities, Case Studies, Poster Presentations, Power-point Presentations, Mini Talks, Group Discussions, Extempore, etc. # CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
		Dr. Supraja P, UHV University Coordinator, SRMIST
	THE TANK	Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST
	/ TEARN-I DAT	Dr. Sweety Bakyarani E, Department of Computer Science, FSH, SRMIST

SEMESTER II

	urse ode	LT23G02J	Course Name	Tamil – I		Course Catego		(G	4		Gene	ric El	ective	e Cou	rse				L 2	-		2	C 3
Pre	e-reauis	ite Courses	Nil	Co-requisite Courses	Nil		F	Progr	essive	Course	S	Nil												\neg
		ng Departmen		amil	Data Book / Codes/Standards	s		. og.	000.10	000.00					Nil									
Cours	se Learn	ing Rationale	(CLR):	he purpose of learning this course is to:			Le	earni	ng					Prog	ram L	earni	ng Oı	utcor	nes (l	PLO)				
CLF		320	<i>V</i> -	ான்மை அக, புற வாழ்வியலை அறியச் செ	ச ய்தல்		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLF		0 0	-	குறித்து தெரியச் செய்தல் த மனித மாண்புகளை உணரச் செய்தல்	March Martin	-12-	(m	(%)	(%	e de	Ste		4)				В							
CLF				த மணத மாணபுகளை உணரச செயதல தொல் இலக்கியங்கள் வளர்ச்சி பெற்ற வ	ரலாற்றைப் பரியச் செய்கல்	5/	(Bloc	Jcy (ent (Wed	Concepts		edge	ation			Data	(0	Skills	Skills				
CLF				்வியல் நெறி, மொழியின் நுட்பங்கள் ஆகி) king	oficier	tainm	Kno	of Co	lated	Knowledge	Specialization	lze	deling	Interpret	Skills	Solving S	tion S	Skills			
Cours	se Learn	ing Outcomes	(CLO): At to	he end of this course, learners will be able to		- III - 43	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application	Link with Related	Procedural	Skills in Spe	Ability to Utilize	Skills in Modeling	Analyze, Int	Investigative Skills	Problem So	Communication	Analytical S	PS0 -1	PSO -2	PSO-3
CLC)-1: L	பண்டைத் தமிழ அறிந்துகொள்ளு	ழ்ச் ச <mark>மூகத்தின்</mark> நதல்	ர அக, புற வாழ்வியல் இன்றைய சமூக மே	ம்பாட்டிற்கு வழிகாட்டி நிற்பதை	த	2	75	60	Н	L	Н	М	Н	Н	L	М	Н	М	L	Н	-	-	-
				<mark>ியுறுத்</mark> திய சமூகம் என்பதன் வழி மானுட .			2	80	70	Н		Н	L	М	Н	L	Н	М	L	Н	Н	-	-	-
CLC			·	<mark>றை</mark> த் தந்துவங்களை அறிந்து மானுட ஒற்று		ள்ளுதல்	2	70	65	Н	L	Н	М	Н	Н	М	Н	L	Н	М	Н	-	-	-
CLC		ிதால் தமிழ்ச்ச ிதரிந்துகொள்		<mark>ியம்</mark> , அரசியல், அறம், பக்தி ஆகியவற்றில்	் தழைத்தோங்கியதைத்		2	70	70	Н	M	Н	L	Н	М	Μ	Н	Н	L	Н	Н	-	-	-
CLC	າ ເ		நெறிகளைச் <mark>ச</mark> ெ	ி <mark>சால்</mark> லும் கதைகளைப் படைக்கும் திறனே	ராடு மொழி ஆளுமையையும்		2	80	70	Н	М	Н	Н	М	Н	L	М	Н	L	Н	Н	-	-	-
	ıration		12	12	12						12	E		7						12				
	hour)	காலந்தோற			ADM TO						-													
S-1	SLO-1	அகத்திணை	ர மரபு ["]	<mark>சங்க ம</mark> ருவிய காலம்	பல்லவர் காலம்	ΔP		பண்	டைக்க	சாலத் <u>த</u>	மிழ்ச	ம்							-		குகள்			
	SLO-2		பு/ உள்ளடக்க		பல்லவர் கால இலக்கியங்கள்	11		சங்க	கால ப	க்களில	் வாழ	ந்விய	ல்				ச் சிற வியஓ		தயும்	தமிį	ழ்ச் சட	முக		
S-2	SLO-1	எட்டுத்தொ பகுப்புமு	கை நூல்களுட றயும்	^{ம்} உலக <mark>ப்பொதுமறை</mark> - திருக்குறள்	பக்தியும் தமிழும்			முச்ச	ரங்கம் ·	– அறிபு	கம்					புதுவ	மப்ப	ித்த	ன்-ச	ங்குத	ந் தேவ	பனின்	ு தர்ம	ம்
	SLO-2	ஐங்குறுநூற		திருக்கு <mark>றளின் கட்டமைப்பு</mark>	பக்தி இலக்கியத் தோற்ற நிலை	ல		முச்ச	ரங்க வ	ரலாறு			7			கள்வ	எனின்	தர்ம	ம்					
S-3	SLO-1	உடன்போக் புலம்பலும்	கும் நற்றாய்	திருக்குறள் வ <mark>ான்சிறப்பு (2)</mark>	சைவ சமய இலக்கியங்கள்			பத்த	إناست	ட்டும் எட	ட்டுத்	தொ	கையும	à		ந.பிச்	சமூர்	த்தி –	் வேட	مان	ரம்			
	SLO-2	ஐங்குறுநூற	ı (391)	மழையும் வாழ்வும்	சைவக்குரவர் நால்வர்			சங்க	கால ப	மக்களி	ள் வா	ழ்விய	மல்			மரபு	ம் நம்	பிக்	கைகளு	ரும்				
S-4	SLO-1	உடன் போ பறவையிய	க்கும் தமிழர் ல் அறிவும்	திருக்குறள் – புலவி நுணுக்கம்	தேவாரம் – திருஞான சம்பந்த 2834	தேவாரம் – திருஞான சம்பந்தர் - பாடல் -			நத்தெ ர	ாகை நூ	ல்களி	ன் வர	ரலாற	ı	:	தமிழ	ருவி	மண்	ரியன்	- <u></u>	ற்றை.	ச் சிற	த	

	SLO-2	குறுந்தொகை (02)	ஊட <mark>லின் அழகியல்</mark>	தேவாரம் – திருநாவுக்கரசர் –பாடல் - 4262	எட்டுத்தொகை நூல் <mark>களின் கட்டமைப்</mark> பு	உறவின் மேன்மை
S-5	SL0-1	இயற்கைப் புணர்ச்சியும் தலைவி நலம் பாராட்டலும்	நீ <mark>தி இலக்கியங்</mark> கள்	திருவாசகம் அறிமுகம்	பத்துப்பாட்டு நூல்களின் <mark>வரலாறு</mark>	ஆர். சூடாமணி – மூடநம்பிக்கை
	SLO-2	குறுந்தொகை (03)	நாலடியார்	மாணிக்கவாசகர் பாடல் - ஆனந்த பரவசம் – பாடல் 10	பத்துப்பாட்டும் தமிழர் வாழ்வி <mark>யலும்</mark>	சமூகத்தில் மூடநம்பிக்கைகள்
S-6	SLO-1	தலைவனின் மேன்மைத் தன்மையும் இயற்கையும்	வைகலும் - பாடல் (39)	வைணவ சமயம்	பதினெண் கீழ்க்கணக்கு நூல்கள்	<mark>மூட</mark> நம்பிக்கைகளின் சிக்கல்கள்
	SLO-2	அகநானூறு (238)	நிலையாமையும் அறமும்	வைணவ சமய வளர்ச்சிப்போக்கு	பதினெண் கீழ்க்கணக்கும் தமிழர் அற மரபும்	<mark>கிருஷ்</mark> ணா டாவின்ஸி – காலா அருகே வாடா
S-7	SLO-1	இயற்கையும் அகவா <mark>ழ்வுச்</mark> சித்திரிப்பும்	தமிழர் மருத்துவம்	நாலாயிரத் திவ்யப் பிரபந்தம்	நீதி இலக்கியங்கள்	<mark>மனித வ</mark> ாழ்வில் மருத்துவம்
	SLO-2	நள்ளியின் கொட <mark>ைத்திறம்</mark>	நீதி இலக்கியத்தில் மருந்து நூல்கள்	குலசேகராழ்வார் பாடல் - 678	நீதி இலக்கியங்களின் பன்முகத் தன்மைகள்	<mark>பாரம்பரிய</mark> மருத்துவம்
S-8	SLO-1	கலித்தொகைப் ப <mark>ாடல் –(11</mark>)	சிறுபஞ்சமூலம் (64)	ஆண்டாள் பாடல் – 574.	காப்பிய இலக்கணம்	<mark>மொழிப்பயி</mark> ற்சி
	SLO-2	அறம் பொருள் <mark>இன்பம் சி</mark> றப்பு	ஈகையின் சிறப்பு	திருமழிசை ஆழ்வார் பாடல் – கணிகண்ணன்	காப்பியத்தின் போக்குகள்	ச <mark>ொற்களை</mark> உருவாக்குதல்
S-9	SLO-1	சூழலியலும் ம <mark>னித வாழ்</mark> வும்	பழமொழி நானூறு அறிமுகம்	தமிழில் இஸ்லாமிய இலக்கியங்கள்	காப்பியங்களின் வகைமை	எழு <mark>த்துகளில்</mark> இருந்து சொற்களைக் கண்டுபிடித்தல்
	SLO-2	தமிழர் புறமரப <mark>ு</mark>	பழமொழி நானூறு – தனித்தன்மைகள்	இஸ்லாமிய இலக்கியங்களின் கொடை	ஐம்பெருங்காப்பியங் களின் தனித்தன்மைகள்	பட <mark>ம் பார்த்து</mark> க் கதை எழுதுதல்
S- 10	SL0-1	புறநானூறு (107 <mark>)</mark> பாரியும் மாரியு <mark>ம்</mark>	பழமொழி நானூறு (184)	சீறாப்புராணத்தின் அமைப்பு	தமிழ்ச் சமூகமும் சமயத் தத்துவங்களும்	பட <mark>ம் பார்த்து</mark> க் கவிதை எழுதுதல்
	SLO-2	புறநானூறு (110 <mark>) பாரியின்</mark> வள்ளல் தன்மை	பழமொழியும் அறிவுரையும்	விடமீட்டப் படலம் (10 பாடல்கள்)	சமயத் தத்துவங்களும் வாழ்வியல் விழுமியங்களும்	கற் <mark>பனைத்தி</mark> றன் – வளர்த்தல்
S- 11	SL0-1	புறநானூறு (112) <mark>கையறுநி</mark> லை	பண்டைக்காலப் போரும் வாழ்வும்	கிறித்தவ சமய இலக்கியங்கள்	சைவத் திருமுறை – அறிமுகம்	க <mark>ற்பனையும்</mark> படைப்பும்
	SLO-2	சிறுபாணாற்றுப்ப <mark>டை (84-1</mark> 15)	புற இலக்கியங்கள்	கிறித்தவ இலக்கியங்களின் தமிழ்க் கொடை	பன்னிரு திருமுறை – வரலாறு	<mark>தமிழில் வ</mark> ாசகம்
S- 12	SL0-1	கடையெழு வள்ளல் <mark>களின்</mark> சிறப்புகள்	களவழி நாற்பது (40)	கிறித்துவின் அருள்வேட்டல் – திரு.வி.க	நாலாயிரத் திவ்வியப் பிரபந்தம் – அறிமுகம்	<mark>விளம்பர</mark> த்திற்கு வாசகம் எழுதுதல்
	SLO-2	பட்டினப்பாலை (40-5 <mark>0)</mark> அட்டில் சாலைகளின் நிலை	போர்க்களமும் யானைப்படையும்	அலகிலொளி – 5 பாடல்கள்	வைணவ ஆழ்வார்கள் வரலாறு	<mark>வாசக</mark> ம் எழுது முறைகள்

earning Resources

- 1. கொன்றை, <mark>தொகுப்பு</mark>ம் பதிப்பும் தமிழ்த்துறை ஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல் மற்றும் தொழில்நுட்பக் கல்விநி<mark>றுவனம், கா</mark>ட்டாங்குளத்தூர், 603203, 2023
- 2. தமிழண்ண<mark>ல், புதிய நோக்</mark>கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2017
- 3. மு. அருணாச<mark>லம், தமிழ் இ</mark>லக்கிய வரலாறு, நூற்றாண்டு முறை (9ஆம் நூ. முதல் 16 வரை), தி பார்க்கர், சென்னை, 2005
- 4. தமிழ் இணையக<mark>் கல்விக்கழ</mark>கம் http://www.tamilvu.org/
- 5. மதுரை தமிழ் இலக்<mark>கிய மின் தொ</mark>குப்புத் திட்டம் https://www.projectmadurai.org/

Learning As	ssessment										
	DI			Continuous	s Learning Ass	sessment (5	0% weightage)		Final Evaminati	on (E00/ weightege)
	Bloom's Level of Thinking	CLA -	1 (10%)	CLA -	2 (10%)	CLA -	3 (20%)	CLA -	4 (10%)#	Filial Examinati	on (50% weightage)
	Level of Hilliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Lovol 1	Remember	30%	30%	30%	30%	20%	20%	20%	20%	30%	
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	2070	30%	-

Level 2	Apply Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%		-
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%		
Level 3	Create	3070	2070	2070	3070	3070	3070	30 /0	3070	2070		-
	Total	10	0 %	10	0 %	10	00 %	10	00 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director, Moz <mark>hi Trust,</mark> Thiruvanmiyur, Chennai – 600 041.	1. Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, Pondicherry University, Pondicherry	1. Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST
		2. Dr. R. Ravi, Assistant Professor <mark>and Head,</mark> Dept. of Tamil, FSH, SRMIST, VDP.
		3. Mr. G. Ganesh, Assistant Professor,
		Dept. of Tamil, FSH, SRMIST, RMP.
		4. Dr. T.R.Hebzibah beulah Suganthi,
		Assistant Professor, Dept. of Tamil,
		FSH, SRMIST, KTR.
		5. Dr. S.Saraswathy, Assistant Professor,
		Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	ULH		irse ime	HINDI-II	, CHEN	Cou Cate		G	4				Generi	ic Electi	ve Cours	6e		L T 2 0	P 2	0 2	C 3		
Pre	e-requisiteCou	irses	AI'I	Co-requisiteCourses	AU			Progres	siveCour	ses						N							
	ourse Offering		Nil	HINDI	Nil Data Book / Codes/Standar	do		- 3						Nil		Nil							
CO	urse offering	Department	Data Dook / Codes/Stallual	us					-	7		IVII											
Course Lo	earning Rat	ionale (CLR):			Learnir	ng			H	D	Prog	gram L	earnin	g Outco	mes (P	LO)			-				
CLR-1:	They get to l	earn Ancient ,Mediev	al,and Modern poetry	~ /	37 280, 572	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12		
CLR-2:	To understan	d the Significance <mark>of</mark>	poems of great poets like	Kabir,Tulsidas,Bihari and Dhananand	Sec. 10. (1975)	775						7											
CLR-3:	To Enhance	and Enrich their know	eledge through poetry	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 (7)		120																
CLR-4:	Media based	understanding for er	nployability		- A 1988 No. 1144	-100					Concepts		ge	<u></u>			ata		<u>s</u>	S			
CLR-5:	Job Oriented	writing skills	11 7 7 7 7	б	ienc)	ment	6 . 7	Ъ.,	Conc	20	wled	izatic		<u>g</u>	et D	SE:	g Ski	SKii					
			THE WAY THE	evel of Thinking	22 Expected Proficiency	Secreted Attainment	13	ruilualileilla	J o	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills				
		(2. 2)	1000	of _	ted F	ted /			Application of	Vith Fi	dural	in S	, to L	<u>∑</u>	ze, Ir	iigativ	S me	nunic	lical				
Course Le	arning Outco	omes (CLO <mark>): A</mark>	t the end of this course	e, learners will be able to:		evel	xbec	xbec	10	2	\pplic	¥	roce	SKI SKI	billity	Skills	ınaly	nvesi	roble	Juno	ınaly		
CLO-1:	To provide a	brief Introduction of	Hindi poetry(Bhaktikal,Reeti	ikal and Aadhunikkal)	707070	2	75	80		Н	Н	Н	М	L	Н	L	M	 L	L	Н	M		
CLO-2 :	To Discuss ti	he origin and develop	ment of various forms of po	petry in Hindi	The sale of	2	80	90	1	Н	Н	Н	М	L	Н	Н	М	L	L	Н	М		
CLO-3:	Focus on Ev	aluating the social ch	anges through poetry	77 77 77		2	75	95		Н	Н	М	L	Н	Н	М	Н	М	М	Н	Н		
CLO-4:	To Examine	Transcreation in adve	ertisement	437		2	80	90		Н	Н	L	Н	М	Н	L	Н	Н	М	Н	Н		
CLO-5 :	To guide the	students in the learn	ing of the technical aspect o	of the Hindi Languge,this would help them	in thefield administration	2	85	90		М	Н	М	Н	,	Н	Н	,	Н	М	Н	Н		
			-				00	90		VI	П	IVI	П	L	П	П	L	П	IVI	П	П		
Duration	n (hour)		12	12		12						12	7					12					
	SLÓ-1	BHAKTI KALIN KA	VITA	RITI <i>KALIN</i> KAVITA	ADHUNIK KAVITA				VI	GYAPA	AN	77			PATRA LEKHAN & PARIBHASHIK SHABDAVALI								
S-1	SLO-2	BHAKTIU KALIN I	K <mark>AITA KI AVA</mark> DHARNA	AVADHARNA	AVADHARNA						ARNA	7			VADHA	RNA							
	SLO-1	SWARUP		SWARUP	SWARUP				R	Ή					RTH								
S-2	SLO-2	MAHATVA		RITI KAL VIBHAJAN	AHATVA				A	RIBHA	SHA				WARUP)							
	SLO-1	UDDESHYA		MAHATVA	DDESHYA					/ARUI					<mark>ARI</mark> BHA	SHA							
S-3	SLO-2	BHAKTIKAL KI PF	RASANGIKTA	UDDESHYA	MATHLI SHARAN G NIRASH KARO MAN		R HO NA	П	VI	SYAPA	N KE P	RAKAR			RAYOJA	AN							
	SLO-1	DOHE- KABIRDAS	S	DOHE- BIHARI	KAVI PARICHAYA							SHESHT	AYEN		RAYOG								
S-4	SLO-2	SANT PARICHAY		KAVI PARICHAYA	KAVITA KA VISLES						N MAN				AHATV								
	SLO-1	DOHE KA VISLES		DOHE KA VISLESHAN	ASHAVADI DRISHT							RABHAI	/			KHAN KA	LA						
	SLO-2	GURU KA MAHAT		KANAK KA MAHATVA	SANGHARSH KI AC				VI	SYAPA	N MAH	ATVA			RAKAR								
S-5		CURUTUA OF ICE	IVARATVA KI AOR	VIPRIT SWABHAV KI CHARCHA SURYAKANT TRIPATHI NI			LA- VAR	? DE			N KI BH						T PATRA						
5-5	SLO-1							IIKALA- VAK DE			VIGYAPAN AUR BAZAR				AUPCHARIK PATRA						$\overline{}$		
S-5 S-6	SLO-1 SLO-2			PRAKRITI KA ATAL RUP	KAVI PARICHAYA				VI	SYAPA	N AUR	BAZAR			AUPCHA	RIK PATI							
		GURUTVA SE ISH BAHYA ADAMBAH	IVARATVA KI AOR R KA VIRODH									BAZAR ROZGA	R			ARIK PATI PI PATRA							
S-6	SLO-2	GURUTVA SE ISH	IVARATVA KI AOR R KA VIRODH	PRAKRITI KA ATAL RUP	KAVI PARICHAYA KAVITA KA VISLES	HAN	ARPAN		VI	SYAPA		ROZGA	R		SARKAR		RA						

S-8			MAHATVA			
•	SLO-2	AHNKAR KA PARITYAG	DOHE- GHANANAND	NAGARJUN AKAL AUR USKE BAD	VIGYAPAN PARIYOJANA	AVADHARNA
C 0	SLO-1	DOHE- TULSHIDAS	KAVI PARICHAYA	AKAL KA VASHTAVIK CHITRAN	VIGYAPAN AUR SAMAJ	SHABDAVALI KI AVSHYAKTA
S-9	SLO-2	PAROPKAR KI BHAVANA	DOHE KA VISLESHAN	AKAL KE PURVA KA CHITRAN	VIGYAPAN KI VYAPAKTA	KARYALYIN SHABDAVALI
	SLO-1	DAYA KA MAHATVA	SNEH KI SARLTA KA VARNAN	AKAL KE BAD KA CHITRAN	VIGYAPANLEKHAN KALA	EK DIN EK SHABD
5-10	SLO-2	ISHVAR KI MHATTA	PREM KA MAHATVA	KATTIS- BADRINARAYAN	VIGYAPAN AUR JAGRUPTA	HINDI SE ANGREJI SHABD
	SLO-1	MADHUR VAHAN <mark>KI UPYOGITA</mark>	NAYIKA KE PRATI SMARPAN	SAMBAND VICCHED KI PARICHARCHA	UDDESHYA	ANGREJ SE HINDI SHABD
S-11	SLO-2	RAM KI MAHIMA	GHANANAND KI KAVYA SHAILI KA MAHATVA	SWARTH NIHIT BHAVANA	VIGYAPAN KI SPASTTA	ABHYASH KARYA
0.40	SLO-1	DHOHA PARI <mark>CHARCHA</mark>	DHOHA PARICHARCHA	KAVYA PARICHARCHA	VIGYAPANPARICHARCHA	PARICHARCHA PARICHARCHA
S-12	SLO-2	PRASHNAA <mark>BHYASH</mark>	PRASHNAABHYASH	PRASHNAABHYASH	PRASHNAABHYASH	PRASHNAABHYASH

	Edited Book:	"" <mark>Samanya H</mark> indi", Srijonlok Publication, 2023, New Delhi.	3.	В	HAKTI ANDOLAN AUR SURDAS KA KAVYA – MANAGER P <mark>ANDEY</mark>
Learning Resources	1.	KABIR – HAZARI PRASAD DWEDI	4.	В	HARI – VISHVNATH PRASAD MISHR
g nocourses	2.	SURDAS – RAM CHANDRA SHUKL	5.	A	adhunik Vigyapan aur Jansampark – Taresh Bhatia

Learning Ass	sessment		100	No. 2 5 5							
	Dia any/a			Continuous Lea	arning Assessmen	t (50% weightag	e)			Final Evamination	(FOO) (weighters)
	Bloom's	CLA – 1	(10%)	CLA - 2	(10%)	CLA - 3 (20%)		CLA - 4	l (10%)#	Final Ex <mark>amination</mark>	50% weightage)
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Lovel 1	Remember	200/	200/	200/	200/	200/	200/	200/	200/	200/	
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	
LCVCI Z	Analyze	4070	3076	3070	40 /0	3076	3076	3076	5070	3076	-
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	
Level 3	Create	3070	2070	2070	30 /0	3076	3070	3070	3070	2070	-
	Total	1	00 %	10	00 %		100 %		100 %		100 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	/TTARN. I DAD	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Shri. Santosh Kumar Editor :	1	
Srijanlok Magazine	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi, CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
Place: Vashishth Nagar, Ara – 802301		

2. Dr. Md.S. Islam Assistant Professor, SRMIST
3.Dr. S. Razia Begum, Assistant Professor, SRM IST
4, Dr.Nisha Murlidharan Assistant Professor, VDP,SRM IST

			SCII	EN	Q	E	4									L T	Р	0	С	
Course	11111	23G02J Course Name	French-II		Cou		G	1/2	_		Generi	c Electi	ve Cour	se		2 0		2	3	
Pi	re-requisite Courses	Nil	Co-requisite Nil Courses	a Yis	Progressive Nil Courses															
(Course Offering	g Department	French Data Book / C	Codes/Standard	s				- 1			Nil								
				3.444.7																
Cou	ırse Learning I	Rationale (CLR):	The purpose of learning this course is to:			Learni	ing			1	-		Progra	<mark>m Le</mark> arnir	ng Outco	mes (Pl	_0)			
CLR-1:	Strenathen	the language of the students both in oral	and written		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	
CLR-2:	-	ir sentiments, emotions and opinions, rea		S. 18-7	186		3			3		3	U	-	-	,	10	+	12	
CLR-3:		learn the basic rules of French Grammar		300				B. 10:												
CLR-4:		ategies of comprehension of texts of diffe			(mo	(%)	8	ege	st		d)	_			а					
		•		(B)	ncy (eut	wlec	uceb		edge	ation			t Dat	S	Skills	Kills			
CLR-5:	Enable the	students to overcome the lear of speaking	g a foreign language and take position as a foreignerspeaking French		king	oficie	ain	ᇫ	S J	ated	,now	cializ	Ze	eling	rpre	S	/ing	lon S	SE SE	
				21 5	- E	d Pro	d Att	enta	o uo	n Rel	<u>ra</u>	Spe	=	Mod	, Inte	ative	Sol	nicat	a Sk	
Course L	earning Out	comes (CLO <mark>): At the</mark> end of this	s course, learners will be able to:		evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	
CLO-1 :	To acquire	knowledge about French language			2	75	80	H	M	Н	Н	M	Н	Н	L		M	Н	L	
CLO-2:		en the knowledge on concept, culture, ci	vilization and translation of French		2	80	90	М	Н	L	Н	Н	М	Н	М	L	1	Н	М	
CLO-2 :		content using the features in French lang			2	75	80	H	Н	-	М	Н	M	L	Н	M	M	Н	Н	
		the French language into other language			2	75	90	H	11	M	Н	M	Н	Н	M	L	Н	M	L	
CLO-4:									L		П					_				
CLO-5 :	To improve	the communication, intercultural element	s in French language		2	80	75	М	Н	Н	L	М	М	Н	Н	М	L	Н	М	
Duratio	n (hour)	12	12	11.45	1	2				12						12				
	SL0-1	Temps libre	Le pronom indéfini <i>on</i>	Vendre				II faut					Les	gallicisme	S					
S-1	SLO-2	Les activités quotidiennes	Les activités	Les exemples	;			C'est / II	est	779			Les	activités						
	SL0-1	Les exemples	Les adjectifs interrogatifs	Acheter	71.7			Le verbe		20			Les	pronoms	personne	ls COI				
S-2	SLO-2	Les activités	Les prépositions avec les noms	Les exemples				Les activ					Les	exemples						
S-3	SLO-1	Les moments de la journée	Les aliments				Le verbe	pouvoir				Lep	oronom y							
	SLO-2	Les exemples	géographiques Les activités	Les exemples	,			Le verbe	savoir				Les	exemples						
S-4	SL0-1	Les matières scolaires	Les verbes prendre et sortir	Les emballage				Le verbe						pronoms		ients				
	SLO-2	Les exemples												Les activités						
	SL0-1	Les quantités				Demande		e prix			Les nombres ordinaux									
S-5								Les activ					Les exemples							
S-6	SL0-1	Les exemples	Parler de ses gouts	Les commerc	es			Faire des						verbes éc	rire et vo	ir				
	SLO-2	Les activités	Les activités	Les activités					une rece	ette de cu	uisine			activités						
	SLO-1	La fréquence	Parler de ses préférences	les commerça	nts			Les activi	és				Le E	caduc ou	instable					

S-7	SLO-2	Les exemples	Les activités	Les exemples	Les courses	Les exemples
S-8	SLO-1	Les activités	Parler de sa routine	L'impératif	Les activités	Présenter ses vœux
3-0	SLO-2	Les verbes pronominaux	Les activités	Les activités	Vendre et acheter	Présenter ses souhaits
S-9	SLO-1	Les exemples	A la recherche d'un cadeau	Les articles partitifs	Mots et expressions	Présenter ses felicitations
3-9	SLO-2	Les activités	Les activités	Les exemples	Grammaire	inviter à une invitation
S-10	SLO-1	Les pronoms personnels COD	Temps libre	Très ou beaucoup (de)	Communication	répondre à une invitation
3-10	SLO-2	Les exemples	Les activités	Les exemples	Tout le monde s'amuse	Les exemples
S-11	SL0-1	Les activités	Mots et expressions	Le pronom en (la quantité)	Les sorties	Écrire un message amical
5-11	SLO-2	Les adjectifs démonstratifs	Les activités	Les exemples	Les saisons	Les exemples
0.40	SL0-1	Les exemples	Grammaire –Communication	La phrase négative (2	Les fêtes	Parler au telephone
S-12	SLO-2	Les activités	Les activités	Les exemples	Les messages	Un coup de fil

	The	ory:	4.	https://www.elearningfrench.com/learn-french-grammar-online-free.html
	1.	" Nouvelle Génération-Al" Méthode de français, Marie-Noëlle COCTON, P.DAUDA, L.GIACHINO, C.BARACCO,	5.	https://www.lawlessfrench.com/grammar
Learning Resources		L <mark>es éditions Di</mark> dier, Paris, 2018.	6.	https://blog.gymglish.com/2022/12/15/basic-french-gramm <mark>ar</mark>
	2.	C <mark>ahier d'activ</mark> ités avec deux discs compacts.		
	3.	https://www.fluentu.com/blog/french/french-grammar		

	Learning Assessi	ment		100				11.00	V		
	Dia ana/al auril af		(Continuous Lea	rning Assessmer	nt (50% weighta	ige)			Final Fyamination (F00)	usiahta aa)
	Bloom'sLevel of Thinking	CLA - 1	(10%)	CLA – 2	? (10%)	CLA - 3	(20%)	CLA -	4 (5%)#	Final Examination (50%	weightage)
	Hillikilig	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Lovel 1	Remember	30%	30%	30%	30%	20%	20%	20%	20%	30%	
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	
Level 2	Analyze	4070	3070	3076	40 /0	3076	3076	3076	5076	50%	-
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	
Level 3	Create	3070	2070	2070	3070	3076	3070	3070	3070	20%	-
	Total	1	00 %	1	00 %	11	00 %	AP.	100 %	100	%

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
Mr. Kavaskar DanasegaraneProcess Expert Maersk Global Service Center Pvt. Ltd	1. Dr. C.Thirumurugan Professor, Departmentof French, Pondicherry University	Mr. Kumaravel K. Assistant Professor & Head, SRMIST,KTR
2.Mr. Sharath Raam Prasad Character Designer, Animaker Company Pvt.		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP

	Course Co	ode	UES23AE1T	Course Name ENVI	/IRONMENT/ STUDIE:	('0	urse Cate	egory		AE	١.		Abili	ity Enha	ncemen	t Courses) }	L T	P 0	0 2	C 3
	Pre-re	quisite Courses	Nil	Co-requisite Courses		Nil			Progre	essive Cours	es	Α.				Ni	I				
C		ng Department	Compi		Data Book	/ Codes/Standar	ds				*			Nil							
		•																			
Cour	rse Learning	Rationale (CLR):		The purpose of learning this course is to	0:	W. 3774		Learni	ing			<u>~_</u>	٦.	-	Progra	<mark>m L</mark> earni	ng Outco	omes (Pi	L0)		
CLR-1:	To create a	wareness on Envir <mark>onmer</mark>	nt and Renewable and Non	-renewable resources	100	251	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	To understa	and about ecosyst <mark>em and</mark>	I Biodiversity		20	æ		11.											1		
CLR-3:	To understa	and the natural a <mark>nd ant</mark> hr	opogenic impact of the env	PA Her	-07					Sec			a								
CLR-4:	To create a	wareness on different en	vironmental problems	*****	(moc	(%)	(%)	dge	pts	lije Scip	e		Medo		E E		S	<u>s</u>			
CLR-5:			vironment Protection acts a		g (Bl	ency	ment	owle	once	d Dis	vledo	zatio	Knov	0	ot Da	<u>s</u>	 }	S			
02.1101						Expected Proficiency (%)	Expected Attainment (%)	undamental Knowledge	Application of Concepts	ink with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	nvestigative Skills	Problem Solving Skills	Communication Skills	skills		
				- 74	of Th	led P	ted A	ment	ation	₩	dura	n Sp	to Ct	n Mc	e, II	gativ	JS E	Junic	ical		
Course Le	earning Out	comes (CLO <mark>): At t</mark>	<mark>he</mark> end of this course,	learners will be able to:			evel	xbec	xbec	nuda	pplic	¥	roce	kills i	pility	Kills i	nalyz	west	roble	omu	nalyt
CLO-1:	Applying k	nowledge on R <mark>enewable</mark>	and Non-renewable resour	ces	100. 1		2	80	65	L	H	L	M	L	H	L	L	L	Н	L	Analytical Skills
CLO-2 :	Understan	ding about ecos <mark>ystem an</mark>	d Biodiversity	1 2 7 Car 1			2	80	70	М	Н	L	М	L	Н	L	L	L	Н	L	М
CLO-3 :	Gathering	knowledge on impact of	environmental pollution				2	80	70	L	Н	L	М	L	Н	М	М	М	Н	L	М
CLO-4 :	Understan	ding of different e <mark>nviro</mark> nm	n <mark>ental</mark> problems			1970	2	80	70	М	Н	L	М	L	Н	М	М	М	Н	L	М
CLO-5 :				I the impact of human population onenvironr	ment proble	ems	2	80	65	М	Н	,	М	1	Н	,	М	,	Н	,	М
						- 11116		00	03	IVI		L	IVI	L	11	L	IVI	L	11	L	IVI
Duratio	n (hour)		9	9		7.0%	9					9						9			
	SL0-1	Multidisciplinary nature	<mark>ofenvironme</mark> ntal studies	Energy flow in the ecosystem		Conservation of b	,		and Ex-situ	Disaster management- NatureFloods,						Environment Protection Act					
S-1	SLO-2	Definition, Scope and I Environmental Studies		Energy flow in the ecosystem	5 N.	Environmental Po	llution- D	efinition		Earthqu	ıakes					Air (Pre	evention a	and Conti	rol ofPolli	ıtion)	
S-2	SL0-1	Need for public awaren	ness.	Ecological succession	- No. 1	Causes, Effects a	nd Contro	olMeasure	es	Cyclon	es					Water (Act	Prevention	on and co	ontrol ofP	ollution)	
	SLO-2	Institutions in Environm	nent	Food chains, Food webs and Ecological p	pyramids	of Air Pollution				Landslid	les					Wildlife	Protection	n Act			
	SL0-1	People in Environment		Ecosystem, Introduction, Types, Character features, Structure and functions		Causes, Effects a	nd Contro	olMeasure	s of Water	Social	Issues	and the	Enviro	nment:	From	Forest	Conserva	tion Act			
S-3 SLO-2 Introduction to natural resources-Associated Forest ecosystem Problems										Unsusta	inable to	Sustaina	ble Deve	elopmer	nt	Issues legislati	involved i	in enforc	ement of	environm	iental
SLO-1 Renewable and Nonrenewableresources Grassland ecosystem Causes, Effects a						nd Contro	olMeasure	es	Urban problems related to energy												
S-4	SLO-2	Forest resources		Desert ecosystem		of Soil Pollution				Water Conservation						Public awareness					
S-5	SLO-1	Water Resources		Aquatic ecosystems (ponds, lakes,stream		Causes, Effects a Marine pollution	nd Contro	l Measure	es of	Rain Wa Waters		esting,									

	SLO-2	Mineral Resources	Aquatic ecosystems (rivers, estuaries, oceans)	THINGE A	A. A.	Human Population and the Environment: Population growth, variation among nations
S-6	SLO-1	Food Resources	Biodiversity and its conservation-genetic, species and ecosystem diversity	Causes, Effects and ControlMeasures of Noise Pollution	Environmental Ethics: Issues andPossible Solutions	Population explosion – FamilyWelfare Programme
	SLO-2	Energy Resources	Biogeographical classification of India	of Noise Poliulion	Solutions	Environment and human health
	SLO-1	Land Resources	Value of Biodiversity	Causes, Effects and Control Measures of		Human Rights
S-7	SLO-2	Role of an individual in conservation of natural resources	Biodiversity at Global, National andLocal Levels	Thermal Pollution	Climate change & Global warming	Value Education
S-8	SLO-1	Equitable use of resoureces for sustainable lifestyles	India as a Mega Diversity Nation	Causes, Effects and Control Measures of Nuclear hazards	Acid rain & Ozone layer depletion	HIV/AIDS
	SLO-2	Concept of an ecosystem	Hot-spots of biodiversity	INUCICAL HAZALUS		
S-9	SLO-1	Structure and Functions of anecosystem	Threats to biodiversity: habitat loss,poaching of wildlife man-wildlife conflicts	Solid Waste Management Causes, Effects and Control Measures of Urban and Industrial Waste	Nuclear Accidents and NuclearHolocaust	Women and Child Welfare
	SLO-2	Producers, consumers and decomposers	Endangered and endemic species of India	Role of Individuals In Pollution Prevention	Wasteland Reclamation	Role of Information Technology inEnvironment and human health

1.	Learning Resources Bharucha Erach, (2013),	Textbook of Environmental Studies for Undergraduate Courses (Second edition).	Telangana, India:
	Orient BlackSwan.		

- Basu Mahua, Savarimuthu Xavier, (2017), SJ Fundamentals of Environmental Studies. Cambridge, United Kingdom: Cambridge University Press
- R.Jeyalakshmi (2014),Text book of Environmental St<mark>udies, Devi p</mark>ublications, Chennai.

 Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (R)

Learning A					. /							
Level	Level Bloom's Level of Thinking Continuous Learning Assessment (50% weightage)									F1 1 F 1 11 /F00/		
		CLA - 1	(10%)	CLA - 2 (*	10%)	CLA – 3 (20%)		CLA - 4 (10%)#	Final Examination (50% weightage)		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
	Remember	100/	1 1	100/		400/		400/	-7	100/		
Level 1	Understand	40%	1.00	40%	-	40%	-	40%	/	40%	=	
110	Apply	200/		200/		200/	100	200/	4	2007		
Level 2	Analyze	30%	-	30%	ADAT	30%	-	30%	7 /	30%	-	
110	Evaluate	200/	/	200/	HIVIN	200/	D. T	200/		2007		
Level 3	Create	30%	1.0	30%	-	30%		30%		30%	-	
	Total 100 %		00 %	100	0 %	10	00 %	10	00 %	100 9	%	

[#] CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Academic	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	(Autonomous) Chennai	1. Dr. P. Parthipan, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR 2.Dr. D. Sankari, Professor and Head, Department of Biotechnology, FSH, SRMIST, KTR

Course Code	U	JBT23201J	Course Name BIOCHEMISTRY			ourse tegor		١.	D	۸,	D	isciplin	e Specif	ic Core Co	purse					C 4	
Pre-requis Courses	S		NII	Co-requisite Courses	Nil	Yes					Progr	essive Co	urses					Nil			
	Course Offering	Department	Biote	chnology	Data Book / Codes/S	Standards									Nil						
Col	urse Learning F	Rationale (CLR):		The purpose of learning this	course is to:		ı	_earnir	ng			4				Program Le	arning Ou	tcomes (F	PLO)		
CLR-1:	Understand	ling the classification o	of carbohydrates	7		7.756	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Understand	ling the importance <mark>of</mark>	<mark>lipids </mark>		relative the	11. 11.		<u></u>	<u></u>												
CLR-3:	Understand	ling the importanc <mark>e of l</mark>	bonds in structure integrity	V.	F 12 1 1 1 1 1 1 1	1000	(L	У(%	%)tı							6					
CLR-4:	Knowledge	on structure of nucleic	acid		The said was	W. 103	loor	Suc	ner	app d	Data					elon					
CLR-5:	Knowledge	on importance o <mark>f vitar</mark>	mins and minerals	4		7.77	Jking(B	Proficie	Attainr	Knowledge	rpret Da	pility	ices		ion of	nt and lifelong					
Course Learn	ing Outcomes(CL	.0):	At theendof thiscourse,learnersw	illbeableto:			Levelof Thinking(Bloom)	ExpectedProficiency(%)	ExpectedAttainment(%)	Tundamental	Analyze, Interpret	Reasoning ability	Ethical Practices	Feam Work	Communication of complex	ndependent	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PSO-5
CLO-1:	To analyze the importance of carbohydrates, requirement for living organism						3	_	70	Н	L	L	L	M	M	M	-	L	L	M	Н
CLO-2:							3	85	75	Н	L	L	L	L	M	Н	-	М	М	М	М
CLO-3:	Strong basi	is for understanding pr	otein structure				3	75	70	Н	L	М	L	L	М	Н	L	М	М	М	М
CLO-4:	- u		ructure of DNA and RNA		***	1400	3		80	Н	М	М	М	1	Н	М	L	L	-	М	М
CLO-5:		0 0	nins importance and deficiency	disease		/ / / 			75	Н	1	M	М	-	Н	M		М	М	М	M
020 0.	7 mary 2 mg c	iomity against the man	mo importante una denorano	uiotaot		-		00	, 0		<u> </u>						_				
Duration (hou	ır)		18	18	1.0	18						18	7					18			
S-1	SLO-1	Introduction - Cart	oohydrates	Introduction - lipids	Introduction	of amino acids				Introductio					Puri	<mark>ne bi</mark> osynt	hesis. A	ΓP			
	SLO-2	classification of ca		Classification of lipids		on of amino acids- ba				Structure of						Synthesis					
S-2	SLO-1	Structure of carbol monosaccharides Function	hydrates- (straight ch <mark>ain)</mark> ,Disaccharide,	Simple lipids- Fat, waxes	Based on requ synthesis	uirement, based on involve	olvement in protein Structure of Pyrmidines Pyri				Pyrimidine biosynthesisCTP										
	SLO-2	Epimers, enantiomers,		Classification of fats	Zwitter ion an	d isoelectric point				Unusual base					TTP,	•					
S-3	SLO-1	Structure of carbol monosaccharides	hydrates- (Ring structure), Functions	Mixed fats	Properties	of amino acids Nucleosides				Vitai	mins- Clas	sification	1								
	SLO-2			Compounds lipids- Phospholip		Properties of amino acids Nucleotides					soluble vita										
S4-6	SLO-1	Introduction to B guidelines	liochemistry lab-Lab safety	Sugar analysis-Fructose, Gala	actose Sugar anal	ysis- starch & dextrin	tarch & dextrin Amino acid analysis- cysteine, arginine Estimation of Protein Lor				Lowry's	method	I								
	SLO-2																				
S-7	SLO-1		des- Starch, Glycogen	Phospholipid- Cephalin	Properties	of amino acids				Phosphodieste	r bond				Fat :	soluble vit	amins-D				
	SLO-2	Structure & function heteroploysacchar	ons of ides- hyaluronicacid	Phosphotidyl inositol	Protein- Int	roduction				N-glycosidic b	ond				Fat	soluble vit	amins-E&	- ≩K			

S-8	SL0-1	Structure & functions of				
		heteroploysaccharides- Chondroitinsulphate,	Plasmologens	Classification of protein on different basis	Hydrogen bond in DNA structure	Water soluble vitamins- B1, B2
		Dermatan sulphate				
	SLO-2	Structure & functions of	Compounds lipids- Sphingolipids-Sphingomyelin			
		heteroploysaccharides- keratin <mark>sulphate,</mark> Heparin.		Classification of protein on different basis	DNA double helical structure	Water soluble vitamins- B3, B5
S-9	SL0-1	Properties of carbohydrates	Gangliosides	Forces stabilizing protein structure	Forms of DNA- A DNA	Water soluble vitamins- B6, B12,
	SLO-2	Metabolism introduction	Terpenes	Structure of proteins- primary	B-DNA	Minerals- Introduction
S-10-12	SL0-1	Reagent preparation forcarbohydrate analysis	Sugar analysis- Sucrose	Amino acid analysis-General	Estimation of Glucose- OT method	Estimation of DNA- Diphenylamine method.
	SLO-2			procedure, Histidine, tyrosine	A VA	
S-13	SL0-1	Glycolysis pathway	Derived lipids- cholesterol	Secondary structure of protein	Z-DNA	Macro minerals- Calcium
	SLO-2	Energetics of glycolytic pathway	Physical properties of fats.	Structure of proteins-tertiary	Difference between DNA & RNA	Macro minerals-potassium
S-14	SL0-1	Glycolysis regulation	Chemical properties of fats.	Structure of proteins-quarternary	Types of RNA-m-RNA	Macro minerals-magnesium
	SLO-2	TCA cycle	Chemical properties of fats.	Urea cycle	t-RNA	Micro minerals-Manganese
S-15	SLO-2	Energetics of TCA cycle.	Biosynthesis of fatty acid-Palmiticacid	Importance of Urea cycle	r-RNA	Micro minerals- Copper
	SLO-2	Regulation of TCA cycle	Elongation and desaturation	Regulation of Urea cycle	Heterogenous RNA	Micro minerals-Zinc
S-16-18	SL0-1	Sugar analysis-Glucose	Sugar analysis- lactose, Maltose	Amino acid analysis- tryptophan,	Standard solution preparation and	Estimation of RNA- Orcinol method.
	SL0-2			methionine	colorimetery basics	

Learning Resources

- 1. Robert K. Murray, David Bender, Kathleen M. Botham and Peter J.Kennelly, Harpers'lllustrated Biochemistry' 29th Edition, Mc Graw Hill 2012.
- 2. Lehninger, Nelson and Cox, "Principles of Biochemistry", 6th edition, W.H.Freeman & Company, 2013.
- 3. Voet&Voet, "Fundamentals of Biochemistry", John Willey & Sons, 2010. Jeremy M. Berg, John L.Tymoczko and LubertStryer, Biochemistry, 4th Edition, Freeman and Company, 2011
 3. Devlin, Thomas M. Textbook of biochemistry: with clinical correlations. John Wiley & Sons, 2011.

Learning Ass	essment								-			
					Continuous Learning As	sessment (50% weightage	e)			Final Examina	tion(50%	
	Bloom's Level of	CLA - 1	(10%)	CLA - 2 (1	0%)	CLA - 3 (2	20%)	CLA - 4 (10	%)#	weightage)		
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Total	Th.	100 %		100 %	100 %			100 %	1	00 %	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. S.Vijaya bharathi, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST,KTR

Course Code	U	BT23202J	Course Name	IVUI FUUI AK DIUI UUT				irse gory	С	7	١,		Di	scipline	Specific	ific Core Course $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						O C 2 4
Pre-red	quisiteCour	ses	Nil	Co-requisiteCourses	Nil				Progre	ssiveC	ourses						Nil					
Cou	rse Offering	Department		Biotechnology	Data Book / Codes/Sta	tandards									Nil							
	`			A Y		÷.		-I														
Course L	earning Ra	tionale(CLR):		The purpose of learning this course is to				Learn	ing			1	40			Prog	gram Lear	ning O	utcome	s (PLO)		
CLR-1:	Learn abo	ut the structure	and functions of nucleic acid	ds	NAM. 27		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Gain know	ledge on the st	tructu <mark>re and types</mark> of chrom	osomes		-			11	İ												
CLR-3:	Understan	d the central do	ogma of molecular biology		1. 学生生于			144	14.		a)					×						
CLR-4:	Learn on th	e mechanism of	transcription		a P. Ohio, or		00m)	(%)/	(%)		vledg	i Data)	ces	논	omple	-p -Di					
CLR-5:	Gain knowl	edge about the t	tr <mark>anslation proc</mark> ess and molec	ular biology techniques	1 1 1 1 1 1 1		g (B	ienc)	Attainment		Knov	rpret	Reasoning ability	Ethical Practices	Team Work	of co	idependent and lifelong learning	1.1	0-2) – 3	PS0-4	PS0-5
		Ū			1 12 . 150 E	-	E E	rofic	∖ttain		intal	, Inte	sonir	cal F	Feam	ation	ender ng les	PSO.	PS0 -	PS0	PS	PS
Course Lo	arnina Ou	teamos (CLO	At the end of this se	urse, learners will be able to:	Alle lat		Level of Ininking (Bloom)	Expected Proficiency (%)	Expected /		Fundamental Knowledge	Analyze, Interpret Data	Rea	Ethi		Communication of complex biotechnological ideas	independent and lifelong learning					
Course Le	arriiriy Ou	iconies (CEO). At the end of this co	urse, learners will be able to.		3	Feve	Expe	Expe	4	굔	⋖				Com						
CLO-1:	Gain know	edge on the gen	nome organization		3 7 7 7		2	80	75		H		М		-	L	M	-	-	-	-	М
CLO-2:	Learn abo	ut the fine struc	<mark>cture of gene</mark> and molecular	techniques	711 E X	2	2	80	75		Н	-	L	М	Н	L	M	-	-	-	-	-
CLO-3:	Apply know	vledge on vario	o <mark>us replication</mark> mechanisms	A 100 200 3		1 3	3	75	70		-	Н	Н	-	Н	Н	Н	-	-	-	-	М
CLO-4:	Apply cond	cepts on transcr	ri <mark>ption and its</mark> significance	4 4 4 4 4 4	2.0		3	75	70		-	Н	Н		٠.	Н	Н	-	-	-	-	М
CLO-5:	Learn abou	t the mechanisn	n o <mark>f translation</mark>			2	2	80	75	-	Н	-	М		M	Н	Н	-	-	-	-	-
				_2.				u u	u u													
Duration (•		18	1 8	//	18							1	V					18			
S-1		Molecular Biolo		Prokaryotic genome	Central dogma						nscriptio		17			Genetic c						
S-2			genetic material	Eukaryotic genome	DNA Replication	(1) (A)					karyotic tı					Translati						
S-3	SLO-1	DNA – structur	e and functions	Genome organization inprokaryotes	Replication in prokaryotes	es .				Pro	karyotic tı	anscription	on - mecl	nanism		Ribosome	es – prokai	yotic a	ndeuka	ryotic		
S 4-6	SLO-1 SLO-2	Introduction to	molecular biologylaboratory	Isolation of genomic DNA	Isolation of plasmid DN	IA.				Pol	ymerase	chain re	action	7		SDS-PA	GE					
S-7		Watson and Cr	rick Model	Mitochondrial DNA	Mechanism of replication	and enzyr	mesin	volved		Fuk	aryotic tra	anscriptio	n			Prokarvot	ic translati	on				-
S-8		Forms of DNA		Chloroplast DNA	Rolling circle replication									n - mec <mark>hanism </mark>								
S-9	SLO-1	RNA – types ar	nd structure	Genome organization ineukaryotes						c translatio												
S 10-12		Lab Safety and	d GLP	Isolation of RNA	Quantification of DNA	NA Polymerase chain reaction -interpretation Southern					Blotting											
S-13	SLO-2 SLO-1	Functions of RI	NΙΛ	Chromosome – types andfunctions	Replication in eukaryotes					5' 4	capping					Eukaryoti	c translatio	n ma	chanic	n		
S-13			es and functions	Fine structure of gene	Mechanism of replication							vlation								II		
S-14	SLO-1	Structure of Pro	nteins	Types of genes						Proteins involved in translation Post-translational modifications												
S 16-18	SLO-1 SLO-2	Isolation of gen		Agarose gel electrophoresis	Quantification of RNA																	

Learning	 "Essentials of Molecular Biology", David Freifelder, 4th edition, Narosa Publishing House, 2015. 	3. "Cell and Molecular Biology", De R <mark>obertis, 8th Edition,</mark> Lea & Febiger,2017.
Resources	2. "Karp's Cell and Molecul <mark>ar Biology: Conce</mark> pts and Experiments", Gerald Karp, 8 th Edition, 2015.	4. "Genes XII", Lewin, 12 th Edition, Jones <mark>and Bartlett Publish</mark> ers, 2017.

	Bloom's		Final Examination(50%									
	Level of Thinking	CLA - 1	(10%)	CLA - 2	(10%)	CLA - 3	(20%)	CLA - 4	(10%)	weightage)		
	Level of Milliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
ual 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
evel 1	Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
evel 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
VEI Z	Analyze	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	
wol 2	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
evel 3	Create	1070	1070	1370	1370	1370	1370	1370	1370	1370	1370	
	Total	1	00 %	1 1 1 1	00 %	100 %		100 %		1	00 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	HALL BUT TO THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. G. Swamynathan, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course		DT00000 I	Course	OMOUT	ATIONAL PIOLOGY		Coul	se	0			٠	Di i . li .		0		L	T F	P 0	С
Code	UE	BT23203J	Name	COMPUI	ATIONAL BIOLOGY		Categ		С				Discipiin	e Specific	Core		3	0 2	2 2	4
Pre-requ Cours			NII	Co-requisite Courses	NII	who				4	Progre	ssive Cou	rses				Nil			
	Course Offering	g Department		Biotechnology	Data Book / Codes/Sta	andards						>	N	il						
Course	Learning Ra	ntionale(CLR):		The purpose of learning this course is	to	7 - 16	Lear	ning			ď			Pro	ogram Lea	arning (Outcom	es (PLO)	
CLR-1:	Understand	d the decoding of	DNA and its importance	e		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Analyze the	e genome sequen	ces and compare then	n for better understanding	E/ 1905 1															
CLR-3:	Generate th	he 3D structure of	proteins offering clues	to their function					ч.					×						
CLR-4:	Provide acc	cess to chemical i	nformation in database	and their representation in structure searching	11.0	(mo	%)	(%)		eage Data	<u> </u>	es	_	mple deas	pu					
CLR-5 :	Learn the in	nventive process	of finding new drugs ba	ased on knowledge of target molecules	100	- Bi	ency	nent		pret	Reasoning ability	Ethical Practices	Team Work	of co cal ic	ent a	PS0 - 1	PS0 - 2) – 3	PS0-4	PS0-5
OLIV 0.			J. J. J.			l kij	ofici	ttainr	安石	Inter	onin	al Pl	eam	ation lologi	ende I lear	PS	PS	PSO	PS	PS
				# # # # # # # # # # # # # # # # # # #		evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge Analyze, Interpret Data	Reas	EFF		Communication of complex biotechnological ideas	independent and lifelong learning					
Course L	earning Ou	ıtcomes (CLO)	: At the end of thi	s course, learners will be able to:		skel 0	pect	cbect	100	Ana				ommo	트					
CLO-1 :	Understand	d the simulation o	f biological systems us	ing computational platforms		1	75	70	1		M		М	L		-	-		_	-
CLO-2 :				enes and proteins by sequence analysis		1	75	70	-	-	Н	Н	M	L			-		_	+
CLO-3:	-	rledge on CADD	7 7 7			1	75	70			"	Н	Н	Н		_	_		_	+
CLO-4:		0	ntermolecular interactio	n between the small molecules		1	75	70	10	Н		M	H	Н		М	-			+
CLO-5:		0		whole genome and its applications		1	75	70				M	- ''	Н		M	_		_	+
CLO-J.			7				73	70	10		-	IVI		"		IVI				Ь
Duration (hou	ır)		15	15		15					//1	5					1!	 5		
S-1	SL0-1	Biological databases		Block based alignment	Ab into method		·		Predi	tion methods				Ac	oplications of	molecular	Dockina			
	SLO-2	Classification		Gene Prediction methods in Prokaryotes	Phylogenetic Foo	ot Printing method			Homo	ogy modelling	principle	7			oplications of			-		
S-2	SL0-1	Genbank database		Conventional method	Expression Profil		D	1		ogy modellin				N	Methods of M	olecular D	locking			
	SL0-2	EMBL, DDBJ		Computational method	Protein secondar	ry structure predict	ion				applications			N	Methods of M	lolecular D	ocking			
S-3	SL0-1	UNIPROT, PDB		Ab intio method	Globular proteins	5			Homo	ogy modellin	tools			N	Methods of M	olecular D	locking			
	SLO-2	Specialized Databas	Ses .	Hidden Markov model	Chou fasman m	ethod			Homo	ogy modelling			p#	R	Rigid docking		•			
S 4-5	SL0-1	Retreival of Sequer	ices from genbank	Retreival of Sequences from EMBL, DDBJ	Retreival of Sequ	ences from Unipro	t, PDB		Homo	ogy modelling				C)RF Finder					
S-6	SL0-1	Genome database		Performance Evaluation	GOR method				Fold	Recognition p	rinciple		-	F	Texible dockir	ng				
	SLO-2	Drug bank, Pubmed		Gene Prediction in Eukaryotes	Transmembrane	Proteins			Fold	Recognition st	eps			V	'irtual Screeni	ing				
S-7	SL0-1	Sequence analysis		Ab initio method	Prediction of He	elical membrane pr	oteins		Fold	Recognition a	pplicatrions			F	HTS					
	SLO-2	Pairwise sequence a	alignment methods	Neural Network method		elical membrane pr	proteins Fold Recognition methods Target Preparation													
S-8	SL0-1	Dot matrix		Discriminant Analysis	Prediction of He	elical membrane pr	oteins		Ab ir	tio method pr	inciple			T	arget Prepara	ation				

	SLO-2	Needleman Wunsch algorithm	Homology based method	Prediction of Helical membrane proteins	Ab initio method method	Ligand Preparation
S-9-10	SL0-1	BLAST	BLAST	Global Alignment	Local Alignment	MSA
S-11	SL0-1	Smith waterman algorithm	Consensus-based method	Prediction of Beta membrane proteins	Molecular Docking introduction	Lipinski Rule
	SLO-2	BLAST	Performance evaluation	Prediction of Beta membrane proteins	Molecular Docking definidtion	ADMET analysis
5-12	SL0-1	FASTA	Promoters in prokaryotes & Eukaryotes	Prediction of Beta membrane proteins	Molecular Docking applications	Scoring Functions
	SLO-2	Multiple sequence alignment methods	Regulatory Elements	Coiled-Coil Prediction	Principle of Molecular Docking	Scoring Functions
5-13	SL0-1	Progressive alignment	Consensus Sequences	Protein Tertiary structure	Principle of Molecular Docking	Docking Tools – Protein Ligand
	SLO-2	Iterative alignment	Prediction methods	Protein Tertiary structure	Principle of Molecular Docking	Docking Tools - Protein Protein
S-14-15	SL0-1	MSA - Clustal	MSA - T-COFFEE	Homology Modelling	Rasmol	Rasmol

Learning Resources

- Essential bioinformatics, Jin Xiong, Cambridge University Press, 2006
 Bioinformatics: A Practical Guide to the analysis of genes and proteins, 2nd edition, Andreas D. Baxevanis, B. F. Francis Ouellette
- Introduction to Bioinformatics, <u>Arthur M Lesk</u>, <u>Oxford University Press</u>, <u>2019</u>
 Bioinformatics Concepts, Skills & Applications 2nd Edition, S.C.Rastogi, <u>CBS Publishers</u> and Distributors, 2018.

	Bloom's				Continuous Learning Ass	sessment (50% weighta	ige)			Final Exam	nination(50%	
	Level of Thinking	CLA – 1 (10%)		CLA – 2 (10%)		CLA - 3	(20%)	CLA - 4	(10%)	weightage)		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
evel 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
	Understand			200	111 D. C.	Property and the	ALC: NO					
evel 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
	Analyze			A PRODUCT OF		2.481		h 1				
evel 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Create					1.00						
	Total	10	00 %	1	00 %	1	00 %	10	00 %	10	00 %	

[#] CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	4.510.5	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Vidhya V.G, Assistant Professor, Dept. of
	A DAT TO	Biotechnology, FSH, SRMIST, KTR

	ourse Code UCD23S02T Course Name Verbal Ability and Skill Development				I Development		Course Categor		S			SI	kill Enha	ncemen	nt Course		L 2	T 0	P 0	C 2	
	Pre-	requisite Courses	Nil C	o-requisite Courses		Nil		Pi	rogressive	Courses		<u>. </u>				Nil					
	Course Of	fering Department	Career Guid	dance Cell	Data Book	/ Codes/Standards	ii.				+	9									
Cou	rse Learnir	ng Rationale(CLR):	4	he purpose of learning th	nis course is to		Ė	Learnin	g			۲,	Ĺ	Program	Learnir	ng Outco	mes (PL	0)			
CLR-1	: Critica	ally evaluate basic mathematical co	ncepts related to mixto	ures and alligations, Numb	ers, time and work	0.329	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2	: Use t	heir logical thinking and <mark>analytical a</mark>	<mark>abili</mark> ties to solve reasor	ning problems	10000					1.1											
CLR-3	: Deve	lop soft skills relating to the need fo	r iob recruitment		TX - 1	- March 18 -	-17														
CLR-4	: Provide Boats	de students with the n <mark>ecessary skill</mark> and streams,	ls to generate and inte			ipes and Cisterns,	Bloom)	cy (%)	:ut (%)	vledge	cepts		egp	tion			Data		Kills	S∭	
CLR-5	: Enabi	le students to underst <mark>and problem</mark> s	on graphs and also ir	ncrease their ability in lang	uage skills		inking (Proficien	Attainment (tal Knov	of Con	Related	Knowle	oecializa.	tilize	odeling	nterpret 1	re Skills	olving S	ation Sk	Skills
Course	e Learning	g Outcomes (CLO): At the el	nd of this course, I	earners will be able to	o:	124	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected /	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical S
CLO-1	: Under meth	rstand the concepts of <mark>mixtures and</mark> od	d alligations, Numbers,	time and work and to app	oroach questions in asi	mpler and innovative	3	80	70	М	Н	-	L		М		М	М	Н	-	Н
CLO-2	: Estab	lish a student's interest <mark>and awarer</mark> oning	<mark>n</mark> ess in seating arrang	ements, mathematical ope	erations, logical	1/1/2	3	80	75	М	Н	-	L		М	-	М	М	Н	-	Н
CLO-3	: Acaui	re soft skills that will help for applyi	na iobs			1.77	3	85	70	-	-	M	Н	М		L	-	-	-	Н	-
CLO-4		onstrate various principles involved					3	85	80	-	-	-		М	-	L	Н	-	Н	-	Н
CLO-5	: Ability	to solve problems on reaso <mark>ning ar</mark>	nd to interpret English	language		1400	3	85	75	-	Н	1	L	-	Н	-	М	М	-	Н	
Dura (b)	tion our)	6		6			6					6						(5		
S-1		Time and Distance – Introduction	In	eating Arrangements (Circ troduction		Resume Building - Intr	oduction	n	7.	Chain Rul Introducti		and Ciste	rn –	T		Functions	and Gra	aphs Intr	oduction		
		Time and Distance – Problems	Pi	eating Arrangements (Circ roblems		Resume Building	4 J		Ш	Chain Rul				lems		Functions		aphs – P	roblems		
		Time & Work- Introduction	M	athematical Operations -	BasicProblems	Group Discussions - Ir				Data Suffi						Compret					
S-2		Time & Work – Problems		athematical Operations –		Group Discussions – M				Data Suffi						Comprehe					
S-3		Alligation or Mixture – Introduction		ata Arrangements - Introdu		Group Discussions - A	,			Logarithm						Idioms an Introduct	ion				
C 4		Alligation or Mixture - Problems		ata Arrangements - Proble		Group Discussions - A				Logarithm			Drobles:			Idioms an				- Practise	Session
S-4		Numbers – Basic Problems Numbers – Tricky Problems		ogical Deductions – Introductions – Proble		Group Discussions - A Group Discussions - A				Boats and Boats and						Cause an				ın	
		Problems on Trains – Introduction		etter and Symbol Series –		Leadership Skills Intro				True Disco)		Cause and Effect – Practise Session Theme detection – Introduction					
S-5		Problems on Trains – Problems		etter and Symbol Series –		Leadership Skills	uuciioii			True Disci					Theme detection – Introduction Theme detection – Activity						
		Races and Games – Basic Proble		put Output Tracing Introdu		How to Handle Criticis	m and F	eedback		Geometry			ntroducti	on			Ordering of words _ Introduction				

Learning Resources 1. James Barrett & Tom Barrett - Ultimate aptitude tests: over 1000 practice questions for abstract visual, numerical, verbal, physical, spatial and systems tests, Kogan Page, London, 2018. Fourthedition 2. Kathy A. Zahler & Over Drive, Inc (Distributor) Conquering GRE verbal reasoning and analytical writing, McGraw-Hill Education, New York, 2020 Second Edition 3. Archana Ram, Place Mentor: Tests of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018	S-6	SLO-2 Races and G	Sames – Tricky Problems	Input Output Tracing – Problems	How to Handle Criticism and Fe	eedback	Geometry and Mensuration – Problems	Ordering of words – Practise Session
	Learnii	ng 1. James I spatial 2. Kathy A York, 20	Barrett & Tom Barrett - Ultimate a and systems tests, Kogan Page a. Zahler & Over Drive, Inc (Distrib 020 Second Edition	plitude tests: over 1000 practice questions for abstract vi , London, 2018. Fourthedition utor) Conquering GRE verbal reasoning and analytical wr	sual, numerical, verbal, physical, 5. iting, McGraw-Hill Education, New	David Bartlett, T Zsolt Nagy, Sof	he art of general practice: soft skills to survive and the street street in the survive and the street street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive and the street is survive a	nd thrive, Scion, Banbury, 2018,eBook, 2018

		Continuous Learning Assessment (100% weightage)									
Level	Bloom's Level of Thinking	CLA - 1 (20%)	CLA – 2 (20%)	CLA – 3 (30%)	CLA - 4 (30%)#						
		Theory	Theory	Theory	Theory						
evel 1	Remember	30%	20%	30%	30%						
	Understand	TA - A Make the									
evel 2	Apply	30%	50%	30%	30%						
	Analyze	Children Brown But		1 .30							
evel 3	Evaluate	40%	30%	40%	40%						
	Create	Charles State and									
	Total	100%	100%	100%	100%						

CLA-1, CLA-2 and CLA-3 can be from any combination of these: Online Aptitude Tests, Classroom Activities, Case Studies, Poster Presentations, Power-point Presentations, Mini Talks, Group Discussions, Mock interviews, etc. # CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	Total of the second by a fillend of	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, CognizantTechnology Solutions India Pvt. Limited, Chennai	Dr. G. Saravana Prabu, Asst. Professor, Department of English,Amrita Vishwa Vidhyapeedam, Coimbatore	Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST Dr. Muthu Deepa M, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST



Course Code	UE	EN23V01L	Course Name	COMMUNICATION SKILLS	<u> </u>	Cour Categ		4	AE) ×		Value A	Addition (Course			L 0	T 0	P 4	0 2	C 2
	e-requisite Co e OfferingDep		Nil Department o	Co-requisite Courses f English, FSH, SRMIST	Nil Data Book / Codes/St	andards		Progress	siveCou	rses	2	١		Ni	i	Nil					
Course	e Learning Ra	tionale(CLR):		The purpose of learning this course is to		ΙĠ	Learnii	ng			_	7	5	Progran	n Learni	ng Outco	mes (PL	_0)			
CLR-1 :		, ,	0 11 0	ging in various speaking activities. nd effectiveness in oral communication.	1000	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-3 : CLR-4 :	Expand voi	cabulary and idio	oma <mark>tic ex</mark> pr <mark>essio</mark> ns to commun	icate more accurately and expressively. priately to spoken English in different situations.			12	13				ines		k,	ge						
CLR-5:	Employ eff	ective communic		e listening, summarizing, paraphrasing, and askii	ng clarifying questions, to	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		-undamental Knowledge	Application of Concepts	ink with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	nvestigative Skills	Problem Solving Skills	Communication Skills	I Skills
Course I		utcomes (CL		course, learners will be able to:	1777 70	Level of	Expected	Expected	+	Fundame	Application	Link with	Procedur	Skills in S	Ability to	Skills in P	Analyze,	Investiga	Problem	Commun	Analytical Skills
CLO-1:	Demonstra	te improved flue	<mark>ncy in spoke</mark> n English by expre	essing ideas and thoughts confidently andcoher	ently.	2	75	60	2.5	Н	М	М	L	-	М		М	Н	L	Н	L
CLO-2:		-		appropriate intonation and stress patterns.		2	80	70		М	Н	L	-	-	-	-	М	М	Н	Н	М
CLO-3:	, ,	,	,	omatic expressions to enhance communication.		2	70	65		М	М	М	-	L	L	-	Н	М	Н	Н	L
CLO-4:				ontexts, including informal conversations,lecture		2	70	70		Н	М	L	-	М	Н		-	-	-	Н	L
CLO-5:	Deliver wel	ll-structured and	eng <mark>aging oral pr</mark> esentations, in	ncorporating effective body language and visuala	aids.	2	80	70		Н	Н	-	М	-	М	-	L	L	М	Н	М
Duration ((hour)	12		12	12			12			7	1	-		12						
S-1	SL0-1	Introduction to	o Listening <mark>Skills.</mark>	Introduction to Reading Skills. Discussion of techniques of ReadingSkill	Introduction to Spear Explaining theimport and vocabulary		netics	Introdu	ıction to	Writing .	Skills Imp	oortance	ofwriting	skills	Introdu	uction to a	apprecia	tion ofte.	xts.		
	LO- 2	of Listening.A	ctive Ways of Listening. Barrie ctive and Passive Listening.	students after making them read a few passages.	Explaining the usag Learner's Dictionary of the words at the fu	to learn pho Indamental	netics level.	L	E.				xamples		favour sharin piditth		om any s nes from	sources i padittha	they havi Idhil	e read or	
S-2	SLO-1	mobile applica		speech and listen to it in order to correct their problematic areas	The right enunciation be taught through ph and decoding the phonet learning touse the di	onetic repre ic symbols L	sentation	and Ini Learnii	formal le ng E-ma	tters wit il eti <mark>quet</mark>	hexampi te.	les.	ters- Form		Explai	ning why	apprecia	atingtext	s creates	a good r	eader.
	SLO- 2	Equipping the	listening skill ofthe learners	repetitive practices of reading select paragraphs from web resources, their standard will be measured.	phoneticpronunciation	Observe and repeat and learn the phoneticpronunciation of words by practicing continuously.						nal letter ettes in v	and info. vriting.	rmal	Enabling the students to reflect in the classroom about any of their favourite books/ articles or magazines.						

	SL0-1	Introducing google podcasts.	The speed, fluency, pronunciation, comprehension of the words in the paragraph	Teaching the usage of Thesaurus to understand and develop various words andimprove vocabulary.	Enabling the students to unleash their potentials in creative writing through writing transcripts for advertisements of any product.	Introducing the text of Letters by Mathrubootham published in the Hindu.
S-3 - S-4	SLO- 2	Task to write down the words from the audio they have listened to. This activity should be done in two steps. 1. Jotting down the words simultaneously as they listen to the speaker. 2. Writing the transcript of the audio through repetitive play andpause.	hints and tricks to follow where the pauses are to be followed.	Identifying common errors in concord, preposition, direct speech and indirect speech.	write a review of any book or a movie or aninterview or a debate.	Reading and recitation of thetext of the first letter-Enjoy within limits, says Mr. Mathrubootham Understanding characters byanalyzing the usage of their style of language
S-5	SLO-1	Imitating the speakers by listening to them and attempting to learn the pronunciation of the words uttered in the audio.	Students group 1- reads – group 2 identifies the flaws in reading.	Identifying common errors in tenses,punctuation, and syntactical errors	Mechanics of writing like capitalization, punctuation, spelling, correct pronoun, preposition, concord usage can be taught.	Reading of the second letter-Nobel? What Nobel, asks Mr. Mathrubootham.
	SLO- 2	Repetitive listening to enhancepronunciation skills	The roles have to be exchanged between the two groups and the activity should be practiced.	Rectifying the common errors and instructing the learners about the right usage in order to avoid common errors.	meachnaics of writing - assessed andevaluated.	Mathrubootham's humour andthe language of code switching from Tamil to English and vice –versa.
	SLO-1	Introducing to the audios of TEDTALK American Speakers. Listening to the native speakersof English Language through TED TALKS.	Identify the key arguments in a passage - introductory point, lead point, supportive argument statement, concluding point and the common connecting word between all the key words in the passage.	Practicing how to avoid common errors.	Teaching effective writing by learning to avoid common errors in concord, preposition, conjunction, relative pronouns, question tags.	Reading of the third letter -Mr.Mathrubootham is fully supporting all new technologies
S-6	SLO- 2	Introducing to the audios of TEDTALK British Speakers.Listening to the native speakersof English Language through TED TALKS.	encouraged to identify the key arguments in other passages on theirown.	The learners are introduced to collocations for quick choice of learning how to speak in short time and how to speak effectively.	Practicing effective writing by learning to avoid common errors in concord, preposition, conjunction, relative pronouns, question tags.	Mathrubootham's frustration over the failure of technologies and the language that he positively uses to denote hopelessness over technologies.
S-7 - S-8	SL0-1	American and British styles canbe differentiated.	Guiding the act of reading through scanning and skimming by model	Practice collocations	common errors in tenses, direct and indirect speech and syntax structure.	Reading of the fourth letter in the classroom and discussion
			reading of the passages by theinstructor.	111		Pizza maavu: Welcome to Mr.Mathrubootham food recipe website,
	SLO- 2	The recognition of different accents should be practiced byspeaking after listening.	scanning and skimming activities	ldioms and phrases	Practicing effective writing by learning to avoid common errors in tenses, direct andindirect speech and syntax structure.	Mathrubootham's love for foodand the miscommunication about food.
	SLO-1	Learning advanced pronunciation and vocabulary through various computer applications like Woodpecker.	Loud reading and slow mind reading	A speaking task to learn- collocations, idiomsand phrases, vocabulary and phonetic pronunciation	Teaching how to write statement of purpose for admission to higher educations, and practicing the same.	Analyisng the text for regional relevance and National significance.
S-9	SLO- 2	imitate the different sounds and accents - rep <mark>eat it</mark> after listeningto any of the videos from the library based on individual interest.	Pauses, pronunciation, comprehensionand fluency can be checked for improvement at this stage through repetitive practices.	Their speaking activity is to be recorded and played again to rectify the errors and highlightthe problematic areas in speaking.	Teaching how to write a story by looking ata picture. Developing the writing skill through wordladders.	Appreciating the aesthetics of the comic element and the embodiment of humour in thenarrative in the letter
	SLO-1	Repeat listening to the sametime frames and move from 02.01 to 03.00	Students -groups -checking the comprehension skills. Analyse the textof a passage.	Automating vocabulary through engaging the students in various activity games like solving crossword puzzle and playing	Introduction to blog writing and steps tobecome an effective blog writer.	importance of bringing in the Indianized way of speaking the English Language in orderto depict the character called Mathrubootham.

				scattergories.		
S-10	SLO- 2		Brainstorming the comprehension skills- questioning the key points in thepassage.	Engaging the students to play the games inorder to learn the vocabulary.	Encourage the readers to create their ownblogs and post articles on a regular basis.	relatable characters of both formal and informal everyday life experiences.
	SLO-1	Interested students can complete listening and reflectingthe complete audio listening practice and speaking.	Cross check with misunderstanding ifany and rectify- match the question and answers.	Spur of the moment speech.:	it.	Talk about their favourite letterfrom the letters of Mathrubootham by recollecting the appreciation of the text according to their perception and understanding.
S 11 - S 12	SLO- 2	Group activities and games canbe conducted to test the listening skills by responding to the speech given by other students	Passages for reading comprehensionare to be given for practice that tests their reading skills.	Prepared speech : Giving a speaking task to the students to speakon their own choice		Enabling the students to share their appreciation of anyof their favourite lines form thebooks they have read.

Learning Resources	1. 2. 3.	Horizon- English Text Book – Compiled and Edited by the faculty of English Departement, FSH, SRMIST, 2020 English Grammar in Use by Raymond Murphy Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 2007	4. 5. 6.	R.P. Bhatnagar, English for Competitive Examinations, Trinity Press, 3 rd Edition,2016 http://www.aptitudetests.org/verbal-reasoning-test https://www.assessmentday.co.uk/aptitudetests_verbal.htm

Learning Assessment		FF 775 1 . VV.	The Mark of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the St	ACCES, and		
Level	Bloom's Level of Thinking	Continuous Learning Assess	sment (100% weightage)			
		CLA - 1 (20%)	CLA - 2 (20%)	CLA - 3 (30%)	CLA - 4 (30%) #	
		Practice	Practice	Practice	Practice	
Level 1	Remember	10%	10%	30%	15%	
	Understand	The State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the S	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			
Level 2	Apply	50%	50%	40%	50%	
	Analyze		1777757		4)	
Level 3	Evaluate	40%	40%	30%	35%	
	Create		1111/			
	Total	100 %	100 %	100 %	100 %	

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
	Dr. J Mangayarkarasi	
Krishna Raj	Associate Professor and Head, Dept. of English Ethiraj College	
Sutherland	for Women	1. Dr. Shanthichitra, Professor, & Head, Department of English, FSH,SRMIST
Krishna.Raj1@sutherlandglobal.com	Chennai jmbwilson97@gmail.com	
Ann Mariya Thomson RA2232105010015 Il M.A English Literature CSH, SRM IST az1160@srmist.edu.in	Dr. K S Antonysamy Associate Professor and Head, Dept. of English Loyola CollegeChennai antonysamyks@loyolacollege.edu	2.Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST 3.Dr Anchal Sharma, Prof & Hod EFL SRMIST NCR Campus 4.Dr T Sridevi, Assistant Professor English, FSH Ramapuram SRM 5.Dr Shanmuga Priya, Assistant Professor SRMIST Trichirapalli Campus

Course Code	UCD23P01L	Course Name	Internship Report-		Course Category	IAPO			Intern		Appren munity			ject/			L 0	T 0	P 8	0	C 4
Pre-requis	site Courses	Nil	Co-requisite Courses	Nil			Progres	ssive Co	ourses							Nil					
	Offering Department		OS TOMAISMO OSATOSO	Data Book / Codes/S	Standards		.09.00		-				Nil								
Course Learn	ning Rationale (CLR	2):	The purpose of learning this cour	se is to,		earning	J		7		Pr	ogran	Learr	ning (Outco	mes	(PLO)				
CLR-1:	Demonstrate skills lea	ir <mark>nt in the rea</mark> l time en	vironment.	45.72	1	2	3	1	2	3	4	5 6	7	8	9	10	11	12	13	14	15
CLR-2: E	Explore the different in	n <mark>dustries th</mark> at are usir	ng IT		- CAN TA							L.									
CLR-3:	Enhance the skills in t	he system aspects		A State of the A	Ê	(%)	(i)									ce		Ħ			
CLR-4:	Inderstanding the pro	ofessional connection:	s with the knowledge learnt	The Act of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Contro	(Bloom)		(%)	ge			D				D G	ten		me			
	Applying the skills in p		A LACES	N 100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Suc	ner	/lec			oning		ing) E	arning	be	D	gel			g
	ing Outcomes (CLC		end of this course, learners will be able t	0:	Level of Thinking	Expected	Expected Attainment	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reaso	Research Skills	Scientific Reasoning	Reflective Thinki	Self-Directed Lea	Multicultural Competence	Ethical Reasoning	Community Engagement	ICT Skills	Leadership Skills	Life Long Learning
CLO-1: T	o get an inside view	<mark>of an ind</mark> ustry and org	ganization/company		3	80	70	L	Н	M	Н	L N	1 L	L	L	L	L	Н	M	L	L
	o gain valuable ski <mark>lls</mark>				3	85	75	М	Н	Н	M	L	1 L	L	M	L	L	Н	М	L	L
		connections and enh			3	75	70	М	Н	M	Н	LN	M M	L	M	L	M	Н	М	L	L
			dent to make a career transition	AJJANA	3	85	80	M	Н	M	Н	L	M	L	M	L	M	Н	М	L	L
CLO-5: T	o get an inside view	o <mark>f an indus</mark> try and org	ganization/company		3	85	75	Н	Н	M	Н	L	M M	M	M	L	M	M	М	L	L
Ctudonto	s con chacca a com	nany of their own in	toract for internehin for a period of mini	mum TEN wooks (Dort ti	ma) to loorn ab	out the	annli	ootion	of the	ir rolo	tod fi	، ما اما	oal tim		dram.		۸۱۱۵	4	to be	+.	

Students can choose a company of their own interest for internship for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment				
	Continuous Learning Asse	ssment (50% weightage)	Final Evaluation (50% weight	tage)
internehin	Review – 1	Review – 2	Project Report	Viva-Voce
internship	20%	30 %	30 %	20 %

Course Code	UCD23P02L	Course Name	Project V	Work – I	Course Category	IA	PC	2	Intern		Appre nmuni				iect/			<i>L</i> 0	-	P 0 8 2	
	ite Courses Nil Fering Department	Со	-requisite Courses	Nil Data Book / Coo	des/Standards		Progre	ssive C	ours	es			Ni	il		N	il				
Course Lea	arning Rationale (CLR): The	purpose of learning this o	ourse is to,			earnin	g		4	1		Progr	am Le	earnir	ng Ou	tcome	es (PL	_0)			
CLR-1 : CLR-2 : CLR-3 : CLR-4 : CLR-5 :	Demonstrate skills learnt in the Explore the different industries Enhance the skills in the syste Understanding the profession. Applying the skills in problem	s that are using IT em aspects al connections with the know	/ledge learnt	2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1 (woolg)	iency (%)	went (%)	1 egpelw	2	3	4 Bujuo	5	6	7 Bujud	sing ∞	sarning 6	10 ambetence		Engagement 1		
Course Lea	arning Outcomes (CL <mark>O)</mark> :	At the end of this cou	irse, learners will be a	ble to:	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thinking	Self-Directed Learning	Multicultural Competence		Community Eng		Life Long Learning
CLO-1:	To get an inside view of an inc		oany	11/ 10	3	80	70	L	Н	М	Н	L	М	L	L	L	L	L	H M	1 L	L
CLO-2:	To gain valuable skills and known		Carlo Company	to one the	3	85	75	M	Н	Н	М	L	М	L	L	M	L	L	H N	1 L	<u>L</u>
CLO-3:	To make professional connect				3 3	75	70	M	Н	M	Н	L	M	IVI	L	IVI	L	M	H N	1 L	L
CLO-4 : CLO-5 :	To get experience in a field to To get an inside view of an inc				3	85 85	80 75	M H	H	M	H	L	M	M	M	M	L	M	п IV М N	1 L	L

Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students. At the end of the project, every student shall submit a structured project report and will take a Viva Voce examination.

Learning Assessment		10.00	7	
	Continuous Learning Ass	essment (50% weightage)	Final Evaluation (50% weight	tage)
internehin	Review – 1	Review – 2	Project Report	Viva-Voce
internship	20%	30 %	30 %	20 %

Course Code	UCD23	P03L	Course Name	Apprenticeship – I	Course Category	IAPO		In			prenti nunity			iect/			L 0	T 0	P 8	<i>0 2</i>	<i>C 4</i>
Pre-requisit	te Courses Nil ering Department		Co-requi	isite Courses Nil Data Book / Co	des/Standards		Progr	essive C	ours	es			Nil		٨	lil					
Course Lea	rning Rationale (CLR):	The purpose of I	earning this course	is to,		Learni	ng		'n		Р	rogran	n Learn	ing O	utcom	es (P	LO)	<u> </u>			
CLR-1: CLR-2: CLR-3: CLR-4: CLR-5:	Demonstrate skills learnt Explore the different indu Enhance the skills in the Understanding the profes Applying the skills in prot rning Outcomes (CLO):	stries that are usin system aspects ssional connections olem solving	g IT s with the knowledge	learnt earners will be able to:		Level of Thinking (Bloom) Expected Proficiency (%)	Attainment (%)	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning P	Research Skills Co	Scientific Reasoning 2	Reflective Thinking ∞	Self-Directed Learning	Aulticultural Competence	Ethical Reasoning	Community Engagement 5	CT Skills	eadership Skills	Life Long Learning 51
CLO-1 : CLO-2 :	To get an inside view of a		anization/company		1 mg 1 mg	3 80 3 85	70	L	Н	M H	H M	L N	- S	L L	L	L	L	H	M	L	
CLO-3 : CLO-4 :	To make professional control get experience in a fie	nnections and enha		r transition		3 75 3 85	5 70	M M	H	M M	H	L N	1 M 1 M	L	M	L	M M	H	M	L	L
CLO-5:	To get an inside view of a	<mark>an indu</mark> stry and org	anization/company		11////	3 85	5 75	Н	Н	М	Н	L N	1 M	М	M	L	М	М	М	L	L

Students can choose a company of their own interest for *Apprenticeship* for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment			/	
	Continuous Learning Ass	essment (50% weightage)	Final Evaluation (50% weigh	ntage)
internehin	Review – 1	Review – 2	Project Report	Viva-Voce
internship	20%	30 %	30 %	20 %

SEMESTER III

Course Code		UBT23301J	Course Name	A	BIOPHYSICS	& BIOINSTRUME	ENTATION	Coi Cate	ırse gory	С	K	Q)	Discip	oline Spe	ecific Co	re Cours	e	L	. T	P 3	2	C 4
Pr	e-requisite	Courses	,	Jil	Co-requisiteCourse	:S	- Nil		Pr	ogressiv	eCours	ses		٠,				Nil					
Со	urse Offeri	ing Department		VII	Biotechnology	Data	a Book / Codes/Standards									Nil		IVII					
Course	Learning R	Rationale(CLR):			The purpose of learning this	course is to			Learnii	ng						Program	n Learnir	ng Outcom	nes (PLC))			
CLR-1:	Understa	nd the Principle,	Instrumentation	and working	method of the analyticaltechniques		49.123	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Able to a	nlayse and interp	ret the results.				7.4		76.	-												1	
CLR-3:	Knowledg	ge on applying su	ita <mark>ble techniqu</mark> e	s for analysi	5.	75.77	1. 1. 16. 16. 16. 16. 16. 16. 16. 16. 16		_	-		e e	co.		-		ex s	ong				ii	
CLR-4:	Understa	nd the isolation o	f <mark>pure form bio</mark> n	nolecules	A	B. Ber	Brown Soll	Sloom	.y (%)	ıt (%)		wled	t Dat	billity	lices	¥	comp	and lifelong ing	-	2	3	4	2
CLR-5:	Understa	nd the safety and	l <mark>prope</mark> r handlin	g of instrume	nts.	J. 428.	37.77.71	ing (E	icienc	Attainment (Kno	terpre	Reasoning ability	Ethical Practices	Team Work	nmunication of comple biotechnological ideas	dent and learning	PS0 - 1	PS0 - 2	PS0 -	PS0-4	PS0-5
					4 1677	255	200 mg	Thi	Prof	Atta		nenta	ze, In	easor	thical	Tea	icatic	ender	4	4	Д.		
Course L	earning (Outcomes (C	LO): At the	e end of th	is course, learners will be able	to:		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected /		Fundamental Knowledge	Analyze, Interpret Data	Ř	ü		Communication of complex biotechnological ideas	independent learni				İ	
CLO-1:	Acquire k	nowledge and sk	cills on spectrosc	copic and co	orimetric instruments	F 1861	THE PERSON NAMED IN	3	80	70		Н	Н	-	-	L	М	Н		L	-	Н	-
CLO-2:					nromatographic techniques	100		3	85	75		Н	Н	-	-	М	М	Н	М	-	-	-	Н
CLO-3:		nd the concepts (26.5		3	75	70		Н	Н	М			М	Н		-	Н	-	-
CLO-4:					technique in analyzingbiomolecule		17/1	3	85	80		Н	М	•	-	4	М	Н		М	-	·	-
CLO-5:	Apply the	e instrumentation	and technical sk	ills to collect	analyze and interpretbiological pro	blems with appr	ropriate solutions.	3	85	75		Н	М	М		L	Н	Н		-		М	-
Duration (hou	r)		18		8			18						18		7		7		18			
S-1	SLO-1	Spectroscopy-	- Introduction		Chromatography -introduction	DAI	Centrifugation- Introduction				Electr	ophoresis	- Introdu	ction			Radioi:	sotopes uction					
	SLO-2	Electromagnetic s	spectrum		Principle of Paper chromat	iography	Principle of centrifugation	4			Factor	rs affectin	g migrati	on rate-s	sample		Radio	activity					
S-2	SLO-1	UV-Vis spectro Beer-lamberts law			Procedure – paper chromatograph	ny	Types of centrifugation				Buffer						Radioa	ctive deca	у				
	SLO-2	Instrumentatio	on of UV-Vis		Applications of paper chromatogra	арһу	Types of centrifuge- Sma microcentrifuge.	all bend	h,		Electric	field					Half-life	of radioisotop	es				
S-3	SL0-1	Application of	UV-Vis		Principle of TLC		Low- speed, high speed centrif	fuge			Agaro	se gel ele	ectrophor	esis			Measu	rement of	radioacti	ivity			
	SLO-2		Spectroscopy-S	tokesshift	Procedure -TLC		Ultracentrifuge				Support	ting medium					Measure	ment based	upon ioniza	ation- intro	duction		
\S4-6	SL0-1 SL0-2	GLP-1 (pH me	eter)		Thin layer chromatography		Protein dialysis					ential cent	rifugation	n- chloro	plast		Wester	n blotting					

						Instrumentation
	SLO-2	Application of FluorescenceSpectroscopy	Gel filtration chromatography -Principle	Types of rotor- components andhandling of rotors	Agarose gel electrophoresis- procedure	Application of GM counter
S-8	SL0-1	Mass spectroscopy- principle	Gel filtration chromatography - Procedure	Swinging bucket rotor	Applications	Scintillation Counter- Based on excitation -introduction
	SLO-2	Instrumentation of Mass spectroscopy	Applications of GFC	Fixed angle rotor	SDS PAGE-Procedure	Scintillation Counter- solid scintillation
5-9	SL0-1	Application of mass spectroscopy.	Column chromatography	Vertical rotor	Applications	Liquid scintillation
	SLO-2	Atomic absorption spectroscopy-Instrumentation.	Principle-Ion exchange chromatography	Elutraitor rotor	Native gel electrophoresis	Application of Scintillation counting
S-10-12	SLO-1 SLO-2	Study of UV – Visible Spectroscopy	Procedure- Ion exchangechromatography	SDS- PAGE.	Differential centrifugation	Southern blotting
i-13	SL0-1	Atomic absorption spectroscopy-Applications	Applications of IEC	Differential centrifugation	2 D electrophoresis	Autoradiography procedure
	SLO-2	Atomic emission spectroscopy- Instrumentation	Affinity chromatography-Principle	Density gradient centrifugation- Ratezonal centrifugation	Blotting introduction	Application of autoradiography
S-14	SL0-1	Application of Atomic emission spectroscopy	Affinity chromatography- Procedure	Isopycnic centrifugation	Southern blotting	Applications of radioisotopes- Clinical
	SLO-2	Principle of Nuclear magnetic resonance	Applications of Affinity chromatography	Introduction to Cell disintegration	Northern blotting	Applications of radioisotopes- Carbon dating
-15	SLO-2	Instrumentation of Nuclear magneticresonance	HPLC-Principle, procedure	Cell disintegration- introduction	Western blotting	Applications of radioisotopes- Sterilizing
	SLO-2	Application of NMR	HPLC- Applications	Types of disintegration	Advantages of blotting technique	Safety aspects involved in handling adioisotopes
-16-18	SLO-1 SLO-2	Paper chromatography.	Agarose gel electrophoresis	Cell disruption	Western blotting	Result interpretation - Southern blotting

	1.	Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology. Edited by Andreas Hoffmann.	3.	Upadhyay., Bioph
Learning		Camb <mark>ridge Universi</mark> ty Press, 2018.	4.	M.L. Srivastava
Resources	2.	David T. Plummer, An introduction to Practical Biochemistry, (3 rdEdition), Tata McGraw Hill, 2017.		

- iophysical Chemistry-, Himalaya Publication, Edition <mark>III, 2019.</mark> ₁7 A Bioanalytical Techniques, Narosa Publishing Ho<mark>use, 2011.</mark>

				17.2.37	AND THE RESERVE	Learning Assessme	ent		-		
Level	Bloom's Level of Thinking		24	Col	ntinuous Learning Asse	essment (50% weighta	ge)		100	Final Examination weightage)	1(50%
	, and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	CLA - 1	(10%)	CLA – 2	(10%)	CLA - 3	(20%)	CLA - 4 (10%)#		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
				_	•			_			
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand					A STATE OF			~ /		
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze		- S	-							
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create			7 1 1 1	TATAT.		ди.т	DAT			
	Total	11	00 %	1	00 %	1	00 %	10	00 %	100 %	

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. S. VIJAYABHARATHI, Assistant Professor, Dept. of Biotechnology, FSH,
		SRMIST, KTR

Course Code		UBT23302J	Course Name	ENZYMO	DLOGY	44		urse egory	1	С	Discipl	ine S	pecific	Core	Course				L T		0 0				
	quisite Cou		Nil	Co-requisite Courses	Nil			Progr	ressiv	e Cours	es						Nil								
С	ourse Offe	ring Department	Biot	echnology	Data Book / Codes/Sta	andards									Nil										
				V.,	-the this		10	ornina			_	-		Drogr	om Loor	nina Oı	ıtcomes	/DL (1)							
Course Le	arning Ratio	onale (CLR):	The purpose of learning thi	s course is to:	7.7		1 1	arning 2	3	1	2	3	4	5	6	7 7	8	9	10	11	12				
CLD 1	<u> </u>	Paralle and a different and			- 18					Ė	Ť			Ü		ĺ		Í	10	1					
CLR-1: CLR-2:		_ <u>_</u>	of enzymes & properties				moc	(%)	(%)	dge	ıta).		of complex ideas										
		, ,	<mark>nt in</mark> lowering activation en	ergy	1300 1 2	CT	B	ency	nent	owle	t Da				of con ideas	lent									
CLR-3:	Knowledg	e on different i <mark>nhibitors :</mark>	and its role			4-74-7	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices		Communication objection of the biotechnological is	Independent and lifelong learning									
CLR-4:	**************************************						ΪĒ	d Pr	d Att	enta	Inte	ng a	ract	ork	olog	nde ong l									
CLR-5:	Understan	iding the tec <mark>hniques us</mark> e	ed for purification of enzyme	es		100	el of	ecte	ecte	dam	yze,	soni	cal F	eam Work	Schn	lifelc	-1) - 2) – 3	9-4	2-(
Course Le	arning Out	comes (CLO):	At the end of this cou	ırse, learners will be able to:	The Market Market		Leve	Exp	Expe	Fun	Anal	Rea	Ethic	Tear	Con	and	PSO	PSO	PSO	PS0-4	PS0-5				
CLO-1:		ledge on en <mark>zyme clas</mark> si					3	80	70	Н			Μ		-	Н	-	-	-						
CLO-2:)	e on active s <mark>ite amino a</mark> c		1 7 2 1 3 1 1 1		10.00	3	85	75	Н	L	Н			L	М	-								
CLO-3:		nowledge to <mark>design dr</mark> u		10 × 12 12 73			3	75	70	Н	L	Н			-	М	L								
CLO-4:		owledge on coenzymes		Market Committee			3	85	80	H	L	M			-	-	-								
CL05:	Application	of techniques for isolal	tion and purification of enzy	mes			3	85	75	Н	Н	Н	М		I L	М	-								
Duration (i	18	18		18							18			18									
_	SLO-1	Introduction to Enzyme	S.	Introduction- Chymotrypsin	Inhibition introducti	ion				TPP- Str	ucture	e and	I functi	ions		purification of soluble enzymes- electrophoresis									
S-1	SLO-2	Properties and Nomeno	clature of Enzymes.	Chymotrypsin mechanism Acylation phase	Reversible inhibition	•	petitive Reactions involving TPF									purification of soluble enzymes- electrophoresis									
	SLO-1	Classification - IUB sys	t <mark>em-</mark> group I, II,	Chymotrypsin mechanism deacylation phase	Deviation in MM en of Competetive inh	quation- ir nibitor	n the	prese		Pyridoxal phosphate- Structu functions					and	boun	ion of membrane bound enzymes-								
S-2	SLO-2	Group III, IV	A ~	Lysozyme Introduction	Uncompetitive inhi	Uncompetitive inhibition				Uncompetitive inhibition				Reaction	s invo	volving PLP				Purif	chromatography Purification of membrane bouncenzymes-chromatography				
S-3	SLO-1	Group- V, VI		Lysozyme mechanism	Deviation in MM ed of Uncompetetive	quation- ir inhibitor	n the	prese	nce	Lipoic acids- Precursor, functions					re and	Purification of membrane bound enzymes-electrophoresis									
33		Factors affecting enzyn temperature, pH.	ne action- Effect of	Regulation of enzyme activit Introduction	,					Reaction	s invo	olving	j lipoic	acid		enzy	ication o mes- ele	ctroph		oound					
S 4-6	SLO-1 SLO-2 SLO-3	Preparation of buffer.		Calculation for enzyme and specific activity of enzyme- Protease	Estimation of prote		Э			Optimun determir	ation-	urea	ase			Repetition lab									
S-7		specificity.	oup specificity, absolute	Multienzyme comlpex	Irreversible inhibiti	on				Vitamin B12- Structure and fi						Phys	me Imm ical met	hod, C	hemica	al metho	:tion od				
	SLO-2	Stereospecificity, Bond	Specificity	Isoenzymes-CK, LDH	Suicidal inhibition					Reaction					2		pment a				tion				
S-8	SLU-I	Purity of enzymes- Enz	zyme activity,	Kinetics introduction	Allosteric inhibition					Functions of Vitamin B12						Importance of enzym				iodiliZa	แดบ				

	SLO-2	Specific activity.	Steady state kinetics and pre- steady state kinectics.	Introduction-coenzymes	Enzyme isolation introduction	Enzyme Immobilization – Applications
S-9	SLO-1	Enzyme units- Katal & IU.	Michaelis Menten Equation assumptions	Classification of coenzymes.	Steps of enzyme purification	Industrial application of immobilized enzymes.
	SLO-2	Metalloenzymes and metal activated enzymes, Active site -3D structure	Derivation of MM equation	Functions of coenzymes	Physical method of enzyme isolation	Industrial applications of enzyme- amykase
S 10-12	SLO-1 SLO-2 SLO-3	Estimation of protein	Optimum pH determination- protease	Enzyme activity of urease	Optimum temperature determinationurease	Repetition lab
S-13	SLO-1	Introduction to ES complex, Activation energy	Significance of MM equation	NADP- Precursor, Structure and functions	chemical methods of enzyme isolation	Industrial applications of enzyme- lipase, protease
		Theories of ES complex-collision theory, transition state theory.	Kcat, Kcat/Km	Reactions involving NADP	Biological methods of enzyme isolation	Introduction to enzyme application in clinical field
S-14	SLO-1	Lock and key Hypothesis.	Drawback of MM equation	FAD- Precursor, Structure and functions	Biological methods of enzyme isolation	Clinical applications of enzymes-LDH1,
	SLO-2	Induced fit Hypothesis	Line-weaver Burk plot	FAD	Preliminary purification Salting in, salting out	Clinical applications of enzymes-LDH3, 4, 5
	SLO-1	Mechanism of enzyme catalysis- Acid-base catalysis	Importance of Line-weaver Burk plot	Reactions involving FAD	Dialysis	Clinical applications of enzymes -SGOT
S-15	SLO-2	covalent catalysis, Metal ion catalysis, Proximity a <mark>nd orientat</mark> ion.	Drawback of LB plot, Eadie- Hofstee plots	FMN- Precursor, Structure and functions, Reactions involving FMN	Soluble enzymes & membrane bound enymes, purification of soluble enzymes-chromatography	Clinical applications of enzymes- SGPT
S 16-18	SLO-1 SLO-2 SLO-3 SLO-4	Enzyme activity of protease	Optimum temperature determination- protease	Optimum pH determination- urease		Model Exam

Nicholas C. Price and Lewis Stevens, "Fundamentals of Enzymology", Oxford University Press, 2003.

Trevor Palmer and Philip Bonner, "Enzymes - Biochemistry, Biotechnology, Clinical chemistry", 2nd edition, East-West Press Pvt. Ltd, 2004. Learning Resources

- Lehninger, Nelson and Cox, "Principles of biochemistry", 6th edition, W.H. Freeman & Company, 2013. Prakash M., Digmarti Bhaskara Rao, Jena T, Enzyme Biotechnology, 1st edition, Discovery Publication, 2010.

			-		Le	earning Assessme	ent								
	Bloom's Level				ious Learning As						Final Examination (50% weightage)				
Level	of Thinking	CLA -	1 (10%)	CLA – 2 (10%)		CLA – :	3 (20%)	CLA – 4 (10%)							
	of Hilliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		Theory	Practice			
Level 1	Remember Understand	30%	/	30%	LTYTA	30%	11-1	30%	1		30%	-			
Level 2	Apply Analyze	40%		40%	-	40%	-	40%			40%	-			
Level 3	Evaluate Create	30%		30%	-	30%	-	30%			30%	-			
	Total	10	0 %	10	0 %	100 %		10	0 %		1(00 %			

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi	Dr. S. Vijayabharathi, Assistant Professor, Dept. of Biotechnology,
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Womens College, Chennai.	FSH, SRMIST, KTR

Course Code	DIO NOCESS TECHNOLOGY					Course		С	1/2		Discipli	ne Speci	fic Core	Course	es		L 3	T 0	P 3	0 0	
Pre-	requisiteCou	irses	NIL	Co-requisiteCourses	NIL					K	Progr	essive Co	urses					NIL	-		
	Course Offeri	ng Department		BIOTECHNOLOGY	Data Book / Codes/Standards	3					- 1	-		NIL							
Course Learn	ing Rationale	(CLR):	The purpose of learning	this course is to:		Le	earning	4,]			Prog	ram Learr	ing Outco	omes (PL	0)					
CLR-1:	Understa	nding the basic co	ncepts of bioprocess techn	plogy	1000000	1	2	3	1	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:		•	es used for fermentation	33							-			Ü	J			Ĺ	10		- 12
CLR-3:		ge on bioreactor		N 2/	1. No. 160	-(3				Ф	8				ex	gu					
CLR-4:	Knowledg	ge on the types of	fermentation		T. 134.18	loom.	y (%)	t (%)		wledg	t Dat	b∭ty	ices	J.	dmo	ille ille	-	2	3	4	
CLR-5:	Knowledg	ge on industrial pro	duction		PROPERTY.	ng (B	cienc	nmen		Kno	erpre	Reasoning ability	Ethical Practices	Team Work	n of (ident and learning	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	
					381. W.	hirki	Profi	Attai	100	nental	e, Int	ason	hical	Tear	icatio	nder	۵.	4	ک	Δ.	
Course L	earning (Outcomes (CL	O): At the end of the	s course, learners will be able to:	100	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Re	13		Communication of complex hinterhological ideas	independent and lifelong learning					
CLO-1:			<mark>of strain im</mark> provement	77	The Mark No.	1	75	70	10	L	Н	Н	Н	L	-		-	L	L	-	
CLO-2:	"	nowledge on desig				2	75	70		М	М	L	М	L	-	-	-	М	L	-	
CLO-3:			e <mark>rstand the te</mark> chniques of s	creening microbes		2	75	70		М	М	М	М	L	-	-	-	М	L	-	
CLO-4:		nd about the micro			1777	1	75	70		М	М	М	М	L	-	-	-	М	L	-	
CLO-5:	Having ki	nowledge on down	str <mark>eam processi</mark> ng method			1	75	70		Н	М	М	М	L	-	•	-	М	L	-	
Duration (hour	•)		18	18	/A	18					18	3						18			
S-1	SL0-1	Introduction to B	ioprocessTechnology	Strain improvement	Continuous Fermentation				Memb	orane Biore	eactor	7			Purificati	on of prod	lucts				
S-2	SL0-1	Types of Bioprocess	ses	Mutation	Functions of Fermenter	100	111		Bubbl	e Column	Bioreacto	r			Product	Finishing					
S-3	SL0-1		rial fermentations	Recombination	Components of Bioreactor				Down	stream pro	cessing l	ntroducti	on		Ethanol Pr	oduction					
S4-6	SLO-1	microorganism	h /cellulosedeg <mark>rading</mark>	Growth kinetics	Cell/Enzyme immobilizat alginate/polyacrylamic		Р.	1	Produ	Production of wine						m cultivati	on				
S-7	SL0-1	Criteria for medi	um design	Microbial growth kinetics: Introduction	Types of Fermenters				Intracellular Products and Extracellular Products						Citric ac	id producti	on				
S-8	SL0-1	Sterilization		Fermenter- Introduction	Stirred Tank (Continuous) Bioreactor				Cell dis	ruption mecha	nical and phy	ysical meth	ods		Penicillir	n productio	n				
S-9	SL0-1	Inoculum prepar	ation	Modes of Operation of fermenter	Airlift Bioreactor					al methods					Beer Pro	oduction					
S-10-12	SL0-1	Isolation of stard microorganism	h /cellulosedegrading	Optimization of culture conditions foramylase production	Bread making				Mushi	room cultiv	ation			,	Vermicomposting – demonstration						
S-13	SLO-1	Isolation of micro	bes	Types of Fermentation	Packed tower (Bed) Bioreactor				Enzyr	natic meth	ods				Bioplasti	c Producti	on				

S-14	SL0-1	Screening of microbes	Batch Fermentation	Fluidized Bed Bioreactor	Removal of insoluble	PHA Production
S-15	SLO-2	Industrially importantmicroorganisms	Fed Batch Fermentation	Photobioreactor	Isolation of products	Applications of Bioprocess Technology
S-16-18	SLO-1	Growth kinetics.	Optimization of culture conditions foramylase production	Production of wine	Mushroom cultivation	Model Exam

Loarning Decourage	1. Biochemical Engineering by Harwey W. Blanch and Douglas S.Clark. Hall P T R,2002.	3. Shuler and Kargi, Bioprocess Engineering: Basic Concepts, 2ndEdition, Prentic
Learning Resources	2. Yoshida T., "Applied Bioengineering - Innovations and Future Directions", Wiley-VCH, 2017	4. Najafpour G., "Biochemical Engineering and Biotechnology", 2ndEdition, Elsevier Science, 2017

					Continuous Learning As	ssessment (50% weightage				Final Examina		
	Bloom's Level of Thinking	CLA - 1 (10	0%)	CLA - 2 (1	0%)	CLA - 3 (2	20%)	CLA - 4 (10	0%)#	weightage)		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
el 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
	Understand		Name of the	The second	1000 100	100	No Contract					
el 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
	Analyze		1000	N. 12.43	11 2 1	August and						
el 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Create		100	A Control		- 15 m						
	Total		00 %		100 %		100 %		100 %		100 %	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	43 1000	
Exp <mark>erts from Industr</mark> y	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

SEMESTER III

Cour Cod	1111111	3AE1J	Course Name	Ар	pplied Tamil – I		Course Category		AE	172	Abil	ity En	hanc	emen	t Cou	ırses	(AE)			L -	T F	2 2		<u>}</u>
C	-requisite	Nil	T	Co-requisite Courses	Nil	10.1.10	Р		ressive urses	Nil		λ,			N.									
Course	Offering L	Department	Tamil		рата воок	: / Codes/Standards					-		-		Nil									
Course	Learning	Rationale (CLR):	The purpose of	of learning this course is to:		1-386		Lea	rning					Prog	jram	Learr	ning (Outco	mes	(PLO)				
CLO- CLO- CLO-	2 : மொ 3 : <u>வாய்</u> 4 : கடித 5 : படை Learning 1 : சொ 2 : மொ 3 : விர விடு 4 : அலு	ழியைப் பிழையின் மொழி வழக்காறு ம் எழுதும் முறை, டப்பாற்றல் இறவை Outcomes (CLO): நகளைச் சரியான செ மியைப் பிழையின் ய்மொழி <mark>மர</mark> நமியாங்களை வலகப் பயன்பாடு	ந்றி எழுதும் ஆற்ற களின் நுட்பங்கன கட்டுரை வரையு எ வளரச் செய்தல் At the end of this பாருண்மையில் ந்றி எழுதுவதன் வ புபின் கூறுக் ள அறிந்துகெ , தீறன் மேம்பாடு	s course, learners will be ab பயன்படுத்தும் இறன் பெ பழி மொழி ஆளுமை பெ, கள் வழி, மக்களி காள்ளுதல் இதியவற்றை நுட்பமாச	ble to: பறுதல் பறுதல் பின் வாழ்வியம		2 2 2 2	7	Expected Attainment (%) 60 65 70 70 65 70 70 70 70 70 70 70 70 70 70 70 70 70	<u> </u>	M L M	H H Link with Related	M L M	T T Skills in Specialization 9	A T T Ability to Utilize	7 Skills in Modeling M	т т Я Analyze, Interpret Data	H M L H	10 Broblem Solving Skills T	11 Communication Skills	н н н Analytical Skills	-		15 - -
CLO-		நை, கதை படை <mark>க்</mark> கு	<mark>தம் ஆற</mark> ்றலை அற்	ிந்துகொள்ளுதல்	Clark of the	1000	2	8	70	Н	M	Н	Н	М	Н	L	М	Н	L	Н	Н	-	-	
Durat	ion (hour)		9		9		9						9								9			
S-1	SL0-1	தமிழின் தொன்	மை	மெய்யெழுத்துகளி	ன் வகைகள்	வாய்மொழி மரபு,	எழுத்து ம	மரப	4	தொட	ர் அன	மப்பு	l				கா	மைந்கே	தாறு	ம் கவி	ிதை			
3-1	SLO-2	தமிழின் சிறப்பு	கள்	மூவினம்		வாய்மொழி மரபி	ல் அனுப	வம்	Ď	எளிய	தொட	_ர்			7		க	விதை	வடி	வம்				
6.0	SLO-1	கருத்து – பரிமாற	<u>ற்றம்</u>	ஒற்று இடுதல்		வாழ்வியல் தத்துவ	பம்			நெடுந	தொட	_ர்					ம	ரபுக்க	ഖിത	த				
S-2	SLO-2	பயன்பாட்டுத்தம	மி ழ்	வல்லினம் மிகும் இ	இடங்கள்	பழமொழிகள்	-			பத்தி ம	ாழுது	தல்	7				ഖ	சனக	ഖിച്ചെ	5				
S-3	SL0-1	காலந்தோறும் த	மிழ்	வல்லினம் மிகா இ	டங்கள்	பழமொழியும் மன	ரித வாழ்	விய	பலும்	ஒரு ெ எழுது		ണെ ഒ	மயப	ாகக்	கொ	ண்டு		துக்க விதை		/ புதிய	ப வடி	வக்		
	SLO-2	எழுத்துகள் - அற	ிமுகம்	<mark>எழுத்துப்</mark> பிழை நீக்க	கம்	பழமொழியின் வ	டிவம்			காலந்	தோறு	ம் கடி	டிதங்க	ள்			க	விதை	க் க	ாங்கள்	r			
S-4	SLO-1	தமிழ் எழுத்து வ	ரலாறு	பிழை நீக்கி எழுதுத	தலின் அவசியம்	வட்டார மொழி				தமிழி	ல் கடி	த இ	லக்கிய	ம்			க	விதை	உள்	ளடக்க	கம்			
3-4	SLO-2	எழுத்துகளின் வ	ரிவடிவம்	பிழைகளும் மொழி	ிச் சிக்கல்களும்	வட்டார மொழியி	ல் சொல	ഖഒ	ட	கடித	பகை	ள்					க	விதை	எழு	தும் பு	ம றை			
S-5	SLO-1	எழுத்துகளின் பி	 றப்பு	எதிர்ச்சொல் வரலா	ரறு	பழமொழியும் செ	ாலவடை	_யும்	ò	கடிதம்	எழு	தும்மு	றை				த	ள்னு	ணர்ச்	சிக் கவ	பிதை			

	SLO-2	உயிர் எழுத்துப் பிறப்பு	எதிர்ச்சொல்லின் உருவாக்கம்	பேச்சுநடையும் சொலவடையும்	அலுவல் க <mark>டிதம்</mark>	இயற்கை/ சமூகம் - கவிதை
C /	SLO-1	மெய்யெழுத்துப் பிறப்பு	இணைச்சொல்லும் எதிர்ச்சொல்லும்	மரபுத்தொடர்	வாழ்த்து/ பாராட்டு <mark>க்/ நட்புக் கட</mark> ிதம்	காலந்தோறும் கதைகள்
S-6	SLO-2	மொழி முதல் எழுத்துக <mark>ள்</mark>	தமிழில் எதிர்ச்சொற்கள்	பழமொழி மரபுத் தொடர் வேறுபாடு	கட்டுரை வகைகள்	கதைகளில் கற்பனையும் உண்மையும்
S-7	SLO-1	மொழி இறுதி எழுத்து <mark>கள்</mark>	ஓரெழுத்து ஒருமொழி – அறிமுகம்	தமிழில் மரபுத்தொடர்	கட்டுரை எழுதும் முறை	வாய்மொழிக் கதை
3-1	SLO-2	எழுத்து வேறுபாடு <mark>ம் பொருள</mark> ும்	ஓரெழுத்து ஒருமொழியும் பொருளும்	விடுகதை	கட்டுரைக் களங்கள்	ஒரு பக்கக் கதை
S-8	SLO-1	ணகர - னகர - நக <mark>ர வேறுபா</mark> டு	சொற்களின் தன்மைகள்	நுண்ணறிவு வெளிப்படுதல்	போட்டிக் கட்டுரை	சிறுகதை
3-0	SLO-2	லகர – ளகர - ழ <mark>கர வேறுப</mark> ாடு	ஒரு சொல் பல பொருள்	கதை மரபில் நாட்டுப்புறக் கதைகள்	அனுபவக் கட்டுரை	கதை எழுதும் முறை
	SLO-1	சொல்லும் ப <mark>ொருளும்</mark>	ஒரு பொருள் பல சொல்	தமிழில் நாட்டுப்புறக் கதைகள்	பயணக் கட்டுரை	சமூக உணர்வின் வெளிப்பாடு
S-9	SLO-2	காலந்தோறு <mark>ம் சொற்க</mark> ள்	சொல் உருவாக்கத்தின் பயன்கள்	நாட்டுப்புறக் கதைகளும் சமூக வரலாறும்	இதழியல் கட்டுரைகள்	<mark>நிகழ்</mark> வைக் கதை வழியே வெளியிடல்

Learning
Resources

- 1. நல்<mark>ல தமிழ் எ</mark>ழுத வேண்டுமா?, அ. கி. பரந்தாமனார், பாரி நிலையம், 2010.
- 2. நா<mark>ட்டுப்புற</mark> இயல் ஆய்வு, சு. சக்திவேல், மணிவாசகர் பதிப்பகம், சென்னை, 2006.
- 3. ப<mark>டைப்புக்க</mark>லை, மு. சுதந்திரமுத்து, அறிவுப் பதிப்பகம், சென்னை, 2008.

- 4. கதையியல், க. பூரணச்சந்திரன், அடையாளம் பதி<mark>ப்பகம், ச</mark>ென்னை, 2012.
- 5. இணைய வழித் தரவுகள் : <u>https://tamilheritage.org/</u>

				Continuou	us Learning As	sessment (5	0% weightage)		Contract of the	Final Examination (50% weightage)					
	Bloom's Level of Thinking	CLA -	1 (10%)	CLA -	2 (10%)	CLA -	3 (20%)	CLA -	4 (10%)#	Final Examination (50% weightage)					
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice				
Level 1	Remember Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-				
Level 2	Apply Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%	-				
Level 3	Evaluate Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-				
	Total	10	0 %	10	00 %	10	00 %	1	00 %	11	00 %				

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	LUAP.	T PATTE OF
Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanmiyur, Chennai – 600 041.	1. Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, Pondicherry University, Pondicherry	 Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST,KTR
		 Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP. Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP. Dr. T.R.Hebzibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR. Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	ULH2	3AE1J	Course Name	4	APPLIED HINDI-I	۳		_	ourse tegory		AE	12		Abili	ty Enhar	cement	Courses	s (AE)		1	T 0	P C	C 2
Pre	e-requisiteCours	ses	Nil		Co-requisiteCourses		Nil				Progress	siveCou	irses						Nil				
Col	urse Offering De	enartment	IVII		HINDI	Data Bo	ook / Codes/Standa	ırds				_		1		Nil			INII				
	arse offering be	purumont			THIND	Dutu De	ook / codes/standa	ii u 3								1411							
Course Lear	ning Rationale (CLR):	The purpo.	se of learning this	s course is to:			Lea	ning					Pro	gram Lea	rning O	utcomes	(PLO)					
CLR-1:	Explain and app	reciate the Con	ist <mark>ant moral valu</mark> e	s of India			J. 575	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Focus on Evalua	ating the social	changes through	prose		1,14	SECTION 1																
CLR-3:	To Display mora	l and social val	lues in the field or	religion and con	nmunal Unity	77.			1.33	456				Seu			e Ge						
CLR-4:					t from the Hindi Language to English andvice	ce –vers	5a	evel of Thinking (Bloom)	%	(%)		dge	pts	Link with Related Disciplines	e Je	_	Ability to Utilize Knowledge		ata		<u>s</u>		
CLR-5:		-	Administrative terr		3 3 3		70.10) (Bi	ency	nent		owle	ouc	Dis	vledç	zatio	Kno	D	TO O	<u>s</u>	SKi	SKIII	
OLIK-J.	To Holp the roun	nore to tacino i	idinimiou di Po ton	orgj		-		nking	ofici	tainr		조	of	elate	Knov	Sciali	Ze	delin	erpre	SKi	lving	tion	S <u>I</u>
							,	Ē	P P	Pd A		nent	tion	ih Re	nral	Spe	o Ut	Mo	± i	Jative	n So	ınica	SalS
Course Le	arning Outco	mes (CLO):	At the end	of this course	learners will be able to:			vel o	pecte	Expected Attainment (%)	100	Fundamental Knowledge	Application of Concepts	¥	Procedural Knowledge	Skills in Specialization	ĮĮ.	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills
CLO-1 :	Understand the	various form	c of Droco and o	lifforont acnocte	of social issues		11.0	2	24 Expected Proficiency (%)	<u>3</u>	4.4	<u>군</u> H	₽ H	当	M H	Š	₽ H	∑ Z	M A	_ <u>≤</u>	<u> </u>	3 H	_ ₹
				шетен азрест	UI SUCIAI ISSUES				80		- :	Н		Н	M	L				L	L		M
CLO-2:	To create an av		•				15 N. T.	2					Н		IVI	L	Н	Н	М	L	L	Н	
CLO-3:	To Examine the	,			1 Sept. 159.1			2	75	95		Н	Н	М	L	Н	Н	М	Н	М	М	Н	Н
CLO-4:	To Provide techi	· ·			A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STA	-		2	80	90		Н	Н	L	Н	М	Н	L	Н	Н	М	Н	Н
CLO-5:	To evaluate the	nuance in <mark>es</mark>	says		A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STA		NA AL	2	85	90		М	Н	М	Н	L	Н	Н	L	Н	М	Н	Н
Duration	(hour)		9		9			()						9					ç	9		-
S-1	SLO-1	KAHANI			NIBANDH		BAL RAMAYAN						JVAD					ARIBHAS	SHIK SH	IABDAVA	4 <i>L</i> I		
	SLO-2	AVDHARNA			VDHARNA		KHATHA VASHTU						HARNA		. 7			RTH					
S-2	SLO-1	ARTH		- 1	ARTH		AVADHPURI MEN R					ART						ARIBHA.					
	SLO-2	SWARUP			SWARUP		RAM KE ADARSH K				NA		ARUP					WARUP					
S-3	SLO-1	PARIBHASI			PARIBHASHA		RAMAYAN KE PRA	ATI RUC	HI JAC	GANA		PAF	RIBHASH	łA .			Pi	RAKAR					
	SLO-2	KAHANI KE T	TATVA		AHABHARAT KE SAMAY KAHARAT- BHALKRISHNA BHATT	27	RAMAYAN KA SAM	IAJ MEI	I MAHA	4 <i>TVA</i>		PR/	KAR				A	VADHAF	RNA				
S-4	SLO-1	UDDESHYA			LEKHAK PARICHAYA		OKJEEVAN KE PRA	ATI JAG	RIJP K	ARNA	- 11	MAR	HATVA				P	RAYOJA	N				
•	SLO-2	OBBEOITH			PATH KA VISLESHAN		JANGAL AUR JANKI				- 1		DESHYA					DDESH'					
S-5	SLO-1	ANTASH MAI	N KI JAGRITI		UDDESHYA		GURU KE PRATI AL		ΑV				UBAD PF					AHATVA					
	SLO-2		AHANIPREMCH.	AND	SAMAJIK SAMRASTA		VIRTA KE BH			IA			DH PRAY					RAYOG					
S-6	SLO-1	KAHANI KA I			PAURANIK KAHANIYO SEAVAGAT KAR	RANA I	VIDHARM KA PRAT		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				DI SE AN		NUVAD			DDESH'					
	SLO-2	KAHANI VISL			MAHABHARAT EVAM RAMAYANKE SAM	ΛΛΙΖΙ																	
					TULNA		VAN JEVAN SE AV						GREZI SE					AKANIKI				VA	
	SLO-1	BAL MANOV			BABUL AUR KAKTASH-RAMDARASH MIS																		
S-7						RAM KE CHARITRA SE AVAGATKARANA										ANGREZI SE HINDI SHABD							
					VIRTA KE BHAV JAGANA					SHROT BHASHA KA GYAN					EK DIN EK SHABD SHABDON KA VISLESHAN								
S-8	SLO-2	SAPNE KE L	IYE SANGHARSI	Н	MANVATA KO JIVIT RAKHANEKI PRERN	NA I	PATH KA VISLESHA	4 <i>N</i>				L	AKSHYA	BHASHA	KA GYA	N	Sł	HABDON	KA VIS	LESHAN	I		

S-9	SLO-1	SAMASYA KA SMADHAN JAD MENHOTA HAI	AAJ KE SANDARBH ME MAHABHARAT KI UPYOGITA	PATH PRICHARCHA	ANUVAD KA DAYITVA	PATH PRICHARCHA
	SLO-2	PRASHNABHAYASH	PRASHNABHAYASH	PRASHNABHAYASH	ANUVAD KA ABH <mark>YASH</mark>	PRASHNABHAYASH

Edited Book: "PRAYOJAN MULOK HINDI", SRIJONLOK PUBLICATION, 2023, New Delhi.

Learning Resources

Srijanlok Literary Magazine, Ara (Bihar – 802301)

- https://hindisamay.com/ https://ncert.nic.in/textbook.php?fhbr1=0-12
 - Prayojan mulak Hindi, Dr. Sontakke https://rajbhasha.gov.in/hi/ol_clause

Learning As	sessment				7 - 10	12.34	A State of	7.5						
	D			Continuous Lo	earning Assessmer	nt (50% weightage	e)			First Francisco (500/ miletary)				
1	Bloom's	CLA -	1 (10%)	CLA - 2 (10%)		CLA - 3 (20%)		CLA – 4 (10%)#		Final Examination (50% weightage)				
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice			
Lovel 1	Remember	200/	200/	200/	200/	2007	200/	2007	200/	200/				
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-			
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%				
Level 2	Analyze	40%	30%	30%	40%	30%	30%	30%	30%	30%	-			
Laudi	Evaluate	30%	20%	20%	200/	200/	30%	30%	30%	200/				
Level 3	Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-			
	Total		100 %		100 %	1	00 %	- 40	100 %		100 %			

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		-2
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Shri. Santosh Kumar Editor : Srijanlok Magazine	1. Prof.(Dr.) S.Narayan Raju, Head, Department of Hindi, CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
Place: Vashishth Nagar, Ara – 802301		
	DI-DADAT ID.	2. Dr. Md.S. Islam Assistant Professor, SRMIST
	LEARIN LEAP I FAD	3.Dr. S. Razia Begum, Assistant Professor, SRMIST
	1111111	4, Dr.Nisha Murlidharan Assistant Professor, VDP, SRM IST

Course Code	ULF		Course Name	French for Sp	ecific purpose-l	French for Specific purpose-I Course AE Category						Abili	ty Enhar	ncement	Course	s (AE)		<u>L</u>	T 0	P 0	C 2
Pre	-requisiteCou	ırses	Nil	Co-requisiteCourses	Nil				Progr	essiveCo	urses						Nil				
Co	nurse Offering	Department	IVII	French	Data Book / Codes/S	tandards								Ni			IVII				
	uise onemi	g Department		Tichon	Data Book / Godes/s	turidurus					- 4			141							
Course Lea	rning Rationa	ile (CLR):	The purpose of learn	ning this course is to:	1000	100		Learn	ing				Prog	ram Lea	rning 0	<mark>ut</mark> comes	(PLO)				
CLR-1:	Strenathen t	he language of the s	students both in oral and w	ritten	-	1	2) 2	7	1	2	3	4	5		7	0	9	10	11	10
CLR-1:	·	0 0	ons and opinions, reacting					2 3			2	3	4	5	6	/	8	9	10	11	12
			of French Grammar.	to illioithation, situations				95/5													
CLR-3:						_ E		(%)		e Je											
CLR-4:	•	• .	nsion of texts of different o	•	27 1783	Bloo	5	() tu		vledç	cept		adge	tion			Data		≅	SIII S	
CLR-5:	Enable the s	tudents to over <mark>come</mark>	<mark>e the fea</mark> r of speaking a fo	reign language and take position as a foreig	nerspeaking French	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment		Fundamental Knowledge	Application of Concepts	ted	Procedural Knowledge	Skills in Specialization	به	ling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	<u>S</u>
						Ę	Prof	Atta		ntal	n of	Rela	조	beci	Utiliz	lode	Inter	ive (Solvi	catio	SKi
C I	<u>'</u> O-			una la pia la bill la abla ta	W. 1981. E.	of T	cted	cted	100	ame	catic	Link with Related	unpa	. <u>=</u>	Ability to Utilize	Skills in Modeling	/ze,	tigat	em	muni	Analytical Skills
Course L	earning Ou	icomes (CLO):	At the end of this co	ourse, learners will be able to:		eve	Expe	- xbe	17	Fund	Appli	Ĕ	Proc	Si	Abilit	SKiii	Anal	Inves	Prob	Com	Anal
CLO-1:	To acquire k	nowledge abo <mark>ut Fre</mark>	ench language	E 11 × 11 11	7.77	2		80		Н	М	Н	Н	М	H	Н	L	M	М	Н	L
CLO-2 :	To strengthe	en the knowled <mark>ge on</mark>	concept, culture, civilization	on and translation of French	to your wide.	2	2 80	90		М	Н	L	Н	Н	М	Н	М	L	L	Н	М
CLO-3:			atures in French language			2			14	Н	Н	L	М	Н	М	L	Н	М	М	Н	Н
CLO-4:		· ·	nch language into other la			2				Н	1	М	Н	М	Н	Н	М	1	Н	М	1
CLO-4 :	'		intercultural elements in Fi			2				M	Н	Н	1	M	M	Н	Н	M	1	Н.	M
	<u>'</u>	are communication,	intercutarar croments in 11	onon language			. 00	,,,				l				۱"			_		_ ···
Duration	(hour)		9	9			9					9	· .					9)		
S-1	SLO-1	TP de chimie		Le jour des examens	L'impe	eratif négatif				Comp	rendre ation	une	e let	ttre	de Co	omprendr	e la stru	cture d'u	ın rappo	rt destag	,e
	SLO-2	Les exemples		Les activités	-Le pa	ssé compos	é avec	être		Les exe	emples				Tr	<mark>ouv</mark> er des	mots cl	és-			
	SL0-1	- Un TP au laborat	oire-	Le sms à la française -	Les e	cemples				Repére	r le prése	ent			Le	s activités	S				
S-2	SLO-2	Les exemples		Les activités		issé compo minaux	sé des	verbes		Les act	vités	_			Co	omprendre	e un text	e technic	que-		
S-3	SL0-1	Comprendre un TF		Les examens	-La re	cherche de	stage -		. 11	, le pas	sé compo	osé et			Le	s activités	ŝ				
	SLO-2	Les exemples		Les activités		cemples				Les act						s exempl					
S-4	SL0-1	-Suivre un protoco	le expérimental -	-Donner des conseils		ctivités					dans un	texte				elever des		nts dans	un texte)-	
	SLO-2	Les activités		Les exemples		ge en France	е			Les exe						s activités					
S-5	SLO-1	Lire des équations	chimiques -	-Ecrire et comprendre un sms -		ctivités				des ca	burants	stage et -	ledomaii	ne		s exempl					
	SLO-2	Les activités		Comprendre une interdiction		français			- - -	Les act						s activités					
	SL0-1		ules chimiques àl'oral	Les activités		cemples				Le stag						s activités					
S-6	SLO-2	Les exemples		-Donnez des consignes -		re de motiva				Les exe						s pronom					
	SL0-1	- L'infinitif pour exp	orimer un ordreou	Les exemples	Comp	rendre une o	offre de	stage		La méth	node du p	olan détai	llé-		Le	s exempl	es				

S-7	SL0-2	Les activités	Comprendre	Les exemples	Les activités	Les exemples
S-8	SL0-1	un conseil (dans les consignes) -	Les exemples	Les activités	Les exemples	Les activités
	SLO-2	Les exemples	et parler d'actions passées-	Comprendre et réaliser un CV	Le contenu du rapport de stage	Quelques verbes et leur preposition
S-9	SL0-1	La nominalisation	Les exemples	Les activités	Les exemples	Les activités
	SLO-2	Les exemples	L'impératif des verbes pronominaux	Les exemples	Les activités	Les exemples

Theo
_

Character Designer, Animaker Company Pvt.

Learning Resources

- "Tech French" French for Science and Technology, Ingrid Le Gargasson, Shariva Naik, Claire chaize, Les éditions Didier, India, 2011.
- https://www.fluentu.com/blog/french/french-grammar
- https://www.elearningfrench.com/learn-french-grammar-online-free.html
- https://www.lawlessfrench.com/grammar
- https://blog.gymglish.com/2022/12/15/basic-french-grammar

	Learning Assessr	ment				- / " . "	de Maria	-15		in the second	
	Dia anatal and of		(Continuous Lea	rning Assessmer	nt (50% weighta	ige)	4.5		Final Evamination (F00), wair	htomo)
	Bloom'sLevel of	CLA - 1	(10%)	CLA – 2	2 (10%)	CLA - 3	(20%)	CLA -	4 (5%)#	Final Examination (50% weig	ntage)
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
Level 2	Apply Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%	
Level 3	Evaluate Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	
	Total	1	00 %	1	00 %	1	00 %		100 %	100 %	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	1///	
Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
Mr. Kavaskar DanasegaraneProcess Funct	1. Dr. C.Thirumurugan Professor, Department of French, Pondicherry University	1. Mr. Kumaravel K. As <mark>sistant Profess</mark> or & Head, SRMIST, KTR
Expert	Polidicherry University	1/
Maersk Global Service Center Pvt. Ltd	- 1 D 3 v -	
2.Mr. Sharath Raam Prasad	/ TVARIV- FID	2 Mrs. Abigail Assistant Professor, SPMIST, VDD

Biotechnology 79

2. Mrs. Abigail, Assistant Professor, SRMIST, VDP

Course Code	U	BT23G01J Course Name		MICROBIAL PHYSIO	LOGY	Cours Catego		(3			G	eneric I	Elective	Course			L T	P 4	2	0	C 4
Pre-requi	site Course	S	Nil	Co-requisite Courses	Nil				4	17	Pr	ogressiv	e Courses						Nil			
(Course Offeri	ng Department		Biotechnology D	ata Book / Codes/Standa	ards																
Сог	urse Learning	Rationale (CLR):	: /	The purpose of learning this course is to:	<u> itti</u>	Ħŋ.		Lea	arning		4					Prog	ram Learnir	ng Outcor	mes (PLO))		
CLR-1:	To learn types	of microbes based on nutrition, basic tra	nsport mechanisms pr	esent in microbes for the uptake of nutrients	100	1977	1	2	3	T 1		2	3	4	5	6	7	8	9	10	11	12
CLR-2:	,,	erial growth and factors affecting micro			2584.77	-			1					1					,			
CLR-3:		ents acquainted with various aspects of	•	and metabolism	5,127		ne				۵ ,					nplex as	long					
CLR-4:	To learn the p	physiological and metabolic aspects of t	ne microbes			100	(moo	(%)	8		vledg	Dalc)	ces	논	of comple	ld life		0.1	~		
CLR-5:	To learn famil	ies of phototrophic microorganisms and	their energy synthesis		1. N. V. 11.		lg (Bl	ienc	ment		Knov	<u>5</u>	Reasoning ability	Ethical Practices	Team Work	mmunication of biotechnological	dent and learning	PS0 - `	PS0 - 2	PS0 - (PS0-4	PS0-5
			7.0	Carrier in		V.S	hinkir	Profic	Attair		ental		asonii	ical F	Tean	unica	ende	, A	P,	PS	ď.	۵
Course L	earning (Outcomes (CLO):	At the e	end of this course, learners will be able to:		1121	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	pi '	Fundamental Knowledge	Analyze, mreiprer Data	Re	击	>	Communication of complex biotechnological ideas	independent and lifelong learning					
CLO-1:	Will have got a	cquainted with the dive <mark>rse physiological</mark> gr	oups of bacteria/archea	and transport systems commonly employed by microbes.			1	85	80	T	1	М				L	L		М	Н		Н
CLO-2 :	Will have suffic	ient knowledge of bact <mark>erial bacterial gro</mark> wt	curve, calculation of	generation time and effect of environmental factors on the growth.	1 10 10 1	Mari Care	2	85	80	N	1	Н	Н			М			Н			L
CLO-3:				d by bacteria during growth on glucose under aerobic and anaerobic conditi	ons. They will also become fa	familiar with	2	85	80	·	ı	М	Н			М		L		Н		L
		f aerobic respiration and <mark>fermentation in n</mark>				233																<u> </u>
CLO-4:				rgy from inorganic compounds and assimilate carbon from CO2 (chemolit			3	85	80	H		М	L			L	Н			M	Н	
CLO-5:	Will have an ac	ided knowledge on the famil <mark>ies of phototro</mark>	phic microorganisms.	Students would also be aware of differences between anoxygenic and d	oxygenic photosynthesis.	<u> </u>	3	85	80	N	1	L				Н		L		L		
Duration (hour	r)	18	-	18		18							18		-				18			
S-1	SL0-1	Nutritional requirements of Microorga	nisms	Growth curve	Metabolism - Conce	ept of aerobic respi	ration			Anaerobic r			7			Phot	osynthesis					
S-2	SLO-2 SLO-1	Autotrophs, Heterotrophs, Chemotroph	andOligotrophs	Generation time	Anaerobic respiration					Denitrificatio Anaerobic re					iration	Chara	cteristics and	I tungs of D	hotocynth	atic Drok	anıntas	
	SLO-2											ICIIICIIC	uvo mudioi	cuuciion				•	notosynti	CIIC I TORK	aryoics	
S-3-6	SLO-1 SLO-2	Isolation and culturing of photosynth	etic bacteria	Effect of carbon and nitrogen sources on growthof E. coli	Measurement of growt	th by cell number usi	ngHaen	nocytom	neter	Starch hydro	olysis					Amino	oacid fermen	tation				
S -7	SL0-2	Nutrient transport Mechanisms-		Factors influencing microbial growth	Fermentation	HAT		-		Alcohol fern	nentation	and Pas	teur effect			C02	ixation- Oxy	genic				
C 0	SLO-2	Difference Conflicted Difference			Charlain						f	£				000	Continu Ann					
S-8	SLO-1 SLO-2	Diffusion- Facilitated Diffusion		synchronous growth and continuous cultivation	Glycolysis					mixed acid	iermenia	uon				CUZ	fixation- Ano	xygenic				
S-9-12	SLO-1 SLO-2	Effect of temperature on growth ofmic	oorganisms	Effect of salt on growth of E. coli	Acid and gas production	ion from carbohydrat	es-lacto:	se fermen	ntation	Gelatin hydi	olysis					Detec	tion of Catala	se product	ion by mi	croorgan	nisms	
S-13	SLO-2 SLO-1 SLO-2	Passive, Active transport, - Group t	anslocation	Diauxic growth	TCA cycle					lactic acid fe	rmentatio	n- Homo	and heterof	ermentative	e pathways	Bio Iu	ıminescence					
S-14	SL0-1	Concept of uniport, symport and ant	iport.	Endospore formation in bacteria	Electron transport cha	nain				concept of li	near and	branched	fermentatio	n pathwa	ys.	Bio Iu	ıminescence					
S-15-18	SLO-2 SLO-1	Effect of pH on growth of microorga	nisms	Study and plot the growth curve of E. coli byturbidometric method	1					Casein hydr	olysis					Ureas	e test					

 Microbiology, Dubey RC and Maheswari DK (2004), 1st Edition, S. Chand & CompanyLtd., NewDelhi. Experiments in Microbiology, Plant pathology and Biotechnology, Aneja KR (2005), 4thEdition, New Age International Publishers, Chen 	
Learning Resources 3. Prescott Microbiology, Joanne Willey, Kathleen Sandman and Dorothy Wood(2020). Mc Graw Hill Publication	
4. https://www.frontiersin.org/books/Microbial_Physiology_and_Metabolism. https://onlinelibrary.wiley.com/doi/book/10.1002/0471223867	

			- A - Y -		Continuous Learning A	ssessment (50% weightage		-		Final Examina	ation(50%
	Bloom's Level of	CLA - 1 (1	0%)	CLA - 2 (1	10%)	CLA - 3 (2	0%)	CLA - 4 (10	%)#	weightage)	
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1	Remember					12174 / 1					
	Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
2	Apply				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	774.7					
	Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
3	Evaluate					100					
	Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	1	00 %	100	100 %	1	00 %	1	00 %		100 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr.D.Thirumurugan, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	ι	JBT23S01T Course Name	MATHEMATICAL CALCU	JLATIONS INBIOLOGY			urse	S	1/2		Ski	II Enha	nceme	ent Cou	rse		1	T 0	P 0	C 2 1
Pre-re	quisiteCour	rses	Co-requisiteCourses	Nil						Prog	gressive C	ourses		Nil					,	
(Course Offeri	ng Department	Biotechnology	Data Book / Codes/Standard	S				-		7									
										1	- 1	V .								
Course	Learning R	Pationale(CLR):	The purpose of learning this course is to		1	Learn	ing					_	Progra	ım Learnii	ng Outcom	es (PLO	D)			
CLR-1:	General id	deology on basic mathematics	S A		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Upskilling	the conversion of un <mark>its used in Bi</mark> ology		7. 77.79.77			100							J						
CLR-3:	enhance	the knowledge on t <mark>ype of solutio</mark> n		a M. Ollers and					e e	g				mpley	and					
CLR-4:	Understar	nd the nature of so <mark>lution</mark>		A. P. A. M. W.	mool	y (%)	ıt (%)	6.7	wledg	t Dat	billity	ices	峑	of co	dent	—	2	33	4	2
CLR-5:	Understar	nd the microbial gr <mark>owth</mark>		A P. LAND BY	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong learning	PS0 - 1	PS0 - 2	PS0	PS0-4	PS0-5
				- 300 let 1	of Thin	ed Pro	ed Att	de:	ament	lyze, I	Reaso	Ethica	Te	mmuni	를 를					
Course L	earning (Outcomes (CLO): At the end of this	s course, learners will be able to:		evel o	Expect	Expect	44	Fund	Ana				9						
CLO-1:	Enhancing	g the ability on ba <mark>sic calculatio</mark> n		111 E 1	2	75	80		Н	7			L		Н					
CLO-2:	Enhancing	g the ability to con <mark>version of fac</mark> tors	1 300 500		2	80	90		Н	М	М	Н	L							
CLO-3:	Clear ideo	ology on type of so <mark>lution</mark>			2	75	80		Н			Н								
CLO-4:	Analyze th	he nature of the sol <mark>ution</mark>		100	2	75	90		Н		M									
CLO-5:	Analyze th	he growth pattern of <mark>the microorg</mark> anism and	cell concentration in blood		2	80	75		Н			М			Н					
Duration (hou	ır)	3	3	1/11/4	3						3	N						3		
S-1	SL0-1	Introduction to mathematics in biology	Conversion factors and UnitCancellatio	Concentration and Dilution (%v/v)	ns – Perc	ent volume	by volume		pH and pC	OH – Deriva	tion of pH o	of water			Bacterial Grow	th Curve _	three pha	sesexplar	ation	
	SLO-2	Introduction to mathematics in biology	Conversion factors and UnitCancellatio	on Concentration and Dilutio	ns- Percer	t Volume by	v weight (%v/	/w)	pH Scale i	range					Calculation of	generatio	n time			
S-2	SL0-1	Significant digits	Conversion factors and UnitCancellatio	Calculation – Molarity ,	Molality a	ınd Normal	ity		pH and pC)H - calcula	tions				Calculation of the OD vs Tir		rowth- Seri	ial Dilution	Wethod and	Plotting
	SLO-2	Significant digits	Conversion factors and UnitCancellatio	Calculation - Molarity ,	Molality a	nd Normalit	у	E	Log and A	nti-log - cal	culation			1	Calculation of the OD vs Tir	bacterial g	rowth- Seri	ial Dilution	Wethod and	Plotting
S-3	SLO-1	Converting numbers from scientific todec notations	imal Concentration and Dilutions - Mass percent (%w/w)	Calculation - Molarity ,	Molality a	nd Normalit	у		pH and pC)H - calcula	tions		1		Measuring hemocyto	cell con	ncentrati	ion on a		
	SLO-2	Converting numbers from scientific todec notations	imal Concentration and Dilutions- Percent weight by volum	ne (%w/v) Calculation - Molarity ,	Molality a	nd Normalit	у		Log and A	nti-log - cal	culation	7			Measuring hemocyto		ncentrati	ion on a		

Learning Resources
1. Calculations for Molecular Biology and Biotechnology- A guide to mathematics in the laboratory". by Frank H. Stephenson. Academic Press- 2nd Edition (2014)

					Continuous Learning Ass	sessment (50% weightag	e)			Final Examina	ation(50%
	Bloom's Level of	CLA - 1 (1	10%)	CLA - 2 (1	0%)	CLA - 3 (20%)	CLA - 4 (10	1 %)#	weightage)	
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
	Remember	20		20		20	AUI	20	NIII	20	NIII
evel 1	Understand	30	NIL	30	NIL	30	NIL	30	NIL	30	NIL
	Apply	50	NIII			50	NIII.		NIII	F0	NIII
evel 2	Analyze	50	NIL	50	NIL	50	NIL	50	NIL	50	NIL
	Evaluate	20	NIII	20		20		20	NII	20	NIII
vel 3	Create	20	NIL	20	NIL	20	NIL	20	NIL	20	NIL
·	Total		100	10/10/2	100	4.76	100		100		100

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	병원 가용하면 이번 기계 기계 있다면 모양 모양 모양 모양 모양 모양 모양 모양 모양 모양 모양 모양 모양	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Directo <mark>r ARMATS B</mark> IOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Vidhya VG, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Cource		Cource		Course		L	T	Р	С
Course Code	UBT23P01L	Course Name	INTERNSHIP- I	Category	Internship/ Project/ Community Outreach	0	0	0	1

Pre-requisiteCourses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	
Course Offering Department		Physics and Nanotechnology	Data Book / Codes/Standards		Nil	

Course Learnin	g Rationale (CLR):	The purpose of learning this course is to:
CLR-1:	assist the student's professional skill development useful	ul to employer such as teamwork, communications and work ethics & details
CLR-2:	provide unique learning opportunities by exposing the sti	student to the environment and expectations of professional performance
CLR-3:	expand the student's knowledge of a particular area(s) o	of interest to enhance employability
CLR-4:	help students to explore career alternatives/opportunities	es prior to their graduation

Course Learn	ing Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1:	demonstrate the skill g <mark>ained throug</mark> h work experience	with mentors or successful professionals to support the early stages of their career

		weightage)	Final Evaluation (50% we	eightage)
	Review – 1	Review – 2	Project Report	Viva-Voce
Internship	20%	30 %	30%	20 %

Cours		D23V02T	Course Name	Industry Oriented Employa	bility Skills for Scie	nce		I	Course Catego		V	5		Val	ue Ad	dition	course	,] :	L T	· [P 0	
Pre	-requisite (Courses	Nil	Co-requisite Courses	s	Nil			Progre	essive	Course	es						Nil					
Course	e Offering I	Department	Career	Guidance Cell Da	ta Book / Codes/Sta	ndard	s	4								- 4							
Cource	Loarning	Rationale (CL	D). The nu	pose of learning this course is to:		4	earnir	va					D	rogran	n Loar	ning O	utcom	es (PL	0)				
CLR-1	: Den	nonstrate vario	ous p <mark>rinciples inv</mark> o	pose of learning this codise is to. olved in solving mathematical concepts probability and interpret data	s related to	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2	: Lear	Learn the basic mechanics of grammar and develop resume-building practice as presentation skills in students						77	2945		nes			Je									
CLR-3	,	Understand the obj <mark>ect oriente</mark> d features					.y (%)	ıt (%)	edge	epts	scipli	dge	on	wled		ata		SIIIS	<u>s</u>			iour	
CLR-4	,					g (B	ienc	mer	MOL	onc	Q p	wlec	izati	Kno	g	et D	<u>S</u>	SK	SKi			Behaviour	ing
CLR-5	-5: Instill confidence in students and develop the necessary skills to face interview				erview	hinkin	Profic	Attain	ntal Kr	n of C	Relate	al Kno	Specialization	Jtilize	lodelir	nterpr	ive Sk	Solving	cation	Skills		nal Be	Learn
Course	ourse Learning Outcomes (CLO) At the end of this course, learners will be able to:				e to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in S	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical	ICT Skills	Professional	Life Long Learning
CLO-1			<mark>con</mark> cepts of per pler and innovativ	mutation and combinations, probab ve method	oility and approach	3	80	70	М	М		М	-	Н		М	Η	М	-	Н	-	-	-
CLO-2			ff <mark>erent part</mark> s of sp resume preparati	eech and use them in sentences appr on	ropriately and also	3	85	75	М		-	М	-	Н		-	-	-	Н	-	-	L	Н
CLO-3	: Und	erstand the im	p <mark>ortance of</mark> object	ct oriented features		3	85	80	Н	М	М	М	M	Н	L	-		-	-	-	М	-	Н
CLO-4	: Fac	e interviews co	onfi <mark>dently</mark>	624		3	85	80	M	М	Н	М	M	Н	L	-		-	-	-	М	-	Н
CLO-5	: Dev	elop their dom	nain <mark>skills to fac</mark> e	the interview		3	85	80	М	М	Н	М	M	Н	'YL	-/	-	-	-	-	М	-	Н
Durati	on (hour)	<u> </u>	6	6		6	2	٠.					6	7						6			
S-1	SLO-1	Permutation Combination	·	Change of voice	Object Oriented	_	ammin	g -	Ove	erloadin	ıg & Ov		-	oductio	n		Time	Compi	exity –	0	uction		
	SLO-2	Permutation		Change of voice		Introduction to Monolithic, P Structures, OOP			Ove	erloadin	g & Ov	erridin	g				Time	Compi	exity				
S-2	SL0-1		- Introduction	Change of speech	Translators – Ir	ntroduci	tion				ctions a				ntroduc	tion		ks & Qı					
	SLO-2	Probability -		Change of speech	Translators						ctions			ISS				ks & Qı					
S-3	SLO-1	Data Sufficion	,	Resume Writing - Introduction	Class – Introdu	Class – Introduction				Dangling Pointer – Introduction Linked List & Op-						& Opera	ations -	- Introd	uction				

SLO-2

SL0-1

SLO-2

S-4

Data Sufficiency –

Puzzles - Selections

Puzzles - Selections

Problems

Resume Writing - Introduction

Resume Writing - Session 1

Resume Writing - Session 1

Class

Object Abstraction – Introduction

Object Encapsulation

Biotechnology 85

Garbage Collector – Introduction

Linked List & Operations

Types of Trees & BST

Types of Trees & BST – Introduction

Dangling Pointer

Garbage Collector

S-5	SLO-1	Puzzles - Distribution	Types of Interviews - Group / Stress /	Polymorphism, Inheritance and	Algorithm and Data Structures - Introduction	AVL Tree Operations – Introduction
			HR	Dynamics Binding – Introduction		
	SLO-2	Puzzles - Distribution	Types of Interviews - Group / Stress /	Polymorphism, Inheritance and	Logical Thinking & Arrays	AVL Tree Operations
		_	HR	Dynamics Binding		
S-6	SL0-1	Cubes & Cuboids	Presentations - Introduction	Function Execution Sequence -	Structures & Pointers – Introduction	Introduction to P, NP, NP-Hard & NP-
			A (200)	Introduction		Complete Problems
	SLO-2	Cubes & Cuboids	Presentations - Activity	Stack & In Line Functions -	Structures & Pointers	Introduction to P, NP, NP-Hard & NP-
				Introduction		Complete Problems

Learning	1. Abhijit G <mark>uha, Quant</mark> itative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th	4. Greg Perry, Dean Miller, C Programming Absolute Beginne, Que Publishing, 3 rd Edition
Resources	Edition	5. Cay S. Horstmann, Core Java Fundamentals, Volume 1, 11th Edition, Prentice Hall, 2018
	2. Scott Bennett, The Elements of Resume Style: Essential Rules for Writing Resumes and	6. Langsam, Augenstein, Tanenbaum, Data Structure <mark>s Using C a</mark> nd C++, 2nd Edition, Pearson
	Cover Letters That Work, AMACOM, 2014 3. Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 2007	Education, 2015.

Level	Bloom's Level of Thinking	king Continuous Learning Assessment (100% weightage)										
		CLA-1 (20%)	CLA-2 (20%)	CLA-3 (30%)	CLA-4 (30%) #							
		Theory	Theory	Theory	Theory							
Level 1	Remember	10%	10%	30%	30%							
	Understand		to their tradition and the									
_evel 2	Apply	50%	50%	40%	40%							
	Analyze		24 7 3 8 6 1 L									
Level 3	Evaluate	40%	40%	30%	30%							
	Create		11.00.25									
	Total	100 %	100 %	100 %	100 %							

CLA-1, CLA-2 and CLA-3 can be from any combination of these: Online Aptitude Tests, Classroom Activities, Case Studies, Poster Presentations, Power-point Presentations, Mini Talks, Group Discussions, Mock interviews, etc. #CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, Cognizant Technology	Dr. G. Saravana Prabu, Asst. Professor, Department of English,	Dr. Sathish K, HOD, Department of Career Guidance Cell, FSH, SRMIST
Solutions India Pvt. Limited, Chennai	Amrita Vishwa Vidhyapeedam, Coimbatore	Dr. Muthu Deepa M, Assistant Professor, Department of Career Guidance Cell, FSH,
	//	SRMIST

SEMESTER IV

Course Code	UE	11777111	ourse Name	(O)F	OOD BIOTECHNOLO	OGY			course tegory	(Discipl	ine Spe	cific Core	Courses		L 3	T 0		0 C 2 4	
Pre-re	equisiteCours	ses	Nil	Co-requisiteCourses	0.1	Nil	77.		Prog	ressiveCou	veCourses					Nil						
Cou	ırse Offering I	Department		Biotechnology	Data Boo	k / Codes/Standa	ards)	Ni							-	
Course Learnin	ng Rationale (CLR)):	The purpose of learning this	course is to:		Learning	34	E	Ŀ	Progr	am Learning	Outcomes (PLO)									
CLR-1:	To practice s	terilization technique	for personal and societ	al safety			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	
CLR-2:			rmines the quality of foo	*	R 20 1	W. 10	17				11.				~							
CLR-3:	Knowledge a	cquired to analysis a	Qualitative of milk		5 S S	7.79	_			يو	9				mple) deas	and						
CLR-4:	To understan	d the techniqu <mark>es req</mark>	<mark>uired f</mark> or Preparation of	dairy products	386	100 Y	Noom	y (%)	nt (%)	Wedc	t Dat	billty	ices		of co gical i	ident arning	-	2	33	4	2	
CLR-5:	Techniques to	o determine th <mark>e Qua</mark> l	li <mark>ty ch</mark> ecking of packagii	ng material	180° - 476		ing (E	icienc	nmer	X	terpre	Reasoning ability	Ethical Practices	Team Work	imunication of comple: biotechnological ideas	independent and ifelong learning	PS0 - 1	PS0 -	PS0 -	PS0-4	PS0-5	
				H 30 72 1		- 27	Think	Prof	Atta	nenta	e, n	sason	hical	Tea	nunica	ind lifelo	4	Ь	Д	ш		
Course L	earning Out	tcomes (CL <mark>O):</mark>	At the end of this c	ourse, learners will be able to:			Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Analyze, Interpret Data	88	Et		Communication of complex biotechnological ideas							
CLO-1:	CLO-1: To learn basic sterilization technique for personal and societal safety					1	80	70	Н	L	Н	Н	Н	L	Н							
CLO-2:	Knowledge a	cquired for isola <mark>tion a</mark>	<mark>and iden</mark> tification of fool	d pathogens			2	85	75	Н	Н	М	Μ	М	М	М						
CLO-3:	Understandin	g the techniques <mark>req</mark>	<mark>juired for</mark> quality of wate	er and milk	arri	1///	2	75	70	М	М	М	L	L	М	М						
CLO-4:	Application of	f techniques requi <mark>red</mark>	<mark>l for Prepa</mark> ration of dairg	y products			1	85	80	L	М	L	L	М	М	L						
CLO-5:	Knowledge a	cquired to determin <mark>e</mark>	the Quality checking o	f packaging material			2	85	75	М	L	L	М	М	М	М						
												17										
Duratio	n(hour)		18	18		212		18				18	3					18	3			
S-1	SL0-1	Current scenario of	food industry	Classification of food		Principles of th	ermal pr	ocessing		Natu	al food to	icants			Pr	inciples of	food pre	eservatio	on			
S-2	SLO-1	Significance of food	d biotechnology	Shelf life of stable foods	AKIN	Blanching	34	P	. T	Food	allergen	_			Pr	eservation	by ferm	entation	: curing	andpickl	ing	
S-3	SLO-1	Current national an food industry	nd internationalscenario	of Food spoilage and food born	nediseases	Thermal resista	ance of r	nicroorga	nisms	Food	Quality as	sessment	HACCE	7	Pr	eservation	by dryin	ıg-sun d	lrying			
S 4-6	SLO-1 Lab 1. Dringings and method of cterilization			Lab 7: Bacterio	ological A	nalvsis i	nfWater hv	Lab): Isolation	and char	acterizati	onof	La	nb 11: Prep	aration :	and eva	duation o	ıf	-			
3 40	SLO-2	Heat, Filtration, Rad	diation & pasteurization	cotton blue staining				inary 515 (n water by		oacillus fro		ted milk	oroduct		obiotic/pre			iluation c			
S-7	SLO-1	Inter disciplines inv		Food infection and Food into		Thermal Death					gar product					eservation						
S-8	SLO-1	Basics of food micr	0)	Introduction to food process	Introduction to food processing Lethality concept.					Lactic acid production				Pr	eservation	of canni	ing of fo	od items	i			
S-9	SLO-1	Food as a substrate microorganism	e for	Thermal resistance of micro	oorganisms	Factor affecting	g heat re	sistance		Beer	and wine	oroduction	1		Us	se of prése	rvatives	in foods	5			

S	SL0-1		Lab 5: Standard Plate Count Method.	EIN CHE		
10-12		Lab 2: Isolation and identification ofmicrobes from dairy products	OF	Lab 7: Bacteriological Analysis ofWater by MPN method	Lab 9: Isolation and characterizationof lactobacillus from fermented milk products	Lab 12: Quality checking of packagingmaterials
S-13	SLO-1	Physical characteristics of food	Pasteurizations and Sterilization	Antimicrobial agents	Food fermentation	Importance and function of probiotic
S-14	SL0-1	Chemical characteristics of food	Different methods of sterilization	Food Adulteration	Microbiological examination of water	Prebiotic and symbiotic and their application
S-15	J SLU-I	Isolation and identification of microbesfrom dairy products	Different equipment used for foodhygiene	Functional foods and Food Additives	Microbiological examination of food	Types of packaging and package testingmethods
S 16-18		Lab 3: Isolation and identification ofmicrobes from fermented products	Lab 6: Qualitative analysis of milk byMBRT test	Lab 8: Isolation of yeast from foods	Lab 10: Study of food contaminants	Lab 13: Testing methods of packagingmaterials

	1. Food Micro <mark>biology; WC</mark> Frazier; Tata McGraw Hill, Delhi.
Learning	2. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012
Resources	3. Fundame <mark>ntals of Food</mark> Biotechnology, Byong H. Lee, John Wiley & Sons, 2014- 2 nd ed
	4. Ramaswamy H and Marcott M, Food Processing Principles and Applications CRC Press, 2006.
	5. Food Microbiology, 2nd Edition By Adams M & Moss, M, 2008, RSC Publishing

Learning As	sessment			2000				5.0				
	Bloom'sLevel of			24.27	Continuous Learning Ass	sessment (50% weighta	ge)			Final Exam	ination(50%	
	Thinking	CLA - 1	(10%)	CLA - 2	(10%)	CLA - 3 ((20%)	CLA - 4 (1	0%)#	weightage)		
	Hilliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
Level I	Understand	20%	20%	13%	13%	13%	1370	13%	13%	1370	1376	
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
LCVCI Z	Analyze	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
LCVCI 3	Create	1070	1070	1370	1370	1370	1370	1370	1370	1370	1370	
	Total	10	100 %		100 %		100 %		0 %	100 %		

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	LUCAP - FAIR	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr.N. Banu, Bharathi Womens College (autonomous), Chennai	Dr. S. Thanigaivel , Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code		UBT	73/107 [ourse Jame GENETIC EI	NGINEERING	Cour Categ		С		Discipline-Specific Core Courses L T P 0 C 3 0 3 2 4									C 4		
Pre-r	equisite Cou	ırses	Nil	Co-requisite Courses	Nil	Pr	ogress	ive Cou	irses						N	il					
(Course Offer	ring Department	BIOTE	CHNOLOGY Dat	ta Book / Codes/Standards								Nil								
				<u> </u>	- The Year																
PCourse Le	arning Ratio	nale (CLR):	The purpose of learning this course is	s to:				Learni	ng												
DOI D 4	D 6 11									4			1 .						10	- 11	10
PCLR-1:	_	basics of restriction enzy			State of the second	- 1	1	2	3	1	2	3	4	5	6	1	8	9	10	11	12
CLR-2:	U	ng the vectors and Ge <mark>ne</mark>			781			(%)	(%)	edge)ata	>	· ·		mple	≣ e					
CLR-3:		n Gene cloning and <mark>Scre</mark>	eening	606 3 7 8	1000		Level of Thinking	Expected Proficiency(%)	Expected Attainment(%)	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	or S	Communication of complex biotechnological ideas	Independent and life	PSO-1	2	23	- 4	2
CLR-4:	,	PCR and its types		TA - 15	May 11. 15		達	rofici	ttain	Tal K	Inter	ning	l Pra	Team Work	ation	dent	SO-	PS0-2	PS0 -3	PS0 -	PS0 -
CLR-5:	Assess the	e Sequencing and <mark>Applic</mark>	cations of Genetic engineering	2 5 6 H	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		le of	ed P	ed A	ame	yze,	easo	thica	Tea	unica	pen	Δ_	۵	Д	ď	ď
				3/6/24 / 6	ARE WITTER !		Le	bect	pect	jun-	Anal	~	Ш		omm	Inde					
Course Lea	rning Outco	omes (CLO):	At the end of this course, learners w	Il be able to:	65 447 TYNY	100	100	Ã	â						Ö						
CLO-1:	Recogniz	e the role of restri <mark>ction e</mark> r	nzymes in Genetic engineering				3	80	70	Н	M	M	Н	L	M	Н	Н	Н		M	
CLO-2 :	Relate ve	ectors and Gene <mark>transfer</mark>	rtechniques in Gene cloning	200 100 72	7 7 7		3	85	75	Н	L	L	Н	L	M	Н	M	L		Н	
CLO-3:	Utilize the	Gene cloning in Applica	ations	V/2	T V. L.		3	75	70	Н	М	М	Н	Н	Н	Н	Н	Н			
CLO-4 :	Importance	ce of PCR techniques in	Forensic science and viral evaluation	THE THE STATE OF		79.	3	85	80	Н	h	Н	Н	Н	Н	Н	Н	Н		Н	
CLO-5 :	Relate the	sequencing technique in	n Genetic engineering				3	85	75	Н	Н	М	Н	Н	Н	Н	M	M			
			·		17/10		-1	1			***							-1	-1	1	1
Duration (18	18	18						18							18			
S-1	SLO-1	engineering Scope of	Engineering Principle of Genetic Genetic Engineering Genetic sagriculture and Animal husbandry	Application of Restriction Enzymes in Modern Biotechnology I	Basic Principle of GenecloningHisto and Cloning strategy	ory of Gen	e clonir		verse-trans -qPCR	criptase I	PCR Re	al-time	-PCR-		DNA se First Ger History o	ieration	rseque				
S-2		History of Genetic Engir Traditional techniques in	n Ge <mark>neticengineeri</mark> ng	Introduction to cloning vectors: Prokaryotic Vectors: Plasmids	Screening for Recombinant			Ch	aracterizatio	on of PCF	R produc	ct and U	ses of I	PCR	Second (Genera	tion sec	quencin	ıg		
S-3	SLO-1	Role of Genetic engine ModernBiotechnology	ering fro <mark>m traditional Biot</mark> echnology to	Phagmid, Cosmid and Bacterial Artificial Chromosomes	Gene transfer techniques: Bacterial Conjugation and Transformation			De	tection of A	ncient DN	IA by P	CR		7	Next-Ge	neratio	n Sequ	encing	and Ove	erview to	o NGS
S-4-6	SLO-1	3.1		Quantification of Genomic DNA By spectrophotometer	Preparation of competent cell		d		lation of RN		1				CR						
S -7	SLO-1	Discovery of Restriction	n EnzymesTypes of RE	Yeast Artificial Chromosomes.	Transduction			D€	etection o	f Viral i	nfectio	ns PC	R		Whole	Geno	me S	equer	ncing		
S-8	SLO-1	Nomenclature of Restri Sticky endRE	ction enzymes Blunt end and	Expression Vectors	Microinjection			Cl	oning of PC	R produc	ts				Third ge	neratio	n sequ	encing			
S-9	SLO-1	,	Electroporation, Microprojectile, Shot Gun Forensic DN					rensic DNA detection by PCR					Importance of sequencing								
S-10-12	SLO-1	Agarose gel Electrophor	resis	Restriction digestion of DNA by EcoRI andHindIII	Transform the competent cells in int	to EcoKIb	acteria	Qu	<u>ıantification</u>	antification of RNA byspectrophotometer					r Real-Time PCR						
S-13	SL0-1	Isoschizomers and Neo	schizomers.	Polymerases	Ultrasonication, Liposome fusion			Ap	plication of	PCR in F	orensic	Scienc	9		Applicat	ions of	seque	encing			

S 14	SL0-1	Star Activity and Restriction Mapping Restriction Fragment	Ligases and Alkaline Phosphatases	Introduction to PCR –	Problems and Limitations in	Applications of Genetic Engineering
		LengthPolymorphism.		technique Principle of PCR Designing of primers	PCR	
S-15	SL0-1	Application of Restriction Enzymes in modern biotechnology I	Recombinases	Types of PCR –Real-time PCR -qPCR	Factors influencing the PCR reactions	Genetherapy
	SLO-2		1 1 7 -			
S-16-18	SL0-1	Isolation of Genomic DNA	Ligation of ECORI and Hind IIIRestricted	Identification of recombinants - antibioticmarkers, Blue-	PCR	Model Practical
			DNA by	white colony selection	9 2	

	1.	I. Old, R. W., Primrose, S. B., & Twyman, R. M. (2001). Principles of Gene Manipulation: an Introduction to Genetic Engineering. Oxford: Blackwell Scientific	
learning	2.	2. Lewin's "Genes <mark>" – 12th Editi</mark> on, 2017.	
Resources	3.	B. Brown, T. A. (2006). Genomes (3rd ed.). New York: Garland Science Pub.	
	4.	1. Isil Aksan Ku <mark>rnaz (2015)Techniques in Genetic Engineering,Taylor &Francis group, Boca Raton London New York</mark>	

Learning As		Continuous Lear		Final Examination								
	Bloom's Level of Thinking	CLA - 1 (10%)		CLA - 2 (10%)	1. 1. 1. 1.	CLA - 3 (20%)	1 6 1	CLA - 4 (10%)	7.	(50%weightage)		
	Lovor or Transacting	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
	Remember	2001			1000		No. Ohr-	400/		1504	150/	
Level 1	Understand	20%	20%	20%	10%	15%	15%	10%	10%	15%	15%	
	Apply	000/	2004	2004	1 1000	- 1 oo	0004	000/	000/	000/	000/	
Level 2	Analyze	20%	20%	30%	20%	20%	20%	20%	30%	20%	20%	
	Evaluate	100/	100	5 C 40 5 5 5	100/		450	100/	4001	1504	150/	
Level 3	Create	10%	10%	10%	10%	15%	15%	10%	10%	15%	15%	
	Total	100 %		100 %		100 %		100 %	-	100 %		

[#]CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	406	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
	Dr.N.Banu, Bharathi Womens College (Autonomous), Chennai	DR.D.Sankari ,Professor and Head ,Department of Biotechnology ,FSH
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai		,SRMIST, KTR

Course Learning Rate CLR-1 : To CLR-2 : Un CLR-3 : An CLR-4 : Na CLR-5 : Pro CLR-5 : St. CLO-1 : St. CLO-2 : St. CLO-3 : Fal CLO-4 : Un CLO	Rationale (C Fo make the Jnderstand Analyze the Nature and Provide scienary Arraning O Students can Suggest a sui	Department IVII	erials course, learners will be able to:	Data	Nil Book / Code	s/Standard		arming 2 (%) Expected Droiticency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability 3			Communication of complex biotechnological ideas	independent and 2	PS0 - 1	Nil 9 9 0.7	10 BSO - 3	11 PSO-4
Course Learning Ra CLR-1: To CLR-2: Un CLR-3: An CLR-4: Na CLR-5: Pro Course Lear CLO-1: St. CLO-2: Su. CLO-3: Fal CLO-4: Un	Rationale (C Fo make the Jnderstand Analyze the Nature and Provide scient Arning O Students can Suggest a sui	The purpose of learning e students learn the basics of nanotechnology the various methods in the synthesis techniques used in the nanomaterial preparat properties of nanomaterials entific understanding of application of nanomaterials. At the end of this apply the properties of various nanomaterials	this course is to: ion erials course, learners will be able to:		Book / Code	s/Standard	Le	2	(%)		lamental Knowledge		3	4	earning (Outcomes (PL	7 aud			3	
CLR-1: To CLR-2: Un CLR-3: An CLR-4: Na CLR-5: Pro Course Lear CLO-1: St. CLO-2: Su CLO-3: Fal CLO-4: Un	To make the Jnderstand Analyze the Nature and Provide scienarning Official Students can Suggest a sui	e students learn the basics of nanotechnology the various methods in the synthesis techniques used in the nanomaterial preparat properties of nanomaterials intific understanding of application of nanomate utcomes (CLO): At the end of this apply the properties of various nanomaterials	erials course, learners will be able to:				1	2	(%)		lamental Knowledge		3	4	5	6	7 aud			3	
CLR-2: Un CLR-3: An CLR-4: Na CLR-5: Pro Course Lear CLO-1: St. CLO-2: Su CLO-3: Fa CLO-4: Un	Understand Analyze the Vature and Provide scie Arning O Students can	the various methods in the synthesis techniques used in the nanomaterial preparat properties of nanomaterials entific understanding of application of nanomaterial utcomes (CLO): At the end of this apply the properties of various nanomaterials	course, learners will be able to:				77	3	(%)		lamental Knowledge			H			and			3	
CLR-2: Un CLR-3: An CLR-4: Na CLR-5: Pro Course Lear CLO-1: St. CLO-2: Su CLO-3: Fal CLO-4: Un	Analyze the Nature and Provide scie arning O Students can Suggest a sui	techniques used in the nanomaterial preparate properties of nanomaterials entific understanding of application of nanomaterials entitle utcomes (CLO): At the end of this apply the properties of various nanomaterials	course, learners will be able to:				77	3	(%)		lamental Knowledge			Ethical Practices			idependent and long learning			3	
CLR-3: An CLR-4: Na CLR-5: Pro Course Lear CLO-1: St. CLO-2: Su CLO-3: Fa CLO-4: Un	Analyze the Nature and Provide scie arning O Students can Suggest a sui	techniques used in the nanomaterial preparate properties of nanomaterials entific understanding of application of nanomaterials entitle utcomes (CLO): At the end of this apply the properties of various nanomaterials	course, learners will be able to:				evel of Thinking (Bloom)	ected Proficiency (%)	ected Attainment (%)		lamental Knowledge	lyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	nication of complex echnological ideas	idependent and long learning	50 - 1	50 - 2	0 – 3	920-4
CLO-1 : St. CLO-2 : Su. CLO-3 : Far CLO-4 : Un	Students can Suggest a sui	apply the properties <mark>of various nano</mark> materials				ß.	evel of T	ected	ected	ether of	am	λZ	Re	盂		= t	<u></u> =	4	P,	PS(а.
CLO-2 : Su CLO-3 : Fal CLO-4 : Un	Suggest a sui	117 11	nt materials	9.37				Ä	Exp	100	Fund	Ana				Comm					
CLO-3 : Fai	00	table technique for th <mark>e specific chara</mark> cterization differei	nt materials				1	80	70		Н	Н	Μ	М	L	М	L				
CLO-4: Un	- 111 11 11					3.	1	85	75		М	Μ	L	L	L	L	L				
	-amiliarity witi	h working principles, t <mark>ools and techniq</mark> ues in the field o	f nanomaterials				1	75	70		Н	Н	М	L	L	L	L			1	
CLO 5 · De	Inderstanding	g of the strengths, limi <mark>tations and pote</mark> ntial uses of nan	omaterials				2	85	80		М	Μ	L	L	L	М	М				
CLU-3.	Design a nand	bioparticle for specific <mark>application</mark>				177	3	85	75		М	М	М	Μ	М	М	M				
Duration (hour)		18	18			H	18	Ω						18				"	18		
. ,	SLO-1	Introduction and Definitions	Lipid nanoparticles		Nano formu	ations	- 10	Ů.			^haractor	ization of	nanomateria				Nanotechnology	ı in haalthe		tious	
3-1	JLO-1	Historical evolution Nanoscale dimensions and paradi			Emulsification		20						ion and sp	-			Nanotechnology				
S-2 S	SL0-1	Characteristics of nanostructures	Biological Methods		Methods of	_		tion				spectrosc		оспозсору			Nanopharma		Jilous uista.		
3-2	JLU-1	Properties of nanomaterials	Greenery synthesis		Nanomateria		_					ctroscopy	upy				Nanopharma				
S-3 S	SL0-1	Types of nanomaterials and their classifications	Chemical methods	4 T) N	Inert gas co			C3			_	Light Scat	orina	7		•	Diagnosis, sens				
3-3	JLU-I	Types of flationalerials and their classifications	Chemical methods Chemical synthesis	HH.	Inert gas co			Ð	- 1				and Zeta i	notential			Biosensors	2012			
S4-6 S	SLO-1	General safety instruction for nanomaterials synthesi		spectroscopy	Microwave :			nanopartic	les				of nanopar		sis	7	Application of	synthesized	nanoparticle	±S	
S-7 S	SLO-1 1D, 2D Nanoparticle Top-down approaches				Arc dischard	e method					X-Ray Di	ffraction					Nanoparticles a	as a drug D	elivery vehi	cles	
	3D Nanocrystal Top-down approaches				Arc discharg						X-Ray Di						Nanoparticles a				
S-8 S	SLO-1 Quantum Well Bottom-up approaches				Plasma arc	technique					SEM and						Biomedical app				
	Quantum dot Bottom-up approaches				Laser ablati						SEM and	EDAX					Biomedical app		nanomateri	als	
S-9 S	SLO-1	30			Chemical vapor deposition				TEM							Multimodal nanoparticles					
S-10-12 S	SLO-1	Carbon based nanostructures Synthesis of nanoparticles using chemical reducing age	Particle aggregation Synthesis of nanoparticles by sol-gel method			cal vapor deposition esis of magnetic nanoparticles				TEM Synthesis of ZnO nanoparticles by simple approach						Targeted drug delivery Application of synthesized nanoparticles					

S-13	SL0-1	Graphene and Graphene oxides	Growth and stabilization	Ion beam sputtering	Scanning tunneling microscopy	Nanobased Agri and Food Products
		Semiconductor nanomaterials	Self-assembly Self-assembly	Ion beam sputtering	Scanning tunneling microscopy	Nanocomposites for food packaging
S-14	SL0-1	Metal nanoparticles	Structure property relationship	Molecular beam epitaxy	Scanning (optical) probe microscopy	Nanopesticides and Nanofertilizers
		Metal oxide-based nanomaterials	Structure property relationship	Molecular beam epitaxy	Scanning (optical) probe microscopy	Nanopesticides and Nanofertilizers
S-15	SLO-2	Bionanomaterials	Luminescent quantum dots for biological labeling	Ball milling	Atomic force microscopy and molecular pulling	Nanotechnology for environment: contamination detection
		Polymeric materials	Nanoparticle molecular labels	Electrodeposition	Atomic force microscopy and molecular pulling	Nano remediation and applications
16-18	SLO-1	Synthesis of CuO nanoparticles by Co-precipitation method	Characterization of nanoparticles by UV-vis spectroscopy	Green synthesis of nanoparticles	Characterization of synthesized nanoparticles(either XRD or EDAX	Repeat/modal practical

Bionanotechnology: Lessons from Nature Author: David S. Goodsell Publisher: Wiley- Liss ISBN: 047141719X.

Learning Resources

C. A. Mirkin, C. M. Niemeyer, Eds., More concepts and applications (Wiley-VCH, Weinheim, 2007), Nanobiotechnology.

Nanobiotechnology: Concepts, Applications and Perspectives, Christof M.Niemeyer (Editor), Chad A. Mirkin (Editor)

Springer Handbook of Nanotechnology: BBhusan

Bio-Nanotechnology: A Revolution in Food, Biomedical and Health Sciences Debasis Bagchi (Editor), Manashi Bagchi, Hiroyoshi Moriyama, Fereidoon Shahidi

Learning Ass	sessment			77.45.762	200 47		and the second					
_			Final Examina	tion(50%								
	Bloom's Levelof	CLA - 1 (1	0%)	CLA - 2 (1	0%)	CLA - 3 (2	20%)	CLA - 4 (10%)#		weightage)		
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
	Understand		100	T 4 1 2 2		11.4						
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
	Analyze			المراج المشاكم		1. (4)						
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Create											
	Total		100 %		100 %		100 %		100 %	1	00 %	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai i	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens	Dr. PARTHIPAN.P, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR
ů i	College, Chennai.	Dr. S. Thanigaivel, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

	Course Code ULT23AE2J Course Name Applied Tamil – II							Cour Categ		A	AE	Abili	ty En	hance	ement	t Cou	ırses	(AE)				1	T 0	P 2	2	2 2
Pr	e-reauisi	te Courses Nil		-	Co-	requisite Courses Nil				Pro	aressiv	e Cour	ses		Nil											
		ing Department		Tamil			ook / Codes/Standard	ls						٥,			Nil									
Cour	se Learni	ing Rationale (CLR	R):	The purp	oose of learning this	course is to:			Le	earnir	ng		Ì			Prog	ram L	.earn	ing O	utco	mes (PLO)				
CL	R-2: ઉ	நர்காணல் செய்யும	ம் திறனு	<mark>ம் செ</mark> ய்		ளையும் தெரியச் செய்தல்			1	2	3	1 o	2	3	4	5	6	7	8	9	10	11	12	13	14	15
						தம் முறையையும் அறியச் ெ	ிச ய்த ல்	-48	Sloor	cy (%	nt (%	ledg	cepts		dge	ion			Data		cills	IIIS				
					ரப் புரியச் செய்தல் வேறு நுட்பங்	களைத் தெரியச் (செய்தல்	S. /	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret [Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills		21	
	Course Learning Outcomes (CLO): At the end of this course, learners will be able to:												Link w				Skills i						PS0 -1	PS0 -2	PS0-3	
					த் துறையைத் தெற்			11.12	2	75	60	Н	L	Н	M	Н	Н	L	M	Н	М	L	Н	-	-	-
					ாடு செயல்படும் தி	றன பெறுதல க்கை தயாரிக்கும் நுட்பங்க			2	80 70	70 65	H	M	H	M	M H	H	L M	H	M	H	H M	H	-	-	_
CL	0-4: E	பல்வேறு வடி நெந்த மே தமிழைக் கல	டிவங்க டப் பே ணினி	<mark>க</mark> ளை பச்சா l வழி	க் கொண்ட எராக உரு , இணையம் வழி	பேச்சுக்கலையை பாகும் தகுதியைட் கொண்டுசேர்க்குட	அறிவதன்வழி பெறுதல்	<u> </u>	2	70	70	Н	M	Н	L	Н	M	M	Н	Н		H H	Н	-	-	-
02	6	<u> செயல்பாடு</u> ச	களை	அறி	ந்துகொள்ளு	தல்				00	70	L"	107	بزا		101			141	,,	_	,,	''			
	uration (hour)			9		9	9					9		7				П	7		9)				
0.4	SLO-1	தமிழில் அகராதி	நிகள்			நேர்காணல் அறிமுகம்	விமர்சனம் – அறிபு	ழக ம்	பேச்	சுக்க	ທ _ິ					\rightarrow	கணி	னித்த	தமிழ்							
S-1	SLO-2	ஒரு மொழி/ இரு	ருமொழி) அகராஜ	6	ஆளுமைத்திறன்	விமர்சனத்தின் நோ	ாக்கம்	பேச்	சின் .	அடிப்ப	டைகள	ir .		7		கணி	னி வ	பழித் :	தட்ட	ச்சு					
C 2	SL0-1	பன்மொழி அகர	ராதி			நோக்கம் – கண்டறிதல்	விமர்சன வகைகள்		தன்	னம்பி	க்கையு	ம் பேச்	சும்				தட்ட	_ச்சு (செய்ய	ும் ெ	மன்	பாரு	5ட்கள்	T		
S-2	SLO-2	0-2 உயிரி மெய் எழுத்துகள் நேர்காணல் முறைகள் இலக்கிய விமர்சனம்					ாம்	பேச்	சின் ச	வகைக	ள்	7			H	எழுத	ந்துரு	க்கள்								
C 2	SLO-1	உயிர்மெய் எழு	உயிர்மெய் எழுத்துகள் இனிய சொற்கள் பய <mark>ன்பாடு</mark> இனிய சொற்கள்					மே	டைப்	பேச்சு		. *				யூனி	கோ(டு எபு	ழத்து (ருக்கவ	ள்/ பிற	ற எழு	த்துரு	க்கள்		
S-3	SLO-2	அகராதிக்கான அ	அடிப்பன	டைகள்		நேர்காணல் வகைகள் கலை விமர்சனம் ப			பட்ப	4 மன்	றப் டே	ı <i>ச்சு</i>					குரல் வழி தட்டச்சு									
S-4	SLO-1	அகராதி உருவா	க்கப் பயி	ிற்சி		நேரடியாக வினா விடை	விமர்சகர் தகுதிகள்		சொ	ற்பெ	ாழிவு மு	ழறை					எழுத	த்து வ	பழி த	ட்டச்	æ,					
3-4	SLO-2	அகராதி உருவா	க்கப் பயி	ிற்சி		அச்சு ஊடக நேர்காணல்	தேர்ந்த புலமை		பேச்	சின் பூ	நட்பங்	கள்					தட்ட	_ச்சு (செய்ய	ும் ப	யிற்சி					

6.5	SLO-1	கலைச்சொல் அறிமுகம்	காட்சி ஊடக நேர்காணல்	எழுத்துவடிவ விமர்சனம்	பேச்சாளர்களும் பேசும் மு <mark>றைகளும்</mark>	தட்டச்சு செய்யும் பயிற்சி
S-5	SLO-2	பிறமொழிச் சொற்களும் தமிழி <mark>ல் கலைச்</mark> சொற்களும்	கேட்பு ஊடக நேர்காணல்	காட்சி வடிவ விமர்சனம்	பேச்சு - எடுத்துரைப்பும் உடல்மொ <mark>ழியும்</mark>	<mark>பிழை</mark> இருத்திகள்
S-6	SL0-1	கலைச்சொல்லாக்க நெறி <mark>முறைகள்</mark>	கள ஆய்வில் நேர்காணல்	விமர்சனம் செய்யும் பயிற்சி	நவீன தொழில்நுட்பங்களில் பேச்சு முறைகள்	தமிழில் பிழை இருத்தம் செய்யும் மென்பொருட்கள்
3-0	SLO-2	கலைச்சொல் உருவாக் <mark>க உ</mark> த் <mark>திகள்</mark>	நேர்காணல் செய்யும் பயிற்சி	விமர்சனம் செய்யும் பயிற்சி	பேச்சாளர்க்குரிய தகுதிகள்	<mark>வலைப்பூ உ</mark> ருவாக்கம்
S-7	SL0-1	துறைசார் சொற்கள்	நேர்காணல் செய்யும் பயிற்சி	செய்தியறிக்கை	பேச்சுப் பயிற்சி	வ <mark>லைப்பூவில்</mark> எழுதும் முறைகள்
3-1	SLO-2	புதிய கண்டுபிடிப் <mark>புகளும் க</mark> லைச்சொற்களும்	செய்தி வாசிப்பு முறைகள்	சமூக நிகழ்வை எழுதுதல்	பேச்சுப் பயிற்சி	வலை <mark>ப்பூவின்</mark> பயன்கள்
S-8	SL0-1	பயன்பாட்டுச் ச <mark>ொற்கள்</mark>		செய்தியாளர்க்குரிய தகுதிகள்	கலந்துரையாடலின் நோக்கம்	தமிழ் <mark>இணைய நூ</mark> லகங்கள்
3-0	SLO-2	கலைச்சொல்ல <mark>ாக்கப் பயன்</mark> பாடுகள்	உச்சரித்தல்	உற்றுநோக்குதல்	கலந்துரையாடலின் தனித்தன்மைகள்	இணை <mark>ய நூலகப்</mark> பயன்பாடுகள்
S-9	SL0-1	கலைச்சொல் உ <mark>ருவாக்கப்</mark> பயிற்சி	பிழையின்றி வாசித்தல்	சமநிலையில் எழுதுதல்	தம் கருத்தைத் தெளிவாக உரைத்தல்	தமிழ்த் <mark>தொடரடை</mark> வுகள்
3-9	SLO-2	கலைச்சொல் உ <mark>ருவாக்கப்</mark> பயிற்சி	வாசித்தலும் உணர்வும்	செய்தியறிக்கை தயாரித்தல்	கலந்துரையாடல் பயிற்சி	தொடர <mark>டைவின் ப</mark> யன்பாடுகள்

Learning	
Resources	

- 1. <mark>அகராதியி</mark>யல், பெ. மாதையன், தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர், 1997.
- 2. <mark>பேச்சுக்கல</mark>ை, ம. திருமலை, மீனாட்சி புத்தக நிலையம், மயூராவளாகம், மதுரை, 2009.
- 3. பேச்சாளராக, அ.கி.பரந்தாமனார், பாரி நிலையம், சென்னை, 1961

- **4.** இணையத் தமிழ், சந்திரிகா சுப்பிரமணியன், சந்<mark>திரோதயம்</mark> பதிப்பகம், மதுரை, 2020.
- 5. நேர்காணல், மின்னூலகம், தமிழ் இணையக் கல்<mark>விக் கழக</mark>ம், <u>https://www.tamilvu.org/</u>

Learning I	Assessment						17/17/2			40	
	Discourte			Continuou	s Learning As	sessment (5	0% weightage)		Final Examinati	on (E00/ weightege)
	Bloom's	CLA -	- 1 (10%)	CLA -	2 (10%)	CLA -	3 (20%)	CLA -	4 (10%)#	Filial Examinati	on (50% weightage)
	Level of Thinking		Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Lovel 1	Remember	30%	30%	30%	30%	20%	20%	20%	20%	30%	
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-
Level 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%	
Level 2	Analyze	4076	30%	3076	4070	3076	3076	30%	3076	30%	-
Level 3	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%	
Level 3	Create	3070	2070	2070	3070	3070	3070	3070	3076	20%	-
	Total	10	00 %	10	00 %	10	0 %	1	00 %	1	00 %

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
1. Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanmiyur, Chennai – 600 041.	Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, Pondicherry University, Pondicherry	1. Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR
ASI	ASSESSED.	 Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST VDP.
		3. Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
		4. Dr. T.R.Hebzibah beulah Suganthi, Assistant Professor, Dept. of Tamil,
		FSH, SRMIST, KTR.
		5. Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.



Code	ULH	H23AE2J Course Name			ourse tegory	AE	À		Abili	ty Enhar	cement	Courses	s (AE)		1	T 0	2 2	0 C 2 2	
	requisite Courses	Nil	Co-requisiteCourses	Nil			Progress			2				Nil					
Co	urse Offering	Department	HINDI	Data Book / Codes/S	Standards	tandards Nil													
Cour	se Learning R	ationale (CLR):	The purpose of learning this cour	rse is to:		Learni	ng			4	<u> </u>		Progra	m Learni	ng Outo	comes (F	PLO)		
CLR-1:	To find and a	nalyze different types of Cinema			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	To Discover to	he print Media in <mark>the present W</mark> orld		25. 型的位		100	1000												+
CLR-3:	Writing report	for Employability				1.45													
CLR-4:	Writing Revie	ws and Create <mark>Job Oriented</mark> learning		10 1 1 W.	100	>			cepts		ge	uo			ata		S	<u>s</u>	
CLR-5:	To Acquire te	echnical words <mark>for various j</mark> ob Prospects		DEAD TO LANGE	- Bu	cienc	nmen	40.43	Concepts	99	owlec	alizati	a)	gu.	oret D	S S S S	ng Sk) Skii	S
			10.00	Br. Str. Car	hinki	Profi	Attai	ental	n of	Relat	a Z	pecia	Utilize	Jodel	Interp	ive S	Solvir	cation	S
Course L	earning Out	comes (CLO): At the end of this c	course, learners will be able to:		evel of Thinking	Expected Proficiency	Expected Attainment	Fundamental	Application of	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills
CLO-1:	To Understan	nd the History <mark>and Docume</mark> ntary in Hindi Ci	inema .	111 9 4	2	75	80	H	H	Н	М	L	H	L	M	L	L	Н	M
CLO-2:	To Comprehe	end Media Stu <mark>dies</mark>		27, 27th May 1	2	80	90	Н	Н	Н	М	L	Н	Н	М	L	L	Н	М
CLO-3:	To Evaluate r		44.7 10		2	75	95	Н	Н	М	L	Н	Н	М	Н	М	М	Н	Н
CLO-4:		r Writing Skills i <mark>n Media Studi</mark> es	2 7 14		2	80	90	Н	Н	L	Н	М	Н	L	Н	Н	М	Н	Н
CLO-5:	To Understan	nd and usage of <mark>technical word</mark> s in Hindi			2	85	90	М	Н	М	Н	L	Н	Н	L	Н	М	Н	Н
Duration	/hour\	9			9					9	٠		1			q			
Duration	SLO-1	HINDI CINEMA	MEDIA AUR HINDI BHASHA	REPORTAR.	,	<u>'</u>		FILM	REVIEWS	VIGYAP	AN		PARIE	BHASHIK	SHARD				
S-1	SLO-1	CINEMA KI AVDHARNA	AVDHARNA	AVDHARN				ARTH					RTH						
		UDBHAV	SWARUP	SWARUP					HASHA	-				HASHA					
S-2	SLO-1			DDESHYA	77.7			SWAR			-		WAR						
S-3	SLO-2 VIKASH MAHATVA DIL DOCUMENTRI MOVE KI MEDIA MEN BHASHA KAPRAYOG AI					ľ	-11		DHARNA		1		RAKA						
	SLO-2 COMERCIAL MOVE KI AVDHARNA UTTARDAYITVA R					PRATII	RUCHI	FILM I	REVIEW	KA MAHA	ITTVA	7	VADH	IARNA				-	-
	SL0-1	PRAYOJAN	PRINT MEDIA	REPORTAJ	KI BHUMIKA			VIGYA	IPAN <mark>AU</mark> I	R BAZAR			RAYOJAN						
S-4	SLO-2 UDDESHTA ELECTRONIC MEDIA PRA				V			VIGYAPAN AUR ROZGAR					DDESHYA						
S-5	MANATIA MEDIA W. WASDADI							PRINT	VIGYAP	AN			AHA1	TVA					
0.0	SLO-1	PRAKAR	SMACHAR LEKHAN	UTTARDA	YITVA	VIGYAPAN KI BHASHA					RAYOG								
	SLO-2	PRISHTHBHUMI	REPORTER KE GUN	RIPOTARJ L	LEKHAN			AWAL	DHARNA	1			DDES	SHYA				-	-

S-6	SLO-2	KARYASHALA	SAHAJTA	PUNRIKSHAN	ARTH	AKANIKI SHABDAVALI KA MHATVA
0.7	SL0-1	DOCUMENTRY KI VIDHI	NISPAKSHTA	LEKHAN VIDHI	PARIBHASHA	HINDI SE ANGREZI SHABD
S-7	SLO-2	DOCUMENTRY AUR COMERCIALMOVE MEN ANTAR	PEET PATRAKARITA	SAMAJIK DAYRA	SWARUP	ANGREZI SE HINDI SHABD
	SL0-1	COMERCIAL KI VIDHI	UTTARDAYITVA	SAHITYA ME RIPOTARJ LEKHAN	VIGYAPAN KE PRAKAR	EK DIN EK SHABD
S-8	SLO-2	MOVE VISLESHAN	BHASHA GYAN	PARIYOJNA KARYA	VIGYAPAN KI VISHESHTAYEN	SHABDON KA VISLESHAN
	SLO-1	PARICHARCHA	PARICHARCHA	PARICHARCHA	VIGYAPAN MANG	PATH PRICHARCHA
S-9	SLO-2	PRASHNABHY <mark>ASH</mark>	PRASHNABHYASH	PRASHNABHYASH	VIGYAPAN KA PRABHAV	PRASHNABHAYASH

	Edited Boo	k: "Pr <mark>ayojan mul</mark> ok hindi", srijonlok publication, 2023, New Delhi.	3.	https://epustakalay.com/book/4858-hindi-patrakarita-by-dr-krishnbihari-mishra/
	1.	Film Banti Hai aur Banati Bhi hai, Lekhika – Sonal, Neolit Publication	4.	https://hindisamay.com/
Learning Resources	2.	https://navbharattimes.indiatimes.com/entertainment/movie-review/articlelist/2325387.cms?curpg=3	5.	https://rajbhasha.gov.in/hi/hindi-vocabulary

	Bloom's			Continuous Lea	rning Assessment	(50% weightage)		100	100	Final Evamination	(E00/ woightago)		
		CLA - 1	(10%)	CLA – 2 (10%)		CLA - 3 (20%)		CLA – 4	(10%)#	Final Exa <mark>mination (50%</mark> weightage)			
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
Loual 1	Remember	30%	30%	30%	30%	20%	200/	200/	20%	30%			
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-		
evel 2	Apply	40%	50%	50%	40%	50%	50%	50%	50%	50%			
evel 2	Analyze	40%	30%	30%	40%	30%	30%	30%	30%	30%	-		
ovol 2	Evaluate	30%	20%	20%	30%	30%	30%	30%	30%	20%			
evel 3	Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-		
	Total		100 %	1	00 %	1.17	100 %		100 %		100 %		

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Shri. Santosh Kumar Editor : Srijanlok Magazine Place: Vashishth Nagar, Ara – 802301	1. Prof. (Dr.) S.Narayan Raju, Head, Department of Hindi, CUTN, Tamilnadu	1. Dr.S Preeti. Associate Professor & Head, SRMIST
3 ·		2. Dr. Md.S. Islam Assistant Professor, SRMIST
		3.Dr. S. Razia Begum, Assistant Professor, SRM IST
		4, Dr.Nisha Murlidharan Assistant Professor, VDP, SRM IST

Course Code	ULF	Course Name	French for S	Specific purpose-II	_	ourse tegory	AE	1		Abili	y Enhan	cement	Courses	s (AE)		1	T 0	P (0 C 2 2		
	e-requisite Courses	Nil	Co-requisiteCourses	Nil			Progress		1	2				Nil							
C	ourse Offering	Department	French	Data Book / Codes/Standa	rds							Nil									
Cour	se Learning F	Rationale (CLR):	The purpose of learning this cours	se is to:		Learnin	g			₹.	À		Progra	m Learni	ng Outc	omes (F	PLO)				
CLR-1:	Strengthen th	ne language of the students both in o	ral and written		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12		
CLR-2:	Express their	r sentiments, emotions and opinions,	reacting to information, situations			-70													+		
CLR-3:		earn the basic rules of French Gramn	0	The Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract o		100															
CLR-4:		tegies of comprehension of texts of d			evel of Thinking (Bloom)	(%)	(%)	age	ts		(1)				co.						
	ILR-5: Enable the students to overcome the fear of speaking a foreign language and take position as a foreignerspeaking French						ent (wlec	ncep		edge	ation			Dat	S	Skills	Kills			
CLR-5:	LR-5: Enable the students to overcome the fear of speaking a foreign language and take position as a foreignerspeaking French						ainm	Kno	ပိ	ated	Mou	cializ	Ze	eling	rpre	E	/ing	S uo	S∭		
							Expected Attainment	Fundamental Knowledge	Application of Concepts	Link with Related	Procedural Knowledge	Skills in Specialization	Ability to Utilize	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills		
Course I	course Learning Outcomes (CLO): At the end of this course, learners will be able to:						ectec	dam	licati	With	npə	Sin	ty to	Sin	lyze,	stige	olem	Juni	lytics		
Oourse L	Course Learning Outcomes (CLO): At the end of this course, learners will be able to:					Expected Proficiency (%)	Exp	æ	Арр	Link	Proc	S	Abill		Ana	Inve	Pro	Con	Ana		
CLO-1:	o enable the	students to overcome the fear of spe	eaking a foreign language and take position as a fo	reignerspeaking French	2	75	80	Н	М	Н	Н	М	Н	Н	1	М	М	Н	1		
CLO-2 :	To strenathe	n the knowled <mark>ae on concep</mark> t, culture.	civilization and translation of French		2	80	90	M	Н	L	Н	Н	M	Н	M	L	L	Н	M		
CLO-3:		content using th <mark>e features in</mark> French l			2	75	80	Н	Н	1	М	Н	М	1	Н	М	М	Н	Н		
CLO-3 :		the French language into other language			2	75	90	Н	1	M	Н	М	Н	Н	M	1	Н	M	+		
			ů .	· · · · · · · · · · · · · · · · · · ·					L		П					L	П		L		
CLO-5:	To Improve t	the communication <mark>, intercultural</mark> elem	ents in French language	1.00	2	80	75	М	Н	Н	L	М	М	Н	Н	М	L	Н	М		
Dl'	/t					•		1													
Duration	(hour) SLO-1	TOEIC 9	Les quantificateurs	Les préposit	Unna da	9		1	bes irréa	9						9					
S-1	SL0-1	Qu'est-ce que c'est/	le génitif	Les preposi		lieu		le futu		ullers				negation nterrogat	ion						
3-1	SL0-2	À qui est-il destiné?	Les adjectifs	Les préposit		temns -			itionnel	-				s activités							
S-2	SLO-2	Les compétences évaluées	et pronoms possessifs	Les activités		temps		les mo			-			xclamati							
0.2	SLO-1	Le nom	les pronoms	les temps et		т	-		gestion					s activités	-						
S-3	SLO-2	Le pluriel des noms	Les pronoms personnels	Les activités				le cons						emphase							
S-4	SLO-1	Les indénombrables	les pronoms compléments	les aspects-				Les ex	emples					s exempl							
	SLO-2 Les noms composés Les activités Les activités							le repr	oche				Le	s activités	S						
	SLO-1 L'adjectif pronoms réfléchis Le prése							Les ac	ivités					mpératif	'		-				
S-5	20 4011100				5			L'oblig	ation				Le	Les activités							
S-6	S-6 SLO-1 les superlatifs les adverbes Le prése				oe+ing			la permission					la	la voix passive							
SLO-2 les articles définis (the) Les activités Les activités				S			l'interd	liction				Les exemples									
	SLO-1 les articles indéfinis (a, an) La place de l'adverbe dans la phrase Les exem							La capacité les subordonnées relatives													
S-7	SLO-2	Les exemples	Les activités	Le prétérit si	imple - L	e prétéritl	e+ V-ing	l'incap	acité				Le	s activités	S						
							Les exemples les verbes à particule Les subordonnées circonsta					stancielles									

S-8	SLO-2	Les exemples	Les activités	- Le présent perfect be+ing	les verbes suivis de V-ing	Les activités
0	SLO-1	pronoms possessifs (this et that)	les prépositions-	Le past perfect simple -	d'un infinitif avec sans to	A ne pas confondre
S-9	SLO-2	Les activités	Les exemples	Le past perfect be + ving -	Les exemples	Les activités

	Theory:	3.	https://www.elearningfrench.com/learn-french-grammar-online-free.html
	1. "Réussir le noueau TOEIC" Détails des épreuves, méthodologie, grammaire, et vocabulaire, Studyrama.	4.	https://www.lawlessfrench.com/grammar
Learning Resources	2. https://www.fluentu.com/blog/french/french-grammar	5.	https://blog.gymglish.com/2022/12/15/basic-fren <mark>ch-gramma</mark> r

	Learning Assess	ment				11,30			M				
	Dia amatal aval of		Co	ontinuous Learr	ning Assessment	Final Examination (F00/ w	oightogo)						
	Bloom'sLevel of	CLA – 1 (10%)		CLA - 2 (10%)		CLA - 3	CLA - 3 (20%)		4 (5%)#	Final Examination (50% w	Final Examination (50% weightage)		
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
	Remember	200/	200/	200/	200/	2007	200/	200/	200/	200/			
Level 1	Understand	30%	30%	30%	30%	20%	20%	20%	20%	30%	-		
	Apply	400/	F00/	F00/	400/	F00/	F00/	F00/	F00/	F00/			
evel 2	Analyze	40%	50%	50%	40%	50%	50%	50%	50%	50%	-		
	Evaluate	200/	2007	200/	2007	200/	200/	200/	200/	200/			
evel 3	Create	30%	20%	20%	30%	30%	30%	30%	30%	20%	-		
	Total	1	100 %	14 77 4	100 %		00 %		100 %	100	%		

[#] CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Experts from Industry	Expert from Higher Technical Institutions	Internal Experts
Mr. Kavaskar DanasegaraneProcess Expert Maersk Global Service Center Pvt. Ltd	1. Dr. C.Thirumurugan Professor, Department ofFrench, Pondicherry University	1. Mr. Kumaravel K. Assista <mark>nt Professor &</mark> Head, SRMIST, KTR
2.Mr. Sharath Raam Prasad Character Designer, Animaker Company Pvt.		2. Mrs. Abigail, Assistant Professor, SRMIST, VDP
	LEARN · LEAP · LEA	D

Cou		UBT23G	G02T	Course Name	DEVELOPMENTAL BIO	DLOGY	d		Cours		D			Disc	cipline Spe	ecific Elec	tive	L 4	T 0	P 0) C
(-requisite Courses	Nil	Co-requ Biotechnology	isite Courses Nil Data Book / Codes/Sta	andards	Progressive Courses Nil														
	Course Learning Rationale (CLR): The purpose of learning this course is to: Learning Program Learning Outcomes (PLO)																				
CLR-1	. Introd	luction to developmental biolo	oav concepts			1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-1	•	rstanding of Gametogenesis,		early development		JH-		J		'		J	4	3	U	<u> </u>	0	7	10	- 11	12
CLR-3		knowledge on Early Embryor		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		7 17 34	4.77						-		ex IS	independent and lifelong learning					
CLR-4	•	knowledge on Late Embryon				(mo	(%)	(%)		edge	Data	Ιţ	es		ompl I idea	and li					
CLR-5	•	rstanding of Morphogenesis	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	is in plants		1 (8)	ency	neut		(now	pret	g abil	actic	Work	n of c	endent a	PS0 - 1	PS0 - 2) - 3	PS0-4	PS0-5
OLIK-3	•	3 1 3	3 3		THE RESERVE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE	J Ę	rofici	ttainr		ıtal	Inter	Reasoning ability	Ethical Practices	Team Work	cation	penc	PS(PS(PS0 -	PS	PS
Cours	o I oarnii	ng Outcomes			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reas	Ethi		Communication of complex biotechnological ideas	inde					
(CLO)		ng Outcomes	<mark>At the</mark> end of th	nis course, learners will b	e able to:	evel	xbec	xbec	100	Func	Anã				Com						
CLO-1		candidates will have w <mark>ide co</mark> n	n <mark>ceptu</mark> al knowing	of developmental biology		1	75	70		Н				L		Н					
CLO-2		candidates will unders <mark>tand d</mark> e	e <mark>velop</mark> ment of gar	netes and its fertilization		1	75	70	77	Н	М	М	Н	L							
CLO-3		candidate will know th <mark>e conce</mark>	e <mark>pts o</mark> f early emb	ryonic development	NOTE OF BUILDING	" H1"	75	70		Н			Н								
CLO-4	: The o	candidate will know the <mark>conce</mark>	e <mark>pts of</mark> late embry	ronic development		1	75	70	4	Н		М									
CLO-5	: The o	candidates will understa <mark>nd th</mark> e	<mark>e import</mark> ance of a	levelopment in plants		1	75	70		Н			М			Н					
				E-1	Landan B. A. Salaman																
Duration		12	D	12	12				to to	12				0				12			
S-1 S-2	SLO-1 SLO-1	concepts of development Potency, Commitment		duction of gametes I surface molecules in sperm-e	Gametogenesis Spermatogenesis and oogenesis w.r.t.			n of embr of human							rganization rganization						
3-2	SLU-1	Potency, Communicine		ognition in animals	mammals		UIIIIallUII	ui iluillali	piaceilla	ı				U	ryanizalion	UI SHOOL A	iiu iuul a	ipicai III	CHSICIII		
S-3	SLO-1	Specification, Induction		bryo sac development	vitellogenesis in birds			of human				~		S	hoot develo	pment					
S-4	SLO-1	Competence, Determination	n Dou	ıble fertilization in plants	Fertilization: external (amphibians),internal (mammals	of	ther types	of placer	nta on the	e basis (of histolo	gy		ro	ot develop	ment					
S-5	SLO-1	Differentiation, Morphogene gradients	etic Zyg	ote formation	blocks to polyspermy	e	pithelioch	orial type				200		Le	eaf develop	ment and					
S-6	SLO-1	Cell fate and cell lineages		avage	Early development of frog and humans (structure of mature egg and its membranes	e	ndothelio	chorial typ	е	N	IJ	1	6	P	hyllotaxy						
S-7	SLO-1	Genomic equivalence and cytoplasmic determinants	the Blas	stula formation, Embryonicfield		hemochorial type Transition to flowering															
S-8	SLO-1	Genomic equivalence and cytoplasmic determinants		strulation mation of germ lay <mark>ers inanim</mark> a	fate map	Metamorphic events in frog life cycle- Introduction Floral meristems															
S-9	SLO-1	Imprinting	Em	bryogenesis	types of morphogenetic movements	S	tages of I	fe cycle						FI	oral develo	pment- Ara	ment- Arabidopsis				

S-10	SLO-1	Imprinting	Establishment of symmetry inplants	types of morphogenetic movements	hormonal regulation	Floral development- Antirrhinum.
S-11	SLO-1	Mutants	Seed formation	Fate of germ layers	Differentiation of neurons	Programmed cell death, aging
S-12		Transgenics in analysis of development	Germination	Neurulation in frog embryo	Sex determination	Senescence

Learning Resources	1. 2. 3.	Biochemistry and <mark>Molecular Bio</mark> logy of Plants BY <u>Bob B. Buchanan</u> Prescott's M <mark>icrobiology 11th Edition</mark> Human Embryology and Developmental Biology, 6th Edition by Bruce M. Carlson	

Learning As	sessment				11111111111	Mark to the first	Station				
	Bloom's			C			Final Examination	(50% weightage)			
	Level of	CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3	(20%)	CLA – 4	(10%)#		. 3 37
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
_evel 1	Remember	40%		40%	10 1 a 10	40%		40%		40%	-
Level 2	Understand	40%		40%	100	40%		40%		40%	-
Level 3	Apply	20%		20%	2017	20%	V 005-0	20%		20%	-
Level 4	Analyze	-		7.75	100	7.5	E., S. 24, Y.	CO - 1			-
Level 5	Evaluate	-				9 - 1		100	-	-	-
Level 6	Create		-			the Contract of			-	-	-
	Total	100 % 100 % 100 %				100 %					

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr .N. Banu, Professor, Bharathi Women's College (Autonomous), Chennai	Dr. N. Prasanth Bhatt, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR



Course Code		UBT23S02T	Course Name	entrepreneurship in	BIOTECHNOLOGY		Course itegory	S	Ω	Z.		Skil	Skill Enhancement Cour				L			0 C 2 2
	quisiteC		Nil	Co-requisiteCourses	Nil	hu,		Progressiv Courses			2				Nil					
Cou	ırse Offe	ring Department		Biotechnology	Data Book / Codes/Star	ndards						Nil								
Cours	se Learn	ing Rationale (CLR):		The purpose of learning this course it	is to:	۲Ė	Learn	ing			Program Learning Outcomes (PLO)									
CLR-1:	Underst	and the scope and co	on <mark>cept of entre</mark> preneurship			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2 :	Underst	and the principles of	management			1														
CLR-3:	Knowle	dge on funding agenc	ies for startups and their re	oles	27 1. NO. 16	13			F					8						
CLR-4:	Knowle	dge on biotechnologic	al sectors for start ups	(moo	(%)	%	egge	Data				omple	and lifelong							
CLR-5:								ment	owle	et Da	>			of CC	d life					
					TOTAL TELE	Thinking (Bloom)	rofic	ıttain	a K	terpr	apilit	ctice		ation	an tr					
Course Learning Outcomes (CLO): At the end of this course, learners will be able to:						Level of Th	Expected Proficiency (%)	27 Expected Attainment (%)	Fundamental Knowledge	Analyze, Interpret	Reasoning ability	Ethical Practices	Team Work	Communication of complex	ndependent and lifeld earning	PS0-1	PS0-2	PS0-3	PS0-4	PSO-5
CLO-1:	To unde	erstand and develop e	entrepreneurial traits		Carlos March	2	80	75	Н	1	L	- 7	М	L	L	-	-	-	M	1-
CLO-2 :	To deve	elop sales and market	ing skills	1 S 1 VAL		2	85	80	Н	-	L	- 1	М	L	L	-	-	-	Н	-
CLO-3:	Apply k	nowledge to identify s	tart up ideas			3	75	70	-	Н	М		М	Н	Н	-	-	-	Н	-
CLO-4:	Gain kn	owledge on modern b	o <mark>iotechnologic</mark> al sectors for	start ups	1//	2	85	80	Н	М	М	-	L	Н	Н	-	-	-	Н	L
CLO-5:	Apply k	nowledge to create ar	nd <mark>run a start u</mark> p		/15	3	75	70	-	Н	Н	١	Н	Н	M	-	-	-	Н	L
		Learning L	Init / Module 1	Learning Unit / Module 2	Learnin	ng Unit / Mo	dule 3			Learr	nina Unit	Module -	4			Learni	na Unit	/ Module	. 5	
Duration (ho	our)		6	6		6					3 -	6						6		
		Entrepreneurship – C		Management principles	Funding agencies		OS					and nutri	tion				g design	ing		
		Entrepreneurship – S		Management principles	Funding agencies						vation, po	olyhouse				compa				
		Entrepreneurial traits Creativity	1	Functions of a manager Concept of sales	Funding agencies		ctart un	r .		arming	-					stic labs researd				
		Innovation		Concept of sales Concept of marketing		Governmental institutions for start ups Apiculture Governmental institutions - types Organic formulation									olid, biod	128				
		Problem solving gam	ies	Product development	Governmental ins				Anima							compos		ona, bio	jus	
Learning Resources		2. "Er 3. "Ge	ntrepreneurship: New Vent etting started in Entreprene	rship: Starting, Managing, and Leading Biotech ure Creation", David H. Holt, Pearson Education urship", Jack M. Kaplan, John Wiley & Sons, 20 H. Koontz & H. Weihrich, 9th Edition, McGraw H	n, 2016. 201.	Academic F	Press, 20	14.												

	Bloom's Level of Thinking		Final Examination(50%									
Level		CLA - 1 (10%)		CLA – 2	CLA – 2 (10%)		(20%)	CLA - 4 (10%) #	weightage)		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
evel 1	Remember	40%	4 7 1 1	30%	K	40%	_	30%		40%	_	
LCVCII	Understand	1070		0070	4 3 4 57	1070		0070		1070		
evel 2	Apply	40%		40%	1, 40,000	40%		40%		40%	_	
	Analyze	1070		1070	E0035379 T			1070		1070		
evel 3	Evaluate	20%		30%	0.000	20%		30%		20%	_	
revei 2	Create	2070		3070	and the same	2070		3070		2070		
	Total		100 %	-1	00 %	100 %		10	00 %	100 %		

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. G. Swamynathan, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	UCD23V0	ST Course Name	Care	er Readiness and	d Professional Skills			C	ourse	Catego	ory	V	I		Value	Additio	on Cou	ırse		L 2	T I	P 0 0 2	C 2	
Pre-re	equisite Course	s Nil	Co-requisite (Courses	Nil			F	rogres	sive C	ourses	O	٠.				1	Vil						
Course (Offering Departr	nent C	areer Guidance Ce	ell	Data Book / Codes	/Standa	ards	٠,,					7											
	J 1		- A.N.			7.0							T											
Course Le	arning Rational	e (CLR): The pu	rpose of learning this	is course is to:		-		44	J L	Learn	ing		- 1	7.	Pro	gram L	<u>earnir</u>	ng Out	comes					
CLR-1: CLR-2:		ts to und <mark>erstand rea</mark> sonts for jo <mark>b intervie</mark> ws	oning skills and math	hematical concept	S	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CLR-3 :		ed que <mark>ry languag</mark> e (SC efits o <mark>f Python a</mark> s a sci		nte/advanced level		(moo	(%) /	(%) 1	appe	of viola	scipline	ge	<u></u>	wledge		ata		<u>S</u>	S			5		
CLR-5:		ng sk <mark>ills student</mark> s can i		ernships and make	e career changes	Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Annlication of Concents	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	odeling	Analyze, Interpret Data	ve Skills	Problem Solving Skills	Communication Skills	Skills		Professional Behavior	Learning	
Course Le	arning Outcom		e end of this course,	learners will be ab	ole to:	Level of	Expected		Fiindamer	Annlication	Link with F	Procedura	Skills in S	Ability to L	Skills in Modeling	Analyze, lı	Investigative Skills	Problem S	Communic	Analytical Skills	ICT Skills	Professior	Life Long Learning	
CLO-1:	Solve the prob	lem <mark>s on reaso</mark> ning		14 % - Wall	A de la secono de	3	80	75	H	N	1 -	-	-	М	-	Н	-	Н						
CLO-2:	Face interview			W. 17		3	80	75	4		М	-	М	-	-		L	-	- H H				Н	
CLO-3:	Understand the data integrity	e imp <mark>ortance and</mark> majo	or issues of databas	se security and the	maintenance of	3	75	70	H	N	-	М	Н	1	М	-	-	-	M - H				М	
CLO-4:		al prog <mark>ramming c</mark> omp eate sim <mark>ple progra</mark> ms	oonents including va	rariables, conditior	nal logic, loops, and	3	75	70	Н	-	М	М	- 1	Н		-		М	-	Н	-	Н	М	
CLO-5:		s in choo <mark>sing a care</mark> er	path during their co	ourse		3	75	70	-	N	1 M	-	Н	-	М	-	-	-	Н	-	-	Н	Н	
Durati	on /hour)	6			6		-		6				_	9-	,	_	_				,			
S-1	on (hour) SLO-1	Partnership 6		Self-Image and S		SO	I Intri	oductio	n to SQ	'		SQL -	loine		5			Cla	iss cod	ina hac	6			
3-1	SLO-1	Partnership related s	olvina problems	Etiquettes	Jen-i resemanon			ement C					inner j	nins _ I	oin Svr	ntav			iss cod			uiz sas	sion	
S-2	SLO-2	Cryptarithmetic	orving problems	Interview Skills -	Introduction				tabase:	:			ucing P		oiri Jyi	пил			derstar.					
_	SLO-2	Cryptarithmetic – sol	vina problems	Do's and Don'ts					& RDB				ucing P		Object 7	Types		_			ata Otr	uotui oc		
S-3	SLO-1	Ordering, Ranking	and production	Mock Interview -					Introdu		m		n - Data						Python for Data Python Data Types					
	SLO-2	Grouping		Mock Interview -			L data	-					n's Core						Overview of Python Data Type				:S	
S-4	SLO-1	Venn Diagrams conc	epts	Mock Interview -			L - Syn						uction to					Python Structures				71	-	
	SLO-2	Venn Diagrams solve		Mock Interview -					Syntax				se Fun					Overview of Python Data Stru				a Struc	tures	
S-5	SLO-1	Types of Paragraph		HR Round – Pra		SQ	L – Coi	mmana	s Introd	uction		Pytho	า – Fun	ctions i	basic			Python - Collections						
	SLO-2 Paragraph Forming Questions HR personal Interview –Mock-Session				erview –Mock-	SQ	L - DDI	L, DML	Comma	inds		Codir	g funct	ions				Improving Code readability						
S-6	SLO-1	Types of Sentences		Email Etiquettes		SQ	L - Sub	queries	3			Introd	uction to	o Class	es			Collection Module						
	SLO-2	Ordering of Sentence	es	Email Drafting -	Do's and Don'ts	Noi	n-corre	lated S	ubquerie	es		Why L	Ise Cla	sses?				Co.	llection	Modul	e in Py	thon		

Learning	1.	Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition	4.	Bhatnagar R P, English for Competitive Examinations, Trinity Press, 2016
Resources	2.	Dr. Agarwal.R.S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company	5.	C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth
		Limited, 2018 Edition		Edition, Pearson Education, 2006.
	3.	Edgar Thrope, Te <mark>st of Reasoni</mark> ng for Competitive Examinations, Tata McGraw Hill, 6th Edition	6.	Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and
				Programming", 1st Edition, BCS Learning & Development Limited, 2017.

Level	Bloom'sLevel of Thinking	1000 1000	Continuous Learning As	sessment (100% weightage)	
		CLA-1 (20%)	CLA-2 (20%)	CLA-3 (30%)	CLA-4 (30%)#
		Theory	Theory	Theory	Theory
Level 1	Remember	20%	10%	25%	25%
	Understand	Light and the first terms	A 15 15 15 15 15 15 15 15 15 15 15 15 15		
Level 2	Apply	50%	50%	50%	50%
	Analyze		1,000		
Level 3	Evaluate	30%	40%	25%	25%
	Create	1988	FREE TO SEE TO SEE		
	Total	100 %	100 %	100 %	100 %

CLA-1, CLA-2 and CLA-3 can be from any combination of these: Online Aptitude Tests, Classroom Activities, Case Studies, Poster Presentations, Power-point Presentations, Mini Talks, Group Discussions, Mock interviews, etc. # CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr. M. Ponmurugan, Executive PMOSS, Cognizant Technology	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita	Dr. Sathish K, HOD, Department of Caree <mark>r Guidance</mark> Cell, FSH, SRMIST
Solutions India Pvt. Limited, Chennai	Vishwa Vidhyapeedam, Coimbatore	Ms. Deepalakshmi S, Assistant Professo <mark>r, Departme</mark> nt of Career Guidance Cell, FSH,
		SRMIST



Pre-requisite Courses Nil Course Offering Department Data Book / Codes/Standards Nil Course Learning Rationale (CLR): The purpose of learning this course is to, Learning Program Learning Outcomes (PLO)	Course Code	UCD23P04L	Course Name	Internship	Report– II	Course Category	IAP	С	Z	ntern				hip / P reach	roject	/		<i>L</i> 0	T 0	<i>P</i> 8	<i>0 2</i>	<i>C</i>
CLR-1: Demonstrate skills learnt in the real time environment. CLR-2: Explore the different industries that are using IT CLR-3: Enhance the skills in the system aspects CLR-4: Understanding the professional connections with the knowledge learnt CLR-5: Applying the skills in problem solving Course Learning Outcomes (CLO): At the end of this course, learners will be able to: CLO-1: To get an inside view of an industry and organization/company CLO-2: To gain valuable skills and knowledge Program Learning Outcomes (PLO) 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 4 5 6 7 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 4 5 6 7 8 9 10 11 12 13 1 5 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 3 8 9 10 11 12 13 1 4 5 6 7 8 9 10 11 12 13 1 5 8 9 10 11 12 13 1 5 8 9 10 11 12 13 1 5 8 9 10 11 12 13 1 5 8 9 10 11 12 13 1 6 9 10 11 12 13 1 7 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10 11 12 13 1 8 9 10	Pre-requisite	Courses Nil		Co-requisite Courses	Nil			Progre	ssive C	ourse	S						Nil				-	
CLR-1: Demonstrate skills learnt in the real time environment. CLR-2: Explore the different industries that are using IT CLR-3: Enhance the skills in the system aspects CLR-4: Understanding the professional connections with the knowledge learnt CLR-5: Applying the skills in problem solving Course Learning Outcomes (CLO): At the end of this course, learners will be able to: CLO-1: To get an inside view of an industry and organization/company CLO-2: To gain valuable skills and knowledge 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13 1 2 3 4 5 6 7 8 9 10 11 12 13	Course Offer	ing Department		A.Y	Data Book / Code	es/Standards					4			Nil								
CLR-2: Explore the different industries that are using IT CLR-3: Enhance the skills in the system aspects CLR-4: Understanding the professional connections with the knowledge learnt CLR-5: Applying the skills in problem solving CLR-6: To get an inside view of an industry and organization/company CLO-1: To gain valuable skills and knowledge CLR-7: Explore the different industries that are using IT (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogla) (moogl	Course Learr	ning Rationale (CLR):	The purp	ose of learning this course is	to,	Le	earning			Ħ		F	rogra	m Lear	ning ()utcor	nes (F	PLO)				
CLR-3: Enhance the skills in the system aspects CLR-4: Understanding the professional connections with the knowledge learnt CLR-5: Applying the skills in problem solving CLR-6 to depth an inside view of an inside view of an industry and organization/company CLO-1: To get an inside view of an inside view of an industry and organization/company CLR-3: Enhance the skills in the system aspects (W) (%) (%) (%) (%) (%) (%) (%) (%) (%) (%	CLR-1:	Demonstrate skills learnt in the	e real time environme	ent.		1	2	3	1	2	3	4	5	6 7	8	9	10	11	12	13	14	15
Course Learning Outcomes (CLO): At the end of this course, learners will be able to: CLO-1: To get an inside view of an industry and organization/company CLO-2: To gain valuable skills and knowledge At the end of this course, learners will be able to: Clo-1: To get an inside view of an industry and organization/company Clo-2: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable skills and knowledge Clo-3: To gain valuable	CLR-3: I	Enhance the skills in the syste Understanding the professiona	m aspects al connections with the	ne knowledge learnt		iking (Bloom)			Knowledge	king	ving	easoning	ills	asonina	ninking	Lear	Competence	oning	Engagement		Skills	arning
CLO-2: To gain valuable skills and knowledge 3 85 75 M H H M L M L L M L L H M	Course Learr	ning Outcomes (CLO):	At the end of t	his course, learners will be a	ble to:	of	Expected Programmer		Disciplinary I		Problem Sol	Analytical Re	다.	<u>ائز</u>		Direct	Multicultural			T Skills	Leadership S	Life Long Le
				on/company	177 20 7	3		70	L	Н	M	Н	L	M L	L	L	L	L	Н	М	L	L
	CLO-2:	To gain valuable ski <mark>lls and kno</mark>	owledge		Carlotte Manager	3	85	75	M	Н	Н	М	L	M L	L	M	L	L	Н	M	L	L
CLO-3: To make professional connections and enhance networking 3 75 70 M H M H L M M L M L M H M	CLO-3:	To make profession <mark>al connect</mark>	ions and enhance ne	etworking		3	75	70	М	Н	M	Н	L	M M	L	M	L	M	Н	M	L	L
CLO-4: To get experience in a field to allow the student to make a career transition 3 85 80 M H M H L M M L M L M H M						3	85	80	M	Н	М	Н	L	M M	L	M	L	M	Н	M	L	L
CLO-5: To get an inside view of an industry and organization/company 3 85 75 H H M M H L M M M M L M M M M	CLO-5:	To get an inside view <mark>of an ind</mark>	<mark>dustry and organizati</mark>	on/company		3	85	75	Н	Н	М	Н	L	M M	M	M	L	M	M	M	L	L

Students can choose a company of their own interest for internship for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment				
	Continuous Learning Assess	sment (50% weightage)	Final Evaluation (50% weigl	ntage)
internship	Review – 1	Review – 2	Project Report	Viva-Voce
internatio	20%	30 %	30 %	20 %

Course Code	UCD23F	P05L	Course Name	Project Work – II	Cou Cate		IAP	C	, II	ntern		Appre muni				ject/		_	L 0	T	P 8	<i>0</i>	C
Couc			radine		Oute	jory		-			Oom	mann	y ou	ii cac					U		0		-4
Pre-requisite	e Courses I	Vil		Co-requisite Courses Nil			F	Progre	ssive C	ourse	es						N	il					
Course Offer	ring Department			Data Book	/ Codes/Standards									N	il								
Course Lear	ning Rationale (CLF	R): The purp	ose of learning	this course is to,	1 125	Lea	rning						Progra	am Le	earnir	ng Ou	tcome	es (PL	_0)				_
CLR-1:	Demonstrate skills le	earnt in the real	time environme	nt.		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Explore the different			A 8 85 5 5 6	557 . 7781	4.3					7												
	Enhance the skills in			500.30		om)	(%)	%	<u>e</u>									nce		eut			
	Understanding the p			e knowledge learnt	St 15-1	(Bloom)	Cy	tie.	edg			ing			ng	D	nin	ete		lem			_
CLR-5:	Applying the skills in	problem Solvin	ig			ing	icier	in	Moc	βι	bu	Son	S		soni	Thinking	-ear	omb	ning	Engagement		Skills	nin
Course Lear	ning Outcomes (CL	0):	At the end of th	is course, learners will be able to:		Level of Thinking	Expected	Expected Attainment	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Team Work	Scientific Reasoning	Reflective Thir	Self-Directed Learning	Multicultural Competence		nmunity		Leadership Sk	Life Long Learning
CLO-1:	To get an inside view	<mark>v of an ind</mark> ustry	and organizatio	n/company	and the second	3	80	70	L	Н	М	Н	L	М	L	L	L	L	L	Н	М	L	L
	To gain valuable skil			My many of the same of	7 J. L.	3		75	М	Н	Н	М	L	М	L	L	M	L	L	Н	М	L	L
	To make profession				7/4	3		70	M	Н	М	Н	L	M	М	L	M	L	М	Н	М	L	L
				nake a career transition		3		80	M	Н	M	Н	L	M	M	L	M	L	M	Н	M	L	L
CLO-5:	To get an inside view	v <mark>of an indu</mark> stry	and organizatio	n/company		3	85	75	Н	Н	М	Н	L	М	M	M	M	L	М	М	М	L	L

Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students. At the end of the project, every student shall submit a structured project report and will take a Viva Voce examination.

Learning Assessment			-/	
	Continuous Learning Asse	essment (50% weightage)	Final Evaluation (50% we	eightage)
internehin	Review – 1	Review – 2	Project Report	Viva-Voce
internship	20%	30 %	30 %	20 %

Course Code	UCD23P06L	Course Name	Apprentice	eship – II	Course Category	IAP	С	li	nterns		ppren munity			oject/	'	-	L 0	<i>T</i> 0	P () C ? 4
Pre-requisi			Co-requisite Courses	Nil		ŀ	Progre	essive C	ourse	es					I	Vil				
Course Off	ering Department			Data Book / Coo	des/Standards				_	١.			Nil							
Course Lea	rning Rationale (CLR): The	purpose of learning	g this course is to,		Le	earning			ŧ	Ċ	Р	rogran	n Learr	ning O	utcon	nes (P	LO)			
CLR-1:	Demonstrate skills learnt in the	e real time environme	ent.	AS A.E.	1	2	3	1	2	3	4	5 6	7	8	9	10	11	12 1	3 14	15
CLR-2:	Explore the different industries		and the																	
CLR-3:	Enhance the skills in the syste			21,220,000	(Bloom)	(%)	%	a							_	nce		eut		
CLR-4:	Understanding the professiona		e knowledge learnt			c	Ħ	o pe			Du		þ.		in	ete		e		
CLR-5:	Applying the skills in problem s	solving		-4-30	(ing (ficien	Attainment	nowl	bu	ing	asoni	S	Reasoning	Thinking	Learning	Competence	oning	Engagement	Skills	Learning
Course Lea	rning Outcomes (CLO):	At the end of t	his course, learners will be al	ble to:	Level of Thinking	Expected Proficiency (%)	Expected Atta	Disciplinary Knowledge	Critical Thinking	Problem Solving	Analytical Reasoning	Research Skills	Scientific Rea		Self-Directed L	Multicultural (Ethical Reasoning	nmunity	ICT SKIIIS Leadership S	Life Long Lea
CLO-1:	To get an inside view of an ind	lustry and organization	on/company	7.7.7	3	80	70	L	Н	M	Н	L N	1 L	L	L	L	L	Н	M L	L
CLO-2:	To gain valuable skills and kno	owledge	100 No. 200		3	85	75	M	Н	Н	М	L N	1 L	L	M	L	L	Н	M L	L
CLO-3:	To make professional connect	ions and enhance ne	tworking	CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE	3	75	70	M	Н	M	Н	L N	1 M	L	M	L	M	Н	M L	L
CLO-4:	To get experience in a field to				3	85	80	M	Н	M	Н	L N	1 M	L	M	L	M	Н	M L	L
CLO-5:	To get an inside view of an ind	ustry and organization	on/company		3	85	75	Н	Н	М	Н	L N	M M	M	M	L	M	M	M L	L

Students can choose a company of their own interest for *Apprenticeship* for a period of minimum TEN weeks (Part-time) to learn about the application of their related field in real time environment. All students have to give a presentation about their observations made by them in internship as per the schedule given. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Learning Assessment				
	Continuous Learning Assess	sment (50% weightage)	Final Evaluation (50% weigh	tage)
internship	Review – 1	Review – 2	Project Report	Viva-Voce
internanip	20%	30 %	30 %	20 %

SEMESTER V

Course Code		UBT23501J	Course Name	Che	eminformatics			Cours Categor	-	С	1		Disci	pline Sp	ecific (Core Cour	se		L 3	T 0	P 0 3 2	C 4
Pre-requisi Courses	е		Nil	Co-requisite Courses	Nil						1	Progr	essive Co	urses					Nil			
(ourse Offeri	ng Department		Biotechnology	Data Book / Co	odes/Standards									N	il						
Cou	rse Learning	Rationale (CLR):		The purpose of learning	this course is to:	3-34	ki:	Learni	ng							Prog	ram Learninç	g Outcom	es (PLO)			
CLR-1:	T provide	a basic learning ir	n the <mark>emergin area</mark> of chemic	cal sciences and usage of chemin	formatics in the industry		1	2	3] [1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Introduc	ce students to o	diff <mark>erent meth</mark> ods of ch	neminformatics	100 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 11 Per 1						4,5											
CLR-3:	Gain pr	actical experie	nce through exercises	with representative method	ds used in cheminformatics	. 11.	-17			-	ge	ta				as as	long					
CLR-4:	Help in	understanding	use of cheminformation	cs in modern drug research	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	757	(moc	(%)	%		wled	t Da	billity	lices	풎	f con	d life					
CLR-5:			ious applications of ce		A COLUMN TO THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PA	C 10 1) (Blc	ency	nent		Ϋ́	erpre	Reasoning ability	Ethical Practices	Team Work	on of	dent and learning	PS0 -	PSO -	PS0 -	PS0-	PSO-
OLICO.	Ondersi	unung the val	loas applications of co	riminormatics	Transfer of the		nkin	rofici	ttain		ental	± C	isoni	2	Tear	hnol	nder	δ,	δ,	PS	ď.	ď
Course Lo	earning (Outcomes	At the end of this o	course, learners will be able	e to:	7	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	辛	Fundamental Knowledge	Analyze, Interpret Data	Rei	E		Communication of complex biotechnological ideas	independent and lifelong learning				ı	
CLO-1:	construct	dynamic mathem	atical models from given int	teraction diagrams,	Same of the same of the		1	80	70		H	М				L	L		М	Н		Н
CLO-2 :	run simul	ations by choosing	appropriate numerical met	thods for the solution ofthe equa	tions		2	85	75		М	Н	Н			М			Н			
CLO-3:	analyze tl	he qualitative beha	av <mark>ior of the sy</mark> stems in term	s of stability of solutionsand stea	ady states	N.	1	75	70		Н	М	Н			M		ı	П	Н		
CLO-4:	recognize	e, exemplify and ex	xplain typical network motifs	s for metabolic pathways.			2	85	80		Н	М	L		7	L	Н			М	Н	
CLO-5 :	-		vity analysis and parameter			7177.	2	85	75		М	L				Н		L		L		
Duration (hou	r)		18		18				18		,				1	8				18		
S-1	SL0-1	Introduction		Code Rules		Energy m	inimizati	on					Drug	design a	and disc	overy		Virtua	Screen	ning	-	=
	SL0-2	Evolution of Che	emo-informatics	Normalization		molecular								cture-bas				Virtua	l screer	ning		
S-2	SL0-1	History of Chem	nical InformationScience	Chemical Database	Design and theirtools	molecular	dynami	CS					struc	cture-bas	ed drug	design		dockir	ng of lig	ands		
	SL0-2	Use of Chemo-i	nformatics	Chemical Database D	Design and theirtools	enzyme a	active sit	е					QSA	AR				dockir	ng of lig	ands		
S-3-6	SL0-1		entation of moecules	SMILES Representa	tion of moecules	Linear re	presenta	tion of n	noecules		1.1	N				of moec	ules		ndraw			
S -7	SL0-1	Prospects of C		SMILES Notation	1	Binding si	tes				81			QSAR Me				Protei	in struct	ure		
	SL0-2	Drugs, Ligands		Linear Notation		Application								OSAR M				Drug	action e	enzymes	,	
S-8	SL0-1	Drugs, Ligands		SMILES Notation		Computati								rmacoph				J		eceptors		
	SL0-2	Major Classifica	ation of Drugs	Linear Notation		Computa	tional Te	echnique:	s in the	DrugDes	sign Prod	ess		rmacoph	ore Des	ign				eceptors	ز	
S-9-12	SL0-1	chemdraw		chemdraw		ISIS tool							QSA						prediction			
S-13	SL0-1	Major Classifica	tion of Drugs	Structure based Sea	1 11	Drug Met								nd-Based				Drug	design t	target in	iteraction	
	SLO-2 Drug Solubility Structure based Searches			Chemical								nd-Based							Modes			
S-14	SLO-1 Cheminformatics Database Protein structure, PDB				Chemical			micalPar	ameters	in Drug	Design		Novo Dru						nd bindir	ng free ene	rgies	
	SL0-2	Prodrugs and S	Soft Drugs	Development of New	J	Introducti		J						Novo Dru		n		ADM				
S-15-18	SL0-1	Docking		Pharmacophore generation		Pharmacoph	nore gener	ation					Protei	in -ligand d	locking			Protein-	protein do	ocking		

Learning Asse	essment			400	Continuous Learning A	ssessment (50% weightag				Final Examina	tion(50%
	Bloom's Levelof	CLA - 1	(10%)	CLA - 2 (1	•	CLA - 3 (2		CLA - 4 (10	0%)#	weightage)	
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
evel 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
evel 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%

Learning Resources	3. Höltje, Wolfgang Sippl, Didier Rognan, Gerd Folkers
1. Combinatorial Chemistry and Molecular Diversity in Drug Discovery, Eric M. Gordon , James F.Kerwin	tasted and a second
2. Molecular Modeling: Basic Principles and Applications, 3rd Edition, Hans-Dieter	

Level 3 Evaluate	10% 10%	15% 15%	15% 15%	15% 15%	15% 15%
Create		Was Siller Self Carl	The second second		
Total	100 %	100 %	100 %	100 %	100 %
			The second of the second		

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc

	and the same of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the c	
Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Vidhya VG, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR



Course Code		UBT23502J	Course Name	PLA	nt biotechnology		Cours		С			Discipli	ne Spec	fic Core	Courses			L 3	T P	0	C 4
	requisiteCour Course Offerin	rses ng Department	NIL	Co-requisiteCourses BIOTECHNOLOGY	NIL Data Book / Codes/Standard	ds			¥	K	Prog	ressive Co	ourses	NIL	-			NIL			
Cou	urse Learning	Rationale (CLR):		The purpose of learning this course is to:		Ħ	Learr	ning			¥				Prograi	m Learning (Outcomes	s (PLO)			
CLR-1 :		nd about Plant Genor out the plant tissue cu		2/4	333	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-3 : CLR-4 : CLR-5 :	Learn abo	vledge on the gene to out the vectors out Single-cell protein				Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	e,	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong learning	PS0 - 1	PS0 - 2	PSO - 3	PS0-4	PSO-5
(CLO):	J	Outcomes		ourse, learners will be able to:		Level of Th			ber Ger)	Commu						
CLO-1:			s of plant and organelle (genome	1 2 1 1 1 1	1	80	70		Н	М	M	М	M	L	L	L	М	-	L	-
CLO-2:	Understar	nd the concepts of tis	ssue culture techniques			2	85	75		Н	M	M	M	M	L	Н	M	M	-	L	-
CLO-3:	Gain know	vledge on genetic <mark>en</mark>	ngineering of plants	1 77	77.1	1	75	70		М	М	M	M	M	L	M	M	М	-	L	-
CLO-4 :	Apply kno	wledge vectors and	protoplast isolation meth	ods		2	85	80		М	М	M	М	М	L	М	М	М	-	L	-
CLO-5 :	Apply kno	wledge on plant tissu	<mark>ue culture a</mark> nd genetic er	ngineering of plants	107.	2	85	75		М	М	M	М	М	L	M	М	М	-	L	-
Duration (hou	ır)		18	18	11	8					18	-					18	R			
S-1	SL0-1	Plant biotechnology	y –Introduction	Gibberellins Abscisic Acid	Arabidopsis thaliana – ger	-	alysis		PEG				~	G	olden rice						
S-2	SL0-1	Sterilization method	ds	Ethylene	Production of secondary r	netabolit	es		DEAE		7	17		Tı	ansposable	Elements	in plants	S			
S-3	SL0-1	Different types of n		Totipotency of plant cells	embryogenesis					cterium Te		у			olecular farr						
S4-6	SL0-1	Preaparation of Macro nu		Preparation of Plant tissue culturemedia	Root Induction - organogenes	sis	-			Embryogenes	sis				lation of Agrob	bacterium fron	n root nod	lules of le	gumes		
S-7	SL0-1	Media components		Micropropagation	Somatic embryogenesis					t technology				-	CP						
S-8	SL0-1	Composition of MS	media	Micropropagation	Somaclonal variation					n of plant		sts			<mark>ant c</mark> ell Bioread						
S-9	SL0-1	Gamborg media		Callus induction	Diagnosis using enzyme r					of Protopl					ant cell as Bior						
S-10-12	SL0-1	Preaparation of Micro nut		Explant collection and Sterilization	Shoot induction - organog					t Isolation M		nethod			lation of Agrob	bacterium from	n root nod	lules of le	gumes		
S-13	SL0-1	Plant growth regula	ators	Caulogenesis,	Gene transfer methods us	sed inpla	nts			tion of Proto					ydrophonics						
S-14	SL0-1	Auxins		Rhizogenesis	Electroporation					enic Plants	S				quaphonics						
S-15	SLO-2	Cytokinin		Applications of Organogenesis	Gene Gun				Bt cotto			.0 1			ELSI odel Exam						
S-16-18 Learning Re	SLO-1	Preparation of Hormone	1. CN	In vitro Seed Germination leil Stewart Jr. Plant Biotechnology and Genetics bey R.C., "Textbook of Biotechnology" reprint 200	Callus Induction , John Wiley & Sons, Inc., NewJe 5.S. Chand publishers, 2001	ersey 20	08		3. 4. 5.	Murray.	uthuS, "Pla D.R, Adv , Scott.N.	ant Biote anced m W, Fowle	ethods in	, Tata M plant br	cgraw-Hill F eeding andb chnology -T	oiotechnolo	gy, CAB	Interna			

earning Ass	sessment			£2	Continuous Learning A	ssessment (50% weightag	4			Final Examina	otion/E00/
	Bloom's Levelof	CLA - 1 ((10%)	CLA - 2 (1		CLA – 3 (CLA - 4 (10	0%)#	weightage	
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
el 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand		A Section		100 July 1			7			
rel 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze				ROY 0 35	1754 / CT		A Property			
rel 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create			2 4 5	AGC 3029 1	1 1 7 W. T. L. L.					
	Total		100 %	G 316 N	100 %	1	100 %		100 %		100 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code		JBT23503T	Course Name		Signa	ıl Transduc	tion		Cou Categ		C	λ			Disc	ipline S	Specific	Core co	urse		4	T 0	P () C 2 4
Pre-req Cour	ses		Nil		Co-requisite Courses		NIL				ogressiv Courses	е						NI	L					
Со	urse Offeri	ing Department		В	iotechnology	Data	Book / Codes	S/Standards									NII							
Cours	se Learning	g Rationale (CLR	2):		The purpose of learning this course is	s to:		ÌŒ	L	earnir	ng			Ì				Progra	ım Learn	ing Ou	tcomes	(PLO)		
CLR-1:	Understa	anding cell commu	unication proces	S.			2525		1	2	3	1		2	3	4	5	6	7	8	9	10	11	12
CLR-2:		ge on types of red					400			500	3				J		3	U		U	,	10		- 12
CLR-3:	Knowled	ge on mechanism	of hormonal ac	ction.					4	4.			и.				4.	ex Ex	guir					
CLR-4:	Understa	anding the importa	ance of hormona	al balance.		77	. 444		. 5	0/	(%	adge	1				,	cal	learr					
CLR-5:	Understa	anding the hierarci	hy of hormone s	secretion.					, , ,	ادع (b) tue	Jowle	Data					n ofc	long					
OLIVO.					100.00		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Boul	9	alc e	ainme	alKr	rnret		pility	ices	녿	munication ofcom biotechnological	ndlife	_	~	3	4	22
					25 7/21 108			Thinking(Bloom)	٥	Expected Proliciency (70)	Expected Attainment (%)	FundamentalKnowledge	Analyze InterpretData		Reasoning ability	Practices	Team Work	Communication of complex biotechnological	Independent andlifelong learning	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PS0-5
Course L	earning.	Outcomes (C	LO):	At the end of th	is course, learners will be able to:			evel of	3	<u> </u>	ecte	Fund	alv7e	25	ason	Ethical	Tear	Com	bend	P,	PS,	PS	Δ.	
			1100		West N 1929	2.6	100			X D	Exp		An						Inde					
CLO-1:		-			tion between cells	St. Char						Н	64	L	-	1		М	Н	-	-	-	-	-
CLO-2:				isms of all hormon	es					80	80	Н		М	М		-	Н	Н	-	-	-		-
CLO-3:		acquire knowledg	•							90	80	Н		М	М			М	1 -	-	-	-	-	-
CLO-4:					yper level causes, symptoms of different h	hormones.		1000		90	80	Н		Н	-	۳.		М	Н	-	-	-	-	-
CLO-5:	Students	understand the in	mpact of cross t	<mark>alk</mark> in communicati	on.				3	90	90	Н		M		-	-	М	Н	-	-	-	-	-
																N								
Duration (h		Ol	12	r'	12		Di da la la da d	1	_		r	Dellered			12							12	Dl'	.1
S-1	SLU-1 H	ormones: Cnem	nicai ciassifica	tion otnormones	Protein kinases (PKA, PKB, PKC, PKG).		Physiological hypothalamic		iicai act	ions oi	ĺ	hypothy			yroxine	secretio	n: Hyper							ology and osterone.
S-2	SLO-1 Fu	unctions of hormo	nes and thei <mark>r re</mark>	gulation.	Protein kinases (PKA, PKB, PKC, PKG).	V D 7	Physiological hypothalamic	and biochem	ical act	ions of	f		nysiolog	y of thy	yroxine	secretio	n: Hyper	and	Hormone and Bioch	s of adr	enal gla	nd: Phys	iology	31010110.
					/ 11 14 /	NI	,		<u> </u>		T 1	n'a'							aldoster					
S-3				racrine, autocrine,	Receptor tyrosine kinases – EGF		Physiological		ical act	ions of	f			calciun	n home	eostasis:	PTH,Vita		Hormone					
		tracrine and neuro nechanisms.	oendocrine				hypothalamic	hormones				and cal	citonin.						and Biod aldoster		l action	s of Co	rtisol an	ıd
S-4			- endocrine na	racrine, autocrine,	insulin and Ras - MAP kinase cascade		Physiological	and biochem	ical act	ions of	fanterior	Regul	ation of	calcium	n home	ostasis.	PTH,Vita		Adrenal r		v Horm	nnes: Fr	inenhrin	eand
		tracrine and neuro			Insulin and Nas Will kindso sussaudo		pituitary horm		iloui uoi		i di itorioi	and cal		outoiun		ootasis.			Norepine			51105. <u>L</u>	лорин	ourid
S-5	SLO-1 H	ormone receptors	- extracellular a	andintracellular.	insulin and Ras - MAP kinase cascade		Physiological		ical act	ions of	fanterior	Mechar	ism of (Ca2+ re	egulatio	on.			Adrenal r			nes: Ep	inephrine	e and
C /	CI O 1 !!	armana rassalass	outrocallula :	andintro o allula:	Non recentor turceina bizana and turceina	Hin	pituitary horm		ا ما ما	lone d	fontor!	Mark	iom -f (202	الماسو				Norepine			noo F	: بادعامه ما	
S-6	2LU-1 H	ormone receptors	- extracellular a	anumtracenular.	Non receptor tyrosine kinase- erythropoiel receptor JAK – STAT Pathway	euri	Physiological pituitary horm		iicai act	ions of	ranterior	Mechar	ism of (Jaz+ 16	egulatio	JII.			Adrenal r Norepine		у ногто	mes: Ep	mephrine	e and
S-7	SLO-1 R	eceptor - hormone	e binding, G pro	teincoupled	Non receptor tyrosine kinase-		Physiological		ical act	ions of	fposterior	Regulat	ion of G	rowth:	growth	hormor	e and		Hyper an		secretion	of adre	nal corte	x and
		eceptors	Jr - 12	1 **	erythropoietin receptor JAK - STATpathw	way	pituitary horm					somato			J				adrenal n					

S-8	SLO-1 Receptor - hormone binding, G protein	Steroid hormone Receptor	Physiological and biochemical actions of	Physiology and biochemical actions of	Hyper and hypo secretion of adrenal
	coupled receptors	10.2		Growth factors- EGF, PDGF and Erythropoietin.	cortex and adrenal medullary hormones.
S-9	SLO-1 second messengers - cAMP, cGMP, IP3,DAG, Ca2+	Steroid hormone Receptor, Receptorregulation	pituitary hormones	Physiology and biochemical actions of Growth factors- EGF, PDGF and Erythropoietin.	Male and female sex hormones.
S-10	SLO-1 Effector systems –adenylcyclase	Receptor regulation	Biosynthesis of thyroid hormone and its regulation, Role of TRH and TSH in T4synthesis and response.	Physiology and biochemical actions of Growth factors- EGF, PDGF and Erythropoietin.	Male and female sex hormones.
S-11	SLO-1 Guanylcyclase	crosstalk.		Endocrine disorders - gigantism,acromegaly, dwarfism, pygmies.	Biochemical functions of sex hormones.
S-12	SLO-1 Phospholipase-C	Cycle Test-1	Physiological and biochemical action of Thyroxine.	Cycle test-2	Biochemical functions of sex hormones.

	Lehninger: Principles of Biochemistry(2017)7thed., Nelson, D.L. and Cox, M.M. W.H. Freeman & Company (New York)	
Learning Resources	 Vander's Human Physiology (2019) 15 thed., Widmaier, E.P., Raff, H. and Strang, K.T. McGraw Hill International Publications (US) 	5A)

- Endocrinology (2007) 6thed., Hadley, M.C. and Levine, J.E. Pearson Education (New Delhi), Inc.
 The Cell: A Molecular Approach (2009) 5th Ed. Cooper, G.M. and Hausman, R.E. ASM Press & Sunderland, (Washington DC), Sinauer Associates. (MA).

Learning As	ssessment			Section 1	200 41		11.00				
	Bloom's		20 7 77	3.777	Continuous Learning As	sessment (50% weighta	ge)			Final Exar	nination(50%
	Level of Thinking	CLA - 1	(10%)	CLA – 2	(10%)	CLA - 3	(20%)	CLA - 4	(10%)	weightage	2)
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%	- 11/1/1	30%		30%	5000	30%	-	15%	-
	Understand		100	J. 77 (1.74)		1/4/19					
Level 2	Apply	40%	- 10.00	40%		40%		40%		20%	-
	Analyze					10.0					
Level 3	Evaluate	20%		30%	- 17	30%	-	30%		15%	-
	Create										
	Total	10	0 %	1(00 %	10	00 %	10	00 %	10	00 %

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. S.Vijayabharathi, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR
	THE LIERU	

Course Code	l	JBT23D01T	Course Name			BIOFERTILIZER TE	CHNOLOGY		Cou Categ		D	125		Disc	ipline Sp	ecific E	lective Cou	urses		4	T 0	P (2	
Pre	e-requisite Co	ourses		NIL	Co-requisite Cour	rses	NIL				Progressive Courses									NIL				
(Course Offerin	g Department			Biotechnology		Data Book / Codes/Star	ndards					4	٥,		NI	L							
ourse Learnin	ng Rationale (C	LR):	The purpos	se of learning this	course is to:			Le	earning					P	rogram Lea	arning Out	comes (PLO)							
LR-1 :	To gain kn	owledge on the v	arious marine h	nabitats and mi	croorganisms	ALC: Y	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	2	3	1 [1	2	3	4	5	6	7	8	9	10	11	-	
LR-2 :	To know a	bout various anim	als and its com	nmunication me	thods in sea	100 to 1	4 P. M. M. S. A.																1	
LR-3 :	To underst	and how marine of	organisms are	employed for va	arious applications		A 1 Mary 11					gge					Communication ofcomplex biotechnological							
LR-4 :	Deals with	diversity, culturing	g of biomass ar	nd its economic	applicability	7 7 7		- (mo	(%)	(%)wlec	ata				munication ofcom biotechnological	bu						
LR-5 :			-		d its quality management	N. 16. (C. 10. C.	e de la port la	- 8	ancy()ent		Knc	reb	<u>F</u>	es		olor of	lifelo				PS0-4		
LK-J.	7 ipplioution	or marine organi	sins in product	production and	The quality management	W 10 18 18 18 18 18 18 18 18 18 18 18 18 18			oficie	ainm		enta	nterp	j abil	actic	Work	icatio	and	<u>-</u>	- 2	- 3	PS		
								≓	P P	pd Att		ndan	ze, l	onino	al Pr	sam	biot	ndent	PS0 - 1	PS0 - 2	PSO			
ourse L	earning O	utcomes (CL	O): A	t the end of	this course, learners wi	ill be able to:		evel of Thinking(Bloom)	Expected Proficiency(%)	Expected Attainment(%)		Fundamental Knowledge Analyze, InterpretData Reasoning ability Ethical Practices Team Work Communication of comple biotechnological					ndependent andlifelong							
LO-1 :	Will know	the various micro	organism from t	the marine sou	rces and their significance		11 II N	2	85	75	- 1	H L M					М	Н	-	-	-	-		
LO-2 :	Know the I	nigher organisms t	from flora & fau	una and how th	ey interact with one another	777 7		2	85	75		Н	М	М	-	-	Н	Н	-	-	-			
LO-3 :	Deals with	organisms that su	ustain the extre	eme environme	nt and its products of signific	cance		2	85	70		Н	М	М		-	М		-	-	-	-	+	
LO-4 :		-			rvested from marine source			2	85	75		Н	Н	H-		١.	М	Н	-	-	-	-		
LO-5 :	-				nefits and security			3	85	70		Н	М				М	Н	-	-	-	-		
LU-3 .	ocopo oi ii	name maaca ji pi	ouddinent empe	THE THE SE	nomo una occumy						J L							<u> </u>						
uration (hour))		12			12		1	2					1	2					1	2			
.1	SL0-1	Biofertilizers - Definit			Introduction to Bacterial Biofertili		Actinorrhizal s		_			ungal Cor	mmunity D		_		Or	ganic fa	rming ar		_	e		
-2	SLO-1	Biofertilizers - types			Azospirillum - isolation		Nitrogen Fixation						tion in Bio						rop man					
.3	SL0-1	Biofertilizers - Comp	onents		Mass multiplication		Root Nodule Forn						of Bioferti				В	iopestic	cides					
-4	SL0-1	Soil Ecosystem			Carrier based inoculant	- 12 A	Blue green alg			cultivatio			of Bioferti					atural pr						
5	SLO-1	Microbial Consortium			Azotobacter classification		Mycorrhizal Fungi		S				d Quality	Assurance				ultural p						
-6	SLO-1	Plant – Microbe inte			Characteristics		Types of Fungal I					oplication		l Caaliaa II					design fo			1		
-7 -8	SLO-1 SLO-1	Introduction to Algal Cvanobacterial Biofe			Crop response to Azotob Maintenance and mass n		Importance of Ect					Commercialization and Scaling Up Transition to												
-8 .9	SL0-1	Anabaena	CTUNIZETS		Rhizobium isolation	nunphanon	Vesicular Arbusculi		AM Funni)			National and Regional BiofertilizersDevelopment centers Organic food a Organic farming Bio compost m												
10	SLO-1	Nostoc, Spirulina			Identification		Isolation	ai iviyooiiiii.ca(v	ruvi i uligi)			Green manuring Types of Biocompost						ous						
-11	SLO-2	Algalization			Mass multiplication		Inoculum prod	uction of V	ΑM			Concepts and principles of organicfarming Method of vermicomposting												
-12	SL0-1	Field applications of	cvanobacterial Biofe	ertilizers	Carrier based inoculants		Influence on g			onnlants					bleagricu			ield App			-			

					Continuous Learning As	sessment (50% weightage				Final Examina	ation(50%	
	Bloom's Levelof	CLA - 1 (10%)	CLA - 2 (1	0%)	CLA - 3 (2	20%)	CLA - 4 (10	1%)#	weightage)		
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
evel 1	Remember	30%		30%	-	30%		30%		30%	-	
	Understand		4.3		A	· Luci		10				
vel 2	Apply	40%		40%		40%		40%		40%	-	
	Analyze					10.14.5		100				
evel 3	Evaluate	30%		30%	N. J. W. 577	30%	-	30%		30%	-	
	Create				1,72584777	- 100-50	La Company					
	Total		100%		100%		100%		100%	100%		

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Committee of the Commit	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

					CIE	V(7												
Course Code		UBT23D02T	Course Name	PHARMACEUTICAL BIOTEC	CHNOLOGY		Cou Cated	urse	D		Disci	pline Spe	cific El	ective Co	urse		L 4	T 0	P 0 2	C 4
	site Course Course Offering		Nil	Co-requisite Courses	Nil Data Book/Codes/Standa	ards	,				Progressive	Courses	N	lil		J.	Nil			
		ionale(CLR):		The purpose of learning this course is to	Buta Book occusional		Lear	rning			7	Ł			ng Outcom	nes (PLC))			
			ons of drugs and their route mbinant therapeutic protein			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-3 : CLR-4 :	phytophar Address the and treating Recognize	maceuticals significance of antibion infectious diseases the significance of the c	ics and the various anti-mid	crobial tests in detecting		evel of Thinking (Bloom)	ficiency (%)	ainment (%)	Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	ndependent and lifelong learning	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PSO-5
	ŭ	utcomes (CLO):		course, learners will be able to:		Level of Think	Expected Proficiency	Expected Attainment	Fundament	Analyze, Ir	Reason	Ethical	Tea	Commun	independen					
CLO-1:	different rou Gain compr	tes of administration ehensive understanding	mode of action, dosage fo	oduction, their applications,		1 2	75 80	65 70	H	-	M H	- [L	M	-	-	- M	Н	-
CLO-2 :	compare ar Understand	d contrast various reco	mbinant expression system iotics, their mode of action,	is and recognize the significance of phytopharma evaluate the different classes of antimicrobial ag	ceuticals gents and describe the	3	75	65	M	M	Н		-	М	M	-	-	L	-	-
CLO-4:	Develop an	understanding of the v		ery process and comprehend the different phase	es of clinical trials	3	80	70	М	L	Н	М		M	M	-	-	-	Н	-
CLO-5 :	the econom	ic and legal aspects of	pharmaceutical biotechnolo	gy		2	70	60	М	-	-47	M	-		Н	-	-	-	Н	-
Duration(h	SLO-1	Intro	12 oduction	12 Recombinant therapeutic proteins	Antimicro	12 bial agents			Process	f drug dis		2 d develo <mark>pr</mark>	ment			C	Va Concept	12 ccines & Produ	ıction	
S-2	SLO-1 SLO-2	Scope of Pharr	naceuticalBiotechnology	Classification of therapeutic proteins		Antibiotics Source	5	-1	EA	Targ	et identific	cation		1	Vaccine Types Inactivated					
S-3	SLO-1 SLO-2	Sources o	f drugs	General scheme of recombinantprotein production		Antibiotics lassification					Valid	lation	-		Attenuated vaccines					
S-4	SLO-1 SLO-2	Classification of pha based on chemis		Recombinant protein Expressionsystems Bacterial cell system		Antibiotics ode of acti				Assa	ay develop	oment		Recombinant Vaccines						
S-5	SLO-1 SLO-2	Classification of pha based on mode of a		Yeast Cells	Antimicrobia	al resistano	ce		• • •	Lea	ad optimiz	ation		Peptide vaccines						

S-6	SL0-1	Classification of pharmacological agents based	Insect Cell Lines	Antimicrobial activity studies	Dro alinical testing	DNA Vaccines
2-0	SLO-2	on mode of action	Insect Cell Lines	Anti-bacterial	Pre-clinical testing	DINA Vaccines
S-7	SL0-1	Classification of pharmacologicalagents based	Mammalian Cell Lines	Antimicrobial activity studies	Clinical trials involved in drug discovery	Edible vaccines
3-1	SLO-2	on dosage form	Ividifilialidif Cell Lifles	Anti-viral	Phase I trials	Edible vaccilles
S-8	SL0-1	Routes of drug administration	Transgenic Animals	Antimicrobial activity studies	Clinical trials involved in drug discovery	Nanodrugs
3-0	SLO-2	Routes of drug administration	Transgenic Animais	Anti-fungal	Phase II trials	Nanourugs
S-9	SL0-1	Enteral	Applications of recombinanttherapeutic	Antimicrobial activity studies	Clinical trials involved in drug discovery	Prebiotics
3-9	SLO-2	Enleidi	proteins	Anti-parasitic	Phase III trials	Preplotics
S-10	SL0-1	Parenteral	Phytopharmaceuticals	Pharmacological Assays	Regulatory approvals and Phase IV trials	Probiotics
3-10	SLO-2	Falenteial	Filytophamaceuticals	Filailiacological Assays	Regulatory approvals and Friase IV thats	Flobiolics
S-11	SLO-2	Inhalation	General Classes	In vitro assays	High throughput screening	Nutraceuticals
3-11	SLO-2	IIIIIalalioii	General Classes	III viilo assays	High throughput screening	
S-12	SL0-1	Topical	Properties	In vivo assays	Role of Artificial Intelligence in drug discovery	Economic and legal considerationsin
3-12	SLO-2	ropical	riopeilles	III VIVU dSSdyS	Role of Artificial Mitelligence III drug discovery	Pharmaceutical Biotechnology

 Pharmaceutical biotechnology-Concept and applications. Gray Walsh, Wiley John & Sons, Inc. (2003). Biotechnology, Satyanarayana U, Boooks and allied (P) Its, 2010 Pharmaceutical Biotechnology by Dann, J.A, Crommelin & Robert D., Sindelar, Oct. 2002, Taylor & Francis https://www.fda.gov/patients/learn-about-drug-and-device-approvals/drug-development-process 		Learning Resources	3.	Pharmacology and Pharmacotherapeutics, 26 th Edition, RS Satoskar & Nir <mark>mala Rege &</mark> SD Bhandarkar
2. Biotechnology, Satyanarayana U, Boooks and allied (P) Its, 2010 5. https://www.fda.gov/patients/learn-about-drug-and-device-approvals/drug-development-process	1.	Pharmaceutical biotechnology-Concept and applications. Gray Walsh, Wiley John & Sons, Inc. (2003).	4.	Pharmaceutical Biotechnology by Dann, J.A, Crommelin& Robert D., Sindelar, Oct. 2002, Taylor & Francis
	2.	Biotechnology, Satyanaray <mark>ana U, Booo</mark> ks and allied (P) Its, 2010	5.	https://www.fda.gov/patients/learn-about-drug-and-device-approvals/drug-development-process

				40.00	Learning As	ssessment					
				5" 101 1	Continuous Learning As	sessment (50% weighta	ige)			Flack Francisco /	
	Bloom's Level of Thinking	CLA-	1(10%)	CLA-:	2(10%)	CLA-	3(20%)	CLA-4	(10%)#	Final Examination (50% weigntage)
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
14	Remember	30%		30%		30%		30%		30%	
vel1	Understand	30%		30%		30%		30%		30%	
10	Apply	40%		40%	1.0	40%		40%		40%	
vel2	Analyze	4070		40 /0		40 /0		40 /0		40 /0	
دادر	Evaluate	30%	4	30%		30%		30%	/	30%	
evel3	Create	3078	7	3078	INI - T	3076		3078		3070	
	Total		00 %		00 %	PAPI	00 %	1	00 %	1	00 %

[#CLA-4canbefromanycombinationofthese:Assignments, Seminars, TechTalks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paperetc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. S. Samuel Joshua Pragasam, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code		UBT23G03J	MUSHROOM (CULTIVATION					course tegory	G	×		Gen	eric Elective	Courses		L	T 0	P 8	0 C 2 4	
Pre-req	uisiteCourse	es .	NIL	Co-requisiteCourses	١	VIL						6	Progre	ssive Cou	rses			N	IL		
	Course Offer	ring Department		BIOTECHNOLOGY	Data Book	/ Codes	/Standard	ls					TÍ	2	N	NIL					
Course Lear	ning Rational	e (CLR):	The purpose of learn	ning this course is to:		٦	- 13	80	П	Learning				#	Program Learn	ning Outcomes (PLO)					
CLR-1:	Unde	erstanding about the	e mus <mark>hroom cultivat</mark> ion		1,400	1	2	3	H	1	2	3	4	5	- 6	7	8	9	10	11	12
CLR-2:	Unde	erstanding about t	he <mark>culture prepa</mark> ration	A. 77	47.76				1	autol.											
CLR-3:	Know	vledge on croppin	ig <mark>of Mushroom</mark>		200	(m	(%	9	. "	dge	pers	1			nplex	and					
CLR-4:	Know	vledge on Cultivat	ti <mark>on methods</mark>	, 5,7		(Bloc	ncy (ent (nowle	Num	ability	ctices	or Ye	f con al ide	dent	-	- 2	-3	4-	-5
CLR-5:	Unde	erstanding about t	he Pest and Disease Ma	anagement	1	evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1	Fundamental Knowledge	Analyze, Interpret Numbers	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong learning	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PSO-5
Course Le	arning Out	comes (CLO):	At the end of this	course, learners will be able to:		evel c	kpect	kpect	١.,	Fund	nalyz				omm	9					
CLO-1 :	To ur	nderstand the diff	erent types of cultivable	e Mushrooms		3	80	70		М	H	E L	L	М	L	L	-	-	-	-	-
CLO-2 :	Havir	ng knowledge on	Spawn and culture Prep	paration		3	85	75	13	M		L	L	M	L	Н	-	-	-	-	-
CLO-3 :	Apply	ying knowledge o	<mark>n cro</mark> pp <mark>ing o</mark> n Mushroo	m		3	75	70		M	L	L	L	M	1	Н	-	-	-	-	-
CLO-4:	To le	arn about the Cul	ti <mark>vation Meth</mark> ods			3	85	80		M	L	L	L	M	L	Н	-	-	-	-	-
CLO-5:	Havir	ng knowledge on	Pe <mark>st and Dise</mark> ase contr	ol		3	85	- 75		M	М	L	L	М	L	Н	-	-	-	-	-
Duration (ho	ır)		24	24		7	2	24					24	7	7			24			
S-1 - 6	SLO-1	Introduction to types	of Mushroom	Preparation of mother spawn, commercial spawn and its storage	Cultivation	n of oys	ster mus	shroom		C	Cultivation	of ganod	lerma	7		Diseases caused	by fungi,	bacteria	and abi	otic factor	rs
S-6 - 12	SLO-1	Orientation to a	mushroom farm	Compositing methods	Cultivation	n of pa	ddy stra	w mushr	oom	С	Cultivation	of cordy	ceps mili	taris		Market survey and	cost be	nefit anal	lysis		
S-13 -18	SLO-1	Preperation of p	ure culture	Spawning, casing, cropping of Mushrooms	Cultivation	n of mil	lky musl	nroom	ľ		dentification		ects affe	cting but	on	Management of spent mushroom substrate (sms)					
S-19 - 24	SLO-1	Maintainance of	cultures	Post harvest handling	Cultivation	n of shi	iitake				dentification nushroom		cator mo	oulds inbi	utton	Model Exam					
	Learnin	g Resources	Coimbatore.	t al. (1991). Oster Mushroom. Department of Plant Patho K Ghosh, 1996. A Hand Book on Mushroom Cultivation.	0,	Ü		l Universi	ity,	IBH 4. V.N	Publishir	ng Co. P\ Nagendr	<mark>/T.LTD</mark> , a Yadav	New De and Ma	ushrooms. 2nd ed. Vol. I and Tripathi, D.P. (2005) Mushroom Cultivation, Oxfo / Delhi. Maneesha Gaur, Mushroom Production and Processing Technology/ Vedam						

Learning Ass	essment			44.3	-						
	Bloom's Level of				Continuous Learning A	ssessment (50% weightage				Final Examinat	
	Thinking	CLA - 1 (<mark>10%)</mark>	CLA - 2 (10%)	CLA - 3 (20%)	CLA - 4 (10	%)#	weightage)	
	9	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
	Remember		0.7	d	2.53			4 14			
el 1	Understand	0%	10%	0%	10%	0%	10%	0%	10%	0%	10%
	Apply				N 20 Bu 27				\		
el 2	Analyze	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%
	Evaluate	201			0.00			201			500/
vel 3	Create	0%	50%	0%	50%	0%	50%	0%	50%	0%	50%
	Total	-	100 %	N 5. 4	100 %	100	100 %		100 %		100 %

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

	ourse Code	UBT23S03	T Course Name	BIOETHICS AND IPR	,		Course ategory	S	Ų	1/2			Skill E	nhancen	nent Cours	ses		1	T P	0 2	C 1	
	Pre-requi	isiteCourses		Nil	Co-requisiteCourses	Nil			Progres	ssiveC	Courses						Nil					
	Course	Offering Departme	ent		technology	Data Book / Codes/Standa	rds								Nil							
						ATT 7.751																
CLR-	·1: Und	derstanding the eth	ical issues in <mark>Bi</mark>	otechnology	<u> </u>		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-	·2: Thr	rough Knowledge o	n conservin <mark>g th</mark> e	<mark>e intellectu</mark> al property an	d patenting	Park 272	27.7		-				777									
CLR-	·3: Kno	owledge on models	designed to pat	<mark>tent the</mark> biological materi	als						dge	ata				olex as						
CLR-	. 4 : Saf	fety measures to be	e handle <mark>d befo</mark> r	<mark>e usin</mark> g potent vulnerabl	e cultures and fragileinstruments	J. 45 (1947) 11	loom	%) 6	t (%)		owlec	et D	ability	tices	or k	com lide	deni					
CLR-	·5 : Wid	de knowledge on di	fferent environm	n <mark>ental</mark> issues are been ex	rposed	A P. Oaking St.	ng (B	cienc	men		Ā	ıterpr	Reasoning ability	Ethical Practices	Team Work	on of ogica	independent	PS0 .	PSO.	PS0 -	PS0-	PSO-
						77 J. W. W. W. W.	hinki	Profi	Attair		nenta	ze, Ir	easor	hical	Teg	ication	inde	ъ.	ш.	<u> </u>	ч	ш.
Cour	se Learr	ning Outcomes	(CLO):	At the end of this	course, learners will be able to:	The second	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment		Fundamental Knowledge	Analyze, Interpret Data	Re	Э		Communication of complex biotechnological ideas						
CLO-	-1 : Ide	entify the problem p	rone <mark>areas in Bi</mark>	otechnology			- 1	75	70	w	Н				L		Τ					
CLO-	- 2 : Un	derstand the differe	ent w <mark>ays to cons</mark>	erve the intellectual right	S	4 1 2 1 1 1	1	75	70		Н	М	М	Н	L							
CLO-	-3 : Ide	entify the possibilitie	s in <mark>biological m</mark>	naterials that deserve for	patenting	111 P. L. N.	2	75	70	. 1	Н			Н								
CLO-	. 4 : Ha	ndle instruments wi	ith ut <mark>most care a</mark>	<mark>an</mark> d safety precautions th	at ensures goodlaboratory practice	100	2	75	70	w	Н	the same	М									
CLO-	-5 : Add	dress different envi	ronme <mark>ntal issue</mark>	<mark>an</mark> d a wide knowledge o	n the law enforcementrelated to Environ	ment	2	75	70		Н			М			Н					
						1000		1	1											1		
		L	earning <mark>Unit / I</mark>	Module 1	Learning Unit / Module 2	Learning	Unit / N	lodule 3				Learn	ing Unit	/ Module	4			Learning	g Unit / I	Module 5		
	ration hour)		3		3	3							3	V					;	3		
S-1	SLO-1 Socio economical impact of biotechnology and disadvantages (PGR						R- Protection, Plant GeneticResources				es Forms to be filled for Patent filing,Prerequisites for patent filing					F	Reading a patent, Formats for citingprior art,					
S-2	SLO-1 Ethical concerns in Biotechnologyresearch, Committees to approve Bioethical issues IPR- Patents, Trade secrets General Agreement of Tariffs related Intellectual Property (TRIP)						Tariffs and Trade (GATT), Trade Rules and regulations of Indian PatentRights Patenting for Higher Plants andhig					ts andhig	her Anim	als								

Different types of patent agencies

OECD guidelines, Ethical violations thathave occurred

Singh B.D., Biotechnology, kalyani publishers, 2009. Chawla H.S., Introduction to plant Biotechnology, Science publishers, 2004. Shaleesha A, Stanley, Bioethics, Wisdom educational service, 2008. Das H.K., Text book of Biotechnology, Wiley Publishers, 2010.

Copyrights, Trademarks

S-3

Learning Resources

SL0-1

in history

Biotechnology 121

and DNA sequences

Patents - Biological materials, live forms, GMO, Genes

Discussions

Learning Asse	ssment			40.00			1						
	Dia anata i aval af				Continuous Learning As	sessment (50% weighta	age)			Final Exam	nation(50%		
Level	Bloom's Level of Thinking	CLA - 1	(10%)	CLA - 2	(10%)	CLA - 3	(20%)	CLA - 4 (1	10%) #	weightage)			
	Hillikilly	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
evel 1	Remember	30%	ATTO	30%		30%		30%		30%			
Level I	Understand	3070	A.Y	3070		30 /0		3076		3070	-		
evel 2	Apply	40%		40%	(A 1 A 1 A 1 A 1	40%		40%		40%			
LCVCI Z	Analyze	4070		4070	Marine Car	4070		4070		4070	-		
Level 3	Evaluate	30%		30%	* 4.8b. 33	30%		30%		30%			
Level 3	Create	3076		3070	12.78(8).47	3070		30 /0		3070	-		
	Total		00 %	1	00 %	1.01	00 %	1	00 %	10	00 %		

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr.N.Prasanth Bhatt, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	UBT23P02L	Course Name	INTER	NSHIP-II Course Category	Р/	Internship/ Project/ Commu	nity Outreach	L T P O C 0 0 0 0 1
Pre-requ	uisiteCourses	Nil	Co-requisite Courses	Nil	Progressive Courses		Nil	
Cours	se Offering Department		Physics and Nanotechnology	Data Book / Codes/Standards		Nil		
Course Learnin	ng Rationale (CLR):	7.7	The purpose of learning this course is to	Section 2	F. 1	TO T		
CLR-1:			ent useful to employer such as teamwork, communic					
CLR-2:	provide unique learning	opportunities by exposi	ng the student to the environment and expectations	of professional performance				
CLR-3:	expand the student's kn	<mark>owledge of a</mark> particular	area(s) of interest to enhance employability	A Maria it. 175				
CLR-4:	help students to explore	e career alternatives/opp	ortunities prior to their graduation	The second second				
	ng Outcomes (CLO):		At the end of this course, learners will be a					
CLO-1:	demonstrate the skill <mark>ga</mark>	<mark>ined throu</mark> gh work expe	rience with mentors or successful professionals to s	support the early stages of their career				

	Continuous Learning Assessment (50% v	veightage)	Final Evaluation (50% weightage)						
	Review – 1	Review – 2	Project Report	Viva-Voce					
Internship	20%	30 %	30%	20 %					

SEMESTER VI

Course Code		UBT23601J C	ourse Name ANIMAL BIOTECHNOL		Course ategory		С	4	1/2	. Discipline Specific						rses	3	T 0	P 3	0 C 2 4
	quisite Cour		Co-requisite Courses	Nil			F	Progres	ssive Cou	ırses	Nil									
C	ourse Offerir	ng Department	BIOTECHNOLOGY	Data Book / Codes/S	tandards									Nil						
Course L	earning Ratio	nale (CLR): The pu	rpose of learning this course is to,		Lea	ırning			Progr	am Lear	ning Out	comes (P	LO)							
CLR-1:	Define the B	asics of cell culture		138639	1	2	3]	1	2	3	1	5	6	7	8	9	10	11	12
CLR-1:		mal Diseases and <mark>Diagnosis</mark>		45000			3		'		3	7	J	U	, g	0	7	10	11	12
CLR-3:		nsgenic Animals		N. Land	10	145			1				٠.	×	amir					
CLR-4:		Micromanipulation techniques		1000	(moo	(%)	(%)		dge	co.				omple	ngle					
CLR-5:	Definition of		N Extension	13 mars 6 1) (Blc	ency	nent		owle	et Dai	_			of cor	life					
OLIT O .	Delilillon of	LIVESTOCK		30.7	inkin	rofici	ttainr		al Kn	terpre	abillit	ctices		ation	ntano					
Course Le	earning Ou	tcomes (CLO): At the end of	this course, learners will be able to:		evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	P	-undamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	Independentand lifelonglearning	PS0-1	2-0Sc	SO -3	- OSc	PSO - 5
CLO-1:	Experiment v	vith cell culture techniques	E 12 \ (24)	17 P. C. N	2	85	80		Н	M	M	Н		M	Н			а.	Д.	4
CLO-2:		t of techniques to treat the Animal disease	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		3	85	80		H	H	М	H	Ť	M	Н					
CLO-3:	Importance of	of Transgenic an <mark>imals</mark>	100		3	85	80		Н	М	Н	Н	М	Н	Н					
CLO-4:		n of Micromanipulation in IVF -ET		10.00	3	85	80		М	Н	Н	Н	М	Н	Н					
CLO-5:	Analysis of L	ivestock in Indian economy	2.		3	85	80	:	L	Н	L	Н	М	Н	Н					
																	<u> </u>			
Duration S-1		24 Introduction to Animal Cell Culture	Types of cell culture	Monoclonal antibodies	24				Introducti	on to Mic		.4 ulationtec	hniauoc	S	norm m	ndiatod	genetrar	24 octor (SN	ICT)	
3-1	SLO-1	Introduction to Arimai celi culture	Types of cell culture	ivioriocional antibodies					IIIII ouucii	OII (O IVIIC	Julianipi	JIANUINEC	illiques	3	periii -iii	iculateu	yenenai	וטוכו (טוג	iid1)	
S-2	SLO-2	Historical background	Monolayer, Suspension ,Clone cultureMass culture microcarrier culture (monolayer) Stem cell culture	NI FF								>					genetran	•	•	
S-3	SLO-1 SLO-2	Setup of Animal cell cultureLaborotary	Biology and Charecterization of cell culture	Diagnosis of Animal dise	eases by	Molecula	rtechnic	ues	Enrichme	nt of san	nple prep	aration fo	r IVF- E	T In	nportand	e of Tra	insgenic	animals	inBiotec	hnology
S-4		Basic Aseptic Techniques	Contamination testing of cell culture	Diagnosis of Animal dise	eases by	PCR			Breeding	of farm <i>i</i>	Animals				temcell o	culture ir	n the pro	duction (ofTransge	enic
S 5-8	SL0-1	Seperation of cells by su	uitable m	ethod			Primary o	ell cultur	e and its	maintena	nce		ell cycle	analysis	S					
	SLO-2	GLP : Laminar Flow Hoods, CO2 incubator, Open and closed cultures, Microscopes,	Hazards and Safety in Cell CultureLaboratory																	
S-9	SLO-1 SLO-2	Natuarl Media and Chemically definedmedia	Viability measurement and cytotoxicity	In-situ hybridization					Introducti	on to Tra	ansgenic	animals		A	pplicatio	ns of Ar	nimal cell	cultureT	echnolo	ogy
S-10	SLO-1	Media with Serum and Without serum	Mesurement of growth parameters	Northern and sourthern	blotting				History	of Transo	genic Ani	mals		A	dvances	in Cell	technolog	ду		
S-11	SLO-1	Advantages and Disadvantages ofserum in media	Cell cycle analysis of animal cells	RFLP					Cocepts	of Transo	genic anir	nal techn	ology				from an		S	

S-12	SLO-1 Animal cell culture- maintenance	Cell strain	Therapy of Animal diseases	Procedure for the production of TransgenicAnimals	Opportunities and challenges in Animal cellculture
	SLO-2				17
S 13- 16	SLO-1 Thawing and Cryopreservation	Maintenance of cell lines	Tredtional method to modern technologies tocure animal disease	Vector mediated gene transfer	Regulations in Animal biotechnology
S-17	SLO-1 Characters of Cells SLO-2	Animal Diseases –Bacterial and Viraldiseases	Recombinent cytokines in Animal diseases	DNA Microinjection-Pronuclearmicroinjection	Livestock Resources
S-18	SLO-1 Cells in primary culture	Animal Diseases – Viral diseases	Monoclonal antibodies in therapy	ES Cells –Embryonic Stem cells	Role of Livestock in farmers Economy inIndia
S-19	SLO-1 Cells in secondary culture	Diagnosis of Various animal Diseases	Animal vaccine	Somatic cell Nuclear transfer -SCNT	Livestock Bill in India
S-20	SLO-1 Passaging and Subculturing	Monoclonal antibodies	Animal vaccine in animal infections	Gene transfer into gametes	Revision
S 21- 24	SLO-1 GLP: centrifuge, Refrigerators and Freezers, pipetting aids, Miscellaneous small items of Equipments, Materials, filters, Miscellaneous Items.	Isolation of cells by Enzymatic method	Viable cell count	Mesurement of growth parameters	Revision

Learning
Resources

1. Freshney, R. I. (2010). Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications. Wiley-Blackwell, 2010. 6th Edition.
2. Davis, J. M. (2008). Basic Cell Culture. Oxford University Press. New Delhi. 10 | P a g e 3. Butler, M. (2004). Animal Cell Culture and Technology. Taylor and Francis. New York, USA. 4. Masters J.R.W. Animal Cell Culture: Practical Approach. Oxford University Press. 2000

I	earning	Assessment

	Discrete Level of			Final Examinati	on(50%							
	Bloom's Level of Thinking	CLA - 1 (10	%)	CLA - 2 (1	0%)	CLA - 3 (2	20%)	CLA - 4 (10%	6)#	weightage)		
		Theory	Practice	Practice Theory		Theory	Practice	Theory	Practice	Theory	Practice	
	Remember					/						
vel 1	Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
.1.0	Apply	2007	2007	2007	2007	2007	2007	2007	200/	2007	200/	
el 2	Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
	Evaluate	4004		- 17.A T	7 N.L., T	450	450/	450	450	4504	450/	
rel 3	Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Total	1	00 %		00 %		100 %	10	00 %	1	00 %	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai		Dr.D.Sankari, Professor and head Department of Biotechnology FSH SRMIST KTR

Cours Code		l	JBT23602J	ı	Course Name		IMMU	JNOTECHNOLOGY	H		ourse egory	С				Discipli	ne Spec	ific Core (Courses	i	L	T 0	P 0	
	re-requisite	Courses	ont.	Nil		Co-requisiteCo		Nil Data Book / Codes/	Standards		P	rogres	sive Cou	rses				lil		Nil				
	ourse one	iling Departin	ICIIL			DIOTECTINOLOGI		Data Dook / Coues/	Stariuarus								- "	"						
Course	Learning F	ationale(CLF	R):		The	e purpose of learning t	this course is to			Learn	ing			×		-	Progran	n Learninç	g Outcor	nes (PL	_0)			
CLR-1:	Understar	nding the basic	cs of immu <mark>n</mark>	ology				E'11 50	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Underst	anding the	properties	of antigens	and function	n of immunoglobulir	ns	7,300,00	7		Liu													
CLR-3:	Underst	anding the	importanc	e antigrnanti	bogy interac	ction in defense act	tion	1.485,000		11.00	et di		<u>a</u>	co.				× c	elonç					
CLR-4:	Knowle	dge on B &	T cell resp	onse				100		(%)	(%) I		vledg	i Dat	oillty	ces	논	ompl	bu -		7	33	₹+	10
CLR-5:				basis of AID	S. transpla	intation		7 1 7 7 1	g (B	ienc	ımenı		Kno	erpre	Reasoning ability	Ethical Practices	Team Work	of co	ent a	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PS0-5
		J					F 25 27		_ 	Profic	Attair		ental	Ĕ	isonii	ical	Tean	ation	ende	<u>a</u> .	<u>a</u> ,	P,	Δ.	4
Course L	earning	Outcomes	(CLO):	At the er	d of this co	ourse, learners will b	be able to:	W. W.		Expected Proficiency (%)	Expected Attainment (%)	i Our	Fundamental Knowledge	Analyze, Interpret Data	Rea	Et		Communication of complex biotechnological ideas	independent and lifelong					
CLO-1:	Acquire	d basic Kno	wledge or	<mark>ı im</mark> mune cel	ls, organs	F. 1.	2	J. 5	1	75	70		Н			L								
CLO-2:	Basic K	nowledge o	n a <mark>ntigen</mark> ,	<mark>im</mark> munoglob	ulins	THE ST N	12.0	111 11 1	1	75	70		Н	Н	Н									
CLO-3:	Strong I	pasis for un	derstandir	ng the interac	tions of ant	tigen & antibody	17.	THE PARTY	2	75	70		- 1	1	М		Н							
CLO-4:	Better k	nowledge g	aine <mark>d ab</mark> o	<mark>ut im</mark> mune re	esponse		of the last of		2	75	70					Н	Н							
CLO-5:	Better k	nowledge g	aine <mark>d ab</mark> o	<mark>ut im</mark> mune re	esponse in o	disease	412 7 2		2	75	70			Н				Н						Н
	T.							14	100	1		J					7				I			
Duration (h		24				24		24					24					24						
S-1	SLO-1 SLO-2	Immunology		andHistory. Sc	ope of	B cells - specificity, a maturation		MHC and A	ntigen Pres	entation			Hypers	ensitivity-	I and II	Y					andimmu		-	
	SLO-1 SLO-2	Types of imm	unity-innate	(Introduction),		Antibodies - Different Immunogolbulins	t classes of	complement		and itsbiol	ogical		Hypers	ensitivity-	III IV			Prod	uction of	polyclo	nal andm	onoclona	antibod	ies
	S-3 SLO-1 Innate immune cells- monocytes T cell Function & development Cor							Complemen importance	t System –	Pathways	introducti	on and	Autoim	munity	>	1	Production of polyclonal a				onoclona	al antibod	ies	
S-4-6	9101					Rocket imm	unoelectrop	horosis			Demo detecti		R and its	applicatio	<mark>on invi</mark> ra	Prod	uction of	polyclo	nal andm	onoclona	antibod	lies		
	S 7 SLO-1 Adaptive immunity- Antigen, B cells, T cells, Cytokines: general nature of cytokines SLO-2 clonal selection theory					Classical, L	ectin & alter	nativepat	hways		Vaccine	es - killed	attenuate	edorganis	sms,	DOT	ELISA							
												accine, R	NA Vacci	nes		Immı	ınopreci	pitation.	RIA,					
	SLO-2	<u>J</u>				antigen by B cell and		Immune Re against diffe				nces							1	,				
	SLO-1 SLO-2	Lymphoid org Secondary or		1		Antigen Receptors: T	T cell receptors	Immune Eva	asion: micro				Recom	oinant Va	ccines			avidir	n-biotin ı	mediate	d assay,			

S-10-	SLO-1	Agglutination: ABO Blood groupingand ASO	Ouchterlony double immunodiffusion	ELISA- Sandwich ELISA	Widal test	fluorescent immunoassay
12	SLO-2	1				
S-13	SL0-1	Antigen and Immunogen- Antigenicity and	B –cell Maturation and Activation	Immunodeficiency- primary	Harmful side effects of vaccines andits	immunohistochemistry,
	SLO-2	immunogenicity		immunodeficiencies	case studies	
S 14	SLO-1	Types of Antigens, Affinity and Avidity	T cell Maturation and Activation	Acquired immunodeficiencies	Complement fixation test.	DOT ELISA
	SLO-2		2000			
S-15	SLO-1	Properties of Antigen. Adjuvants, Haptens	Kinetics of primary and secondary	Allergic diseases	immunoblotting.	limmunoelectrophoresis,
	SLO-2		immune responses			
S-16-	SL0-1	Separation of mononuclear cellsfrom peripheral		Collection of Blood by Vein Puncture and	1000	
18	SLO-2	blood	Counter current immunoelectrophorosis	isolation of Bloodcomponents	WBC counting using flow cytometry	immunoelectrophoresis,
	SLO-2					

	1.	Richard A. Goldsby "Immunology"
Learning	2.	Barbara, A. Osborne, Janis Kubylmmunology", 5th Edition, W. H. Freeman & Company, 2006
Resources	3.	Ivan Roitt. Element of Immunology. Wiley Blackwell publication, 13th edition, 2017
	4.	https://muhammad1988adeel.files.wordpress.com/2011/04/kuby-immunology-6th-edition.pdf

Learrning As		Continuous Lea	Continuous Learning Assessment (50% weightage)										
	Bloom's	CLA - 1 (10%)		CLA – 2 (10%)	7 17 p.	CLA - 3 (20%)	Andrew .	CLA - 4 (10%)#		Final Examination(50% weightage)			
	Level of Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
1	Remember	200/	200/	2004	100/	150/	150/	100/	100/	150/	150/		
Level 1	Understand	20%	20%	20%	10%	15%	15%	10%	10%	15%	15%		
ovol 2	Apply	200/	200/	200/	200/	200/	200/	200/	200/	200/	200/		
evel 2	Analyze	20%	20%	30%	20%	20%	20%	20%	30%	20%	20%		
oval 2	Evaluate	100/	100/	100/	100/	150/	150/	100/	100/	15%	150/		
Level 3	Create	10%	10%	10%	10%	15%	15%	10%	10%	15%	15%		
	Total	100 %		100 %	TOAT	100 %		100 %	- / -	100 %	,		

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	LILITAD	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Prasanth Bhatt N, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	ι	JBT23603T	Course Name		RESEARCH METHODOLOGY			Cour		С	1	_		DISC	IPLINE	SPECIFIC	ELECTIVE	:	L 4	T 0		0 C
									,		1								•	ŭ		
Pre-requisi Course			Nil	Co-requisite Courses	Nil	, M	4.					P	rogressive	Courses					Nil			
	0 0 1	D 1 1		IOTEQUINOLOGY	24.2.10		4.5															
	Course Offering	Department	В	IOTECHNOLOGY	Data Book/Coo	les/Standards							- 16			Nil						
Course Learning	Rationale (CLF	R):	The purpose of learning this c	ourse is to:			Le	arning					P	rogram Lea	rning Outo	comes(PLO)						
CLR-1:	Know the h	nacine of recearch	, sources of research problem	ns and augstions			1	2	3		1	2	3	4	5	,	7	8	9	10	11	12
				·		_#		2	3	4 3		2	3	4	5	6	/	Ö	9	10	11	12
CLR-2:			review them and carry out bas			34.3	100		1.0							e ex	б					
CLR-3:			<mark>ethods, data</mark> collection method	is, graphical presentation of	data	- 70	372	9	%			ata				ofcomplex gical idea	ifelo					
CLR-4:			<mark>of ethics in</mark> research		Probable Attento		ρĺ)(S	ent(6	A.		etDa	≥	SS		ofc	and				4	ىب
CLR-5:	Gain know	ledge on the typ <mark>e:</mark>	<mark>s of scientif</mark> ic articles, funding	agencies and writing article	S	71.5	ir	ficier	min	7.	Fundamental	terpr	apill	octice	Team Work	ommunication ofco biotechnological	ident and learning	.1	PS0 - 2	- 3	PSO-	PS0-5
							of T	Pro	Atte		ndam	e, In	ning	l Pra	am	unica	end	PSO	PSC	PSO	а_	4
Course Le	arning O	utcomes (CLC	O): At the end of the	nis course, learners wil	ll be able to:	1	Level of Thinking	Expected Proficiency(%)	Expected Attainment(%)		돌 z	Analyze, InterpretData	Reasoning ability	Ethical Practices	Te	Communication biotechnolog	independent and lifelong learning					
CLO-1:	Understand	d the types of rese	<mark>earch, the st</mark> eps involved in a l	research process, define a	research problem, develop a research	question	1	85	80		Н	М	Н			М		_	,	-	_	_
CLO-2 :	Carry out li	terature survey, p	ostulate research hypothesis	and perform descriptive sta	tistics	107	2	80	70	-	M	Н	Н	-	7.	L	M	-	-	-	-	-
CLO-3:	Demonstra	te the ability to ide	en <mark>tify various s</mark> ampling and da	ata collection methods, repr	esent research data graphically	77	3	70	60		М	Н	М			Н			-	М		
CLO-4:	Apply princ	inles of ethics in u	performing and reporting biolo	ogical research		***	2	75	65		I	-	M	Н	-	M	M	_	-	-	1	+
CLO-5:		<u> </u>		•	now about the various funding agencie	25															_	+-
CLO-3.	Tuoning in	Tanous types or	ooronano arabico, mila receard	on papere and messe, and m	mon about the raneae ranamy agenter		3	80	70	L	M	L	F-/	-	L -	Н	M	-	-	-	-	
Duration(h	our)		12		12	4	12						12						12			
S-1	SLO-1	Intro	oduction to Research	Litera	ature survey	Samplin						Resear	ch ethics				Tyne	s of scie	ntific arti	rles		
	SLO-2		and objective of research		roduction	Gampiin	ig typos					rtosoui	orr ourios				1,700	3 01 3010	nuno anu	0103		
S-2			purpose of research	Sources of	f literature survey	Sampling	method	S		Н	Genera	principl	es of ethi	ics inrese	earch			Reviev	<i>a</i> rticles	;		-
	SL0-2	•			ary, Books						- 1											
S-3	SL0-1	Туре	s of research			Sampling	method	S			Genera	principl	es of ethi	ics inrese	earch		Sh	ort comr	nunicatio	ns		
	SLO-2				e databases								CI . C									
S-4	SLO-1		Types of research		nline literature survey	JI	oes of da					Con	flict of int	erest				Res	earch ai	rticles		
S-5	SL0-2 SL0-1	Doccord	h Process Flow	Boolean		Primary hods of pr			tion		Dlagiario	m datas	tion softv	varoc			Compone	atc of a	ocoarch	articla		
3-0	SL0-1	Kezegici	II LINCE22 LINM	ну	rpothesis Mei		nnary u perimer		JUUII		riayialis	iii uetec	uon soll	vai 62			Compone	ILS UI d I	CSCALCII	article		
S-6		Steps involved in	a research process	Types of h	vpothesis		Survey	ii.3		Role	of Instit	utional F	thics Co	mmittee(I	EC)		Choosing	the ann	ropriate i	iournal		
	SLO-2	orobo ilitolitori ili	a . occuron process	1,7000 01 11	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Janvoy			100	01 1110111	anonial L	05 00				Shoosing	o upp	opridio]	journal		

S-7	SL0-1	Steps involved in a research process	Postulating a hypothesis	Questionnaire	Role of Institutional Animal EthicalCommittee	Writing a research article
	SLO-2				(IAEC)	
S-8	SL0-1	Defining a research problem	Measures of central TendencyMean	Interview	3Rs in animal testing	Thesis
	SLO-2		4.37		K V A	
S-9	SL0-1	Sources of research problem	Measures of central TendencyMedian	Methods of secondary data collection	Critical evaluation	Layout of a thesis
	SLO-2		A 1		~ ~ ~	
	SLO-1	Research Question	Measures of central TendencyMode	Graphical representation of data	Critically evaluating a research report	Use of reference managing softwares
S-10	SLO-2			Line graphs and bar graphs		
	SL0-1	Sources of research questions	Measures of dispersionRange	Graphical representation of data	Patents	National Funding Agencies
S-11	SLO-2			Histograms		
	SL0-1	Steps in conceiving a researchquestion	Measures of dispersionStandard	Graphical representation of dataPie charts	Preparing for conference	International Funding Agencies
S-12	SLO-2		Deviation	PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF TH	presentations	

Learning Resources:

- 1. Handbook of Research Methodology. A Compendium for Scholars & Researchers. Dr. Shanti Bhushan Mishra, Dr. Shashi Alok. 2011
- Research Methodology Methods and Techniques, 2nd Revised Edition, C.R. Kothari., 2004
 Biostatistics: A foundation for analysis in the Health Sciences, 10th Edition, W.W Daniel. Publisher, Chad L Cross, John Wiley and Sons.
- Introduction to Biostatistics, A Guide to Design, Analysis and Discovery. 1st Edition, Ronald N. Forthfer and Eun Sun Lee. Elsevier.

Learning Ass	essment			- The Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the		" p. ' 1 2500	Marian.				
					Continuous Learning A	ssessment(50%weightage)				FinalExamina	ition(50%weightage)
	Bloom's Level of Thinking	CLA-1(10)%)	CLA-2(10)%)	CLA-3(20	0%)	CLA-4(10	%)#		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
oual1	Remember	200/		200/		30%		200/		200/	
Level1	Understand	30%		30%		30%		20%		30%	
evel2	Apply	40%		40%	7.0	40%		40%		40%	
VEIZ	Analyze	4070		40 /0		4070		40 /0		4070	
evel3	Evaluate	30%	-	30%		30%		40%		30%	
EVEIS	Create	30%	/	30%	$\{N-I\}$	30%	TITLET	40%		30%	
	Total	100 %	11	100 %		100 %	T.E.A.	100 %		100 %	

#CLA-4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr.N. Banu, Bharathi Womens College (Autonomous), Chennai	Dr. S. Samuel Joshua Pragasam, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code		UBT23D03T	Course Name	FORENSIC	SCIENCE	4	Course	Catego	ry D	1/2	,		Di	scipline	Specific	Elective	Course		<u>L</u>	T 0	P 0 0 2	
	Pre-requisit	e Courses	Nil	Co-requisite Courses		Nil			F	rogress	ive Cou	ırses						Nil				
Co	ourse Offerin	g Department	BIOTECHN	OLOGY	Data Book / C	odes/Sta	andards						A			Nil						
Course L	earning Ratio	nale (CLR):	The purpose of learning this	course is to,			1		Learnin	g		Progra	am Lear	ning Outo	comes (F	PLO)						
CLR-1:		, ,	ence and various departments in fo	prensic science.	17.350	77	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:		0	estigation and evidence collection	2.00	4. 48.3628			11 33	155						1							
CLR-3:		lences left during <mark>the cr</mark> i		10/10/2	100			100			3											
CLR-4:	How to analy	ze the consequ <mark>ences o</mark>	f <mark>a cri</mark> me		1 1 1 1 1		<u></u>		<u></u>		d)		lines	1		eg G						
CLR-5:	Learning diff	erent BEOSP	FA			2v.	Thinking (Bloom)	cy (%	nt (%		ledge	epts	iscip	age	ion	owlec		Jata		SIIIS	Sill S	
CLR 6	Candidates (understanding <mark>on Cyber</mark>	forensic		1		ing (icien	inme		Know	Con	ted [owle	aliza	e Kn	guill	pret [SKiilS	ng SI	on S	<u>s</u>
		itcomes (CL <mark>O):</mark>	At the end of this course,	RE 11 - AC 1 - AC 1	107.	7	Level of Thin	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills
ļ		0 1	<mark>d de</mark> velopment of Forensic Science		The Mile		2	85	80		Н	L				L		L	L	L		
CLO-2:		erstanding the C <mark>rime Sc</mark>		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			3	85	80		М	Н				М		M	Н	М		
CLO-3:		vledge on Duties <mark>of fore</mark>				ш	3	85	80		Н	Н				М		Н	Н	М		<u> </u>
CLO-4:		ered by forensic s <mark>cience</mark>	laboratory				3	85	80		Н	Н			-	М		Н	Н	М		
CLO-5:	· ·	on different BEOSP				7.5	3	85	80			Н				Н		Н	Н	М		
CLO 6	Candidates i	understanding on Cy <mark>ber</mark>	forensic			ш	3	85	80		M	Н		<u> </u>	-	M	-	Н	Н	M	-	-
Duration (ho	ur)	12	W.	12		12				12	2		7		7		12					
S-1	SLO-1	Definition and scope	of ForensicScience.	scene of crime- PRIMARY CRIME SECONDARY CRIME SCENE	SCENE,		Prints, Pr print Analy		of	To	xicolog	y- Medic	o-Legal	Aspects	OfPoiso	ning	Brain ele (BEOSP)		scillation	signature	eproficier	icy
S-2	SLO-1	History and Developm	nent ofFor <mark>ensic Science</mark>	Securing the Crime Scene, Recor the Crime Scene, sketching,photo		Collect	ing Finge	prints			assificat dministi		oison- R	Routes Of			Cyber for	ensic				
S-3	SLO-1		orensic Science in India and of Forensic ScienceLaboratories	Tools for Evidence Collection, Ch Standard/Reference Samples,	ain of Custody,	Foot pr	ints- Prod	ess offir	ngerprint		ction Of Disons	Poison-	Factors	Modifying	gAction	of	Polygrapl	n test				
S-4	SLO-1	Anthropometric burea of explosives	u, Finger printbureau, Department	Preservation of exhibits/evidences	S	Footpri	nt analys	S		IN	JURIES	AND S	EX REL	ATEDISS	SUES		DNA Ana	llysis- DN	NA finger	printing		

S-5	SL0-1	Serologist to the Government ofIndia, Government examiner of questioned document	Principles of Forensic Document Examination	Blood Evidence: Basics andPatterns	Injury- njuries by MechanicalViolence,	Tape and video authenticationSpeaker identification etc.
S-6	SL0-1	Footprint section, Note forgerysection, Ballistics laboratory	Limitations of forensic documentexamination	Blood Stain Pattern Analysis	Sex related issues- sexual offences	Case studies on Sedition charges(Atleast 2)
S-7	SLO-1	Central forensic sciencelaboratories	Physical evidence; types,significanceand collection	Collection and Preservationof Blood Stain Analysis	Examination of the Victim Examination of the Accused	Case studies on Economic offences(Atleast 2)
S-8	SLO-1	Recommendations of scientific advisory committee to the cabinet	Locard's Exchange Principle	Semen Analysis, Medicolegal importance of Age	medico-legal aspects of sexualoffences	Visit to a police station to know theprocedural aspects after a crime.
S-9	SL0-1	Detection of Counterfeit Currency	Tools and techniques	Types Of Witnesses- Inquest, types of inquest	POCSO Act and its provisions	An online discussion with forensicexperts on their field experts
S-10	SLO-1	Intro to IPC	PERSONAL IDENTIFICATION- forensic anthropology,	CONSENT- Types of consent	Case studies on few sexual crimes (Atleast 2)	An online discussion with forensicexperts on their field experts
S-11	SL0-1	Intro to CrPC	age determination,	THANATOLOGY- Types, Modes,	Case studies on few Murders (At least2)	Discussions
S-12	SL0-1	forensic medicine and Indiancriminal laws	photoanthropometry	A MARKET A	Case studies on few Criminal conspiracies (At least 2)	Discussions

	1.	Introduction to Forensic Science in Crime Investigation –Dr.RukmaniKrishnamurty, "Selective and Scientific Books", 1st edition 2011	4.	Moenseens, A.A., Starrs, J.E., Henderson, C.E. and Inabare, F.E., 1995. ScientificEvidence in Civil and
Learning	2.	Richard Saferstein, 2001, Criminalistic: "An Introduction to Forensic Science". 7th editionPrentice-Hall, New Jersey.		Criminal cases, IV edition, Foundation Press, Westbury, NewYork.
Resource	3.	L.J. Kaplan, 2001. "A laboratory manual for the introduction to the Crime Lab". Williamstown, Massachusetts.	5.	Fishes, B.A.J., 2000. "Techniques of Crime Scene Investigation". VI edition CRC Press, Boca Raton, 2000
S			6.	Criminal Manual (Cr.P.C., I.P.C. & Evidence)

Learning Ass	essment					1000					
Level	Bloom's Level of Thinking			С	ontinuous Learning Ass	essment (50% weighta	ige)		7 -		xamination(50%
		CLA - 1 (10%)	CLA - 2 (10%)	CLA – 3 (2	20%)	CLA - 4 (10	%) #	weight	age)
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%		40%		40%	-	40%		40%	-
	Understand					100		_ <	_ / :		
_evel 2	Apply	40%	. 7	40%	RW.	40%		40%	7	40%	-
	Analyze		/_	TITI	FT-CT-A	LIGHT	' • 1 E				
_evel 3	Evaluate	20%		20%	-	20%		20%		20%	-
	Create										
	Total	10	00 %	10	0 %	10	0 %	100) %		100 %

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr.N.Prasanth Bhatt, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code		UBT23D04T	Course Name	Ot.	BIOE	ENERGY			ourse egory	D	1		Dis	scipline S	pecific	Elective Co	ourse		L 4	T 0	P 0 0 2	C 4
Pre-requisi	iteCourse	S	Nil	Co-requisiteCourses	Ni	il				N.	V	Pro	ogressive	Courses					Nil			
Cour	rse Offerir	g Department		Biotechnology	Data B	look / Codes/Sta	indards						#		N	il						
				& W /	6,75																	
Course Learning R	ationale (C	LR):	The purpose of learnin	g this course is to:	196		1	earning					Pr	ogram Lear	ning Outc	omes (PLO)						
CLR-1: Un	nderstandin	g of basics of bioenergy		C F. Ic		700	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
	derstandin	g of wood and grass bio	energy	A 1277.	777		-		wii-									-				+
1		n algal bioenergy	3,7		100					1						eas	P					
	-	n biogas production and	anaerobic digestion		777	~~	(mo	(%)	<u>%</u>	14.1	Fundamental Knowledge	Analyze, Interpret Data	<u>_</u>	SS		Communication of complex biotechnological ideas	independent and lifelong learning					
V=	•	• .		in bioenergy production	ar en	100	- 8	Suc	, Jent		Mon	pret	apilla	actice	Vork	on of	ende	PS0 - 1	PS0 - 2) - 3	PS0-4	PS0-5
OLIC-J.							⊔ ligi	ofici	tainn		ıtal k	Inter	Reasoning ability	Ethical Practices	Team Work	nicati	deb	PS	PS(PS0 -	PS	PS
						-	Ę	ed P	ed A	100	amer	lyze,	Seas	EĦic	Te	biot	-= <u>a</u>					
Course Lear	rning (Outcomes (C <mark>LO):</mark>	At the end	of this course, learners will be able to:			evel of Thinking (Bloom)	Expected Proficiency (%)	UExpected Attainment (%)		Fund	Ana				S						
CLO-1: Kn	nowledge a	bout bioenergy and source	ces and their need for s	ustainable developments		7. 1	2	80	70		М	М	Н			-	1 1				+	+-
020	•	g of wood based bioener					2	80	70		M	M	М	M		, 	H M				+	+-
OLO L .		g of algae based bioener	0, 1				2	85			M	IVI	Н	IVI		·					+	+
		bout biogas production p	0, 1				2	85			L	M	Н	Н	M	N	-				+	+
	-			Ivanced techniques in bioenergy production.			3	85			Н	H	M		M	N.					\vdash	+-
CLO-3.	ioniougo c	bout blouissor production	modicus una rocciti de	manoca toominquos in biosinigy production.				00	70		П	П		-	IVI	IV	II L					
Duration (hour)			12	12				12						12					1	2		
	SLO-1	Introduction to Bioenergy		Wood Bioenergy-introduction		Algae Based Bio					Anaerobic	digestion	-7			В	iodiesel prod	duction				
		Concepts of Bioenergy															roduction pro					
S-2 S	SLO-1	Bioenergy Development		Wood Energy Sources		Algae as a Sustair	nable Feedstock	for Multip	leUses		The anaero	bic digesti	on process t	or biogas pr	oduction		atch process					
S-3 S	SLO-1	Policy, Government Reserved Feedstocks	earch programs	Values and Benefits of Wood Bioenergy	$\Delta + C \Delta$	Importance of Ligh	nt in Dhotocynth	neie alaal	arowth		Benefits of	anaorohi	c diaaction				Continuous pr Ioncatalyzed		hiov proc	220		
3-3	DLO-1	1 GGUSIOCKS		values and benefits of wood blockergy	PT-FT	importance or Ligi	it iii i notosynu	icsis-aiyai	growur		Delicitis vi	anacrobi	L digestion				iupercritical p		DIOX PIOC	1033		
S-4 S	SLO-1	Biomass Materials and S	Sources	Managing Wood Biomass for Bioenergy		Biofuel Production	n from Algae	Biomass		-	The fermer	iting bacte	ria and meth	nanogen rela	tionship		ost reaction		g			
		Forest-Based Feedstocks															ster/glycerol		1			
S-5 S	SLO-1	Agriculture-Based Feeds	tocks	Direct Combustion Options		Algae Strain Selec	ction: Algae Typ	es, Strain	s, and Use in	Biofuel	The proces	s of start	ing a diges	ier		_	ster washing					
S-6 S	SLO-1	Waste-Based Feedstocks		Biochemical Technological Processes		Production Algae Cultivation:					Onoration	and contro	ol of a dige	ctor			Other ester tr Treatment and		nf cido a	ctroame		
3-0 3)LU-I	Manic-Danca I ccannony	·	biochemical Technological F10Cesses		Photobioreacto					Operation	and COILL	n or a ulye	3161			icaliiciil dill	u iccovel)	or sing 3	oucams		
S-7 S	SLO-1	Agroforestry Feedstocks		Thermochemical Processes		Open System					Role of mi	xing in bio	ogas produc	tion		P	retreatment of	of high fro	ee fatty ac	cid feedstoo	cks	
		Biomass from Conservati	tion Lands			Fermenters													,			
S-8 S	SLO-1	Advanced Fuels from Alg	gae	Economics Of Woody Bioenergy		Algae Harvesting					Effect of s	oeed on n	nixing				crobial fuel o		(n==::			
																В	lio-sensitized	solar cel	ls (BSSC)			

S-9	SLO-1	Biomass Supply and Availability	Economics Of Woody Bioenergy Production	Oil Extraction from Harvested Algae Biomass	Types of anaerobic digesters	Photobioreactors
						Bacteriorhodopsin
S-10	SL0-1	Overview of Conversion Technologies	Sustainability Of Woody Bioenergy	Challenges In Upscaling of Algal Biofuel Operations from Bench to	Suspended growth systems	Restriction on the use of bio fuel due to human health and concern
	SLO-2			Commercial Scales		of environment
S-11	SLO-2	Co-Products and Byproducts	Bioenergy from Perennial Grass Biomass	Integrated Algal Biofuel Production	Attached growth system	Socio economic impacts of bio energy
	SLO-2		Biomass Conversion			
S-12	SL0-1	Social, Economic, and Environmental Impacts	Environmental Impact of Grass Biomass	Life Cycle Analysis, Economics, and Environmental Impacts	Merits and demerits of biogas consumption	Government initiatives and role to improve theuse of bioenergy
	SLO-2		Economic Considerations for Grass Biomass			

Learning Resources 1. Anju Dahiya, Bioenergy Biomass to Biofuels, Academic Press (2015) 2. Wei-Hsin Chen, Keat Teong Lee, Hwai Chyuan Ong, Biofuel and Bioenergy Technology, MDPI(2019) 3. Renewable Energy, Sorensen B. (2010): Fourth Edition, Academic press 4. Introduction to Bioenergy (Energy and the Environment), Vaughn C.Nelson and Kenneth L. Starcher (2016), CRC Press, New Delhi	
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

					Continuous Learning As	ssessment (50% weightage)	Sec. 15.			Final Examination(50%		
	Bloom's Levelof Thinking	CLA - 1 (10)%)	CLA - 2 (10	%)	CLA - 3 (20)%)	CLA - 4 (10	%)#	weightage)		
	Tilliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
, d 1	Remember		1 (C 3)	12.7	11 11 11	State of the State of						
rel 1	Understand	30%	5530	30%	The Mary	30%	200	30%		30%	-	
, al 1	Apply		100	2 200								
rel 2	Analyze	40%		40%	-	40%	-	40%	-	40%	-	
4.1	Evaluate		2.									
rel 3	Create	30%		30%	- //	30%	-	30%		30%	-	
	Total	1	00 %	10	00 %	1	00 %	1 11.	00 %	1	00 %	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Trainin <mark>g and Research Institute, Chennai</mark>	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. PARTHIPAN.P, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code UBT23G04J Course Name		SSUE ENGINEERING			ourse tegory	С					PROFES	SSION C	CORE			L 4	T 0	P (O C 2 4
Pre-requisite Courses Nil	Co-requisit	e Courses	Nil			Progre	essive	Course	S					Nil					$\overline{}$
Course Offering Department	BIOTECHNOLOGY		Codes/Stand	dards							T	N	lil						
										4									
Course Learning Rationale(CLR):	The purpose of learning	this course is to			Learning							Program	Learning	Outcome	s (PLO)				
CLR-1: Know about the cell interaction and matrix				1	2	3	Г	1	2	3	4	5		7	8	9	10	11	12
CLR-2: Have knowledge on Tissue organization and it	stynes		-776	ш.	2	3		- 1		3	4	5	6	/	0	9	10	11	12
CLR-3: Understand about stem cells and its importance	71			7.4	-									ong					
CLR-3: Know about tissue synthesis			~	(mo	(%)	(%)		edge	Sata	≥-	SS		Communication of complex biotechnological ideas	ndent and lifelong learning					
CLR-5: Know about curing the diseases				(Blo	ncy (ent (nowle	oret [abili	actice	Nork	of con	t and	PS0 - 1) - 2	- 3	PS0-4	PS0-5
CLR-5: Know about caring the discusses				Thinking (Bloom)	Proficiency (tainm		ta K	Interp	oning	al Pr	Team Work	tion c	nden	PSC	PS0 -	PSO	PS(PS(
				Ē	P Pr	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Ĕ	nmunication of comple biotechnological ideas	independent learni					
Course Learning Outcomes (CLO): At the	e end of this course, learners will	be able to:		evel of	Expected	pecte		, m	Anal				biot	ind					
CL C-1 . Know about the cell interaction and matrix		11000		- T	五 75	五 70		Н	-14			_	3	Н					+
OLO-1.	ts types			1		70		Н	М	M	Н	-		П					+
CLO-2: Have knowledge on Tissue organization and it CLO-3: Understand about stem cells and its important		Wall from		1	75				IVI	IVI									\vdash
CLO-4: Know about tissue synthesis		the same of	4	1	75 75	70 70	-	Н		M	Н								+
020 41.				1				H		IVI	N.4			- 11					
CLO-5 : Know about curing the diseases					75	70	L	П			М			Н					
	40	10						40				-				40			
Duration (hour) 12	12 Structure and organization of	Tissue grafting- Introduction			Three-Dim	nensional S	Scaffold	12 Is. Introd				Sta	em Cell the	rany – Ga		12 tinal			
S-1 SLU-1	tissues- Introduction	9 9								- 14	7			тару Ос	1311011110.	unui			
S-2 SLO-1 cell-cell interaction	Epithelial,	Types of tissue grafting				nensional S						Ki	dney						
S-3 SLO-1 Cell differentiations,	connective	Application of stem cells in tissue	grafting		Fissue En	gineering a plation Ted	and Tra	ansplant	ation Tec	hniques -		Н	eart						
call matrix	muscle tissues- Universal	Stem cells - properties.			Modes of	Cell and T	milique Fissue	S Delivery				Lu	ng disorder	ς					
S-4 SLO-1	Characteristics of Muscle	I KAKN		7						-									
S-5 SLO-1 Biology of cells in culture	Microscopic Anatomy of Skeletal Muscle	Stem cells - Classification.		1	Modes of	Cell and T	issue D	elivery				E	ye Disease:	S					
S-6 SLO-1 cell culture bioreactors -introduction	Nerve tissues- Anatomy of aNeuron	Types of Stem cells - embryonic	stem cells	E	Breast rec	onstruction	n- Intro	duction				Al	zheimer						
S-7 SLO-1 Types of Bioreactors	Classification of Neuron	Adult stem cells				onstruction							lammatory		ease				
S-8 SLO-1 Three-Dimensional organization of Cells in Culture	Nerve fibres	Induced pluripotent stem cells- de them	eriving		Ü	tion of Bor						Liv	er diseases	6					
S-9 SLO-1 Organ Culture, S-10 SLO-1 Histotypic culture	The Nerve-Muscle Relationship	Hematopoietic Stem Cells]	Technitue	for Regen I Pancreas	eration	of Bone	and Car	tilage			abetes	ronhu					
S-10 SLO-1 Histotypic culture S-11 SLO-1 Organotypic Culture	The Nerve-Muscle Relationship Artificial organs	Mesenchymal Stem Cells Application of these stem cells			sioariilicia Fechiniqi		s - IIII/C	uuclion					ıscular dyst ıltiple sclerd						
S-12 SLO-1 Application of these cultures	Bioprinting of Organs and Tissue					tion of hep	atocyte	S.					inal cord in						

Learning	1.	Griffiths, A. J. F., Wessler, S. R, Carroll, S. B., Doebley, J. (2010). An Introduction to Genetic Analysis (10thed.). W.H. Freeman & Company (New York). ISBN:10: 1- 4292-2943-8
Resources	2.	Pierce, B.A. (2012). Genetics - A Conceptual Approach (4thed.). W.H. Freeman & Co. (New York). ISBN:13: 978-1-4292-7606-1 / ISBN:10:1-4292-7606-1.
	3.	Snustad, D. P., Simmons, M. J. (2015). Principles of Genetics (7th ed.). ISBN: 978-1- 119-14228-7

	Bloom's			Co	ntinuous Learning Asse	ssment (50% weighta	ge)			Final Examination	(50% weightage)			
	Level of Thinking	CLA – 1	(10%)	CLA – 2 (10%)		CLA - 3	20%)	CLA – 4 (10%) #	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
	Lovor or Trimining	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice			
Level 1	Remember	40%		20%	75.75	20%		40%	<i>(</i> ()	30%				
Level 2	Understand	40%		20%	2.4	20%		40%		30%				
Level 3	Apply	10%		30%	100000	20%				20%				
Level 4	Analyze	10%		30%	6-1 11775	40%		20%	4-2-	20%				
Level 5	Evaluate	-			7.5		2012/2017				-			
Level 6	Create	-		-	10 10 10						-			
	Total	10	0 %	100	0 %	100	%	10	0 %	1	00 %			

CLA – 4 can be from any combination of these: Assignments, Seminars, Scientific Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennal	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. N. Prasanth Bhatt, Assistant Professo <mark>r, Dept. of Bio</mark> technology, FSH, SRMIST, KTR

Course Code	UBT23P03L	Course Name	/ ,*	Mini project		LEILY	Coi Cate	irse gory	Р	a.			li	nternship	s/ Project	Work		L 0	T 0	P 0 4 2	
Pro	e-requisite Courses	Nil		Co-requisite	e Courses	Ni			Prog	ressive (Courses						Nil				
C	ourse Offering Departme	ent	Biotech	nology	Data Bo	ook / Codes/Standa	rds				-	2.			Nil						
Course I	Learning Rationale(CLR):	The purp	ose of learning this course is to			Lear	ning					5	Program	m Learning	Outcom	es (PLC))			
CLR-1:	To test the ability to iden	ify research gap	_^		12.00	27	1 :	2 3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	To test the ability to ideti	y the problem		7 Miles		76.7															
CLR-3:	To test the ability to devi-	se a pl <mark>an of study</mark>		7 779	1000			239.51					5)					
CLR-4:	To teach how to determine	ne the methodology			10 M	licios and a	4		11.	edge		eut	esear			Sustainability		/ork		92	
CLR-5:	To test the practical know	vled <mark>ge</mark>				a a	le Ve	Nel	1	Knowledge	Analysis	Development	Design, Research	Usage	Iture	625		Team Work	ltion	& Finance	Learning
Course Le	earning Outcomes (CLO): At the e	end of this course	learners will be able to:	- 3	Bloom's eve	Bloom'sLevel	Bloom'sLevel	100	Fundamental	Problem Ana	Design & De	Analysis, De	Modem Tool	Society & Culture	Environment	Ethics	Individual & 7	Communication	Project Mgt.	Life Long Lex
CLO-1:	Knowledge on reading th	e r <mark>eview of lite</mark> rature		B. C. San	7.77	2 2				H	Н	Н	Н	-	-		Н	Н	-	Н	Н
CLO-2:	Knowledge on problem s	olv <mark>ing methods</mark>		W/2 2527		E \ \ ' E				Н	Н	Н	Н	-	-	-	Н	Н	-	Н	Н
CLO-3:	Knowledge on devising r	net <mark>hodol</mark> ogies			77.12		10/14		14	Н	Н	Н	Н	- 1	-	-	Н	Н	-	Н	Н
CLO-4:	Hands- on knowledge or	various techniques	_	A 5 47 1 1925	1		7			Н	Н	Н	Н		-	-	Н	Н	-	Н	Н
CLO-5:	Knowlwdge to interpret the	ne re <mark>sults</mark>	1			NO AND A				Н	Н	Н	Н	-	-	-	Н	Н	-	Н	Н

		Continuou	Learning Assessment s Learning Assessment(50% wei		7	Final Evalua weight		
	Seminar		Review – 3		Dissertation	Presentation		
		Overview of the Dissertation	Research findings	Oral Presentation andInteraction	4	37	Research Outcome**	Viva- Voce
Project Work	10%	10%	20%	10%	20%	10%	10%	10%
Total		/ 1 1 1 1 1 1	50%	IP. I DAINE		50%	, D	

SEMESTER VII

Course Code		UBT23701J	Course Name	AL BIOTECHNOLOGY		Cou Categ		С	1/2	<u> </u>		Disci	pline Sp	ecific Core	Course	s	3	T 0	P 0 3 2	C 4	
	uisite Cours Course Offerir	ses ng Department	Nil	Co-requisite Courses Biotechnology	Nil Data Book / Codes/Stand	lards					Pr	ogressive	Courses	N	Jil			Nil			
Course Learnin	g Rationale (0	CLR):	The purpose of lear	rning this course is to:		W.	İ	Learnin	ng			T	Prog	gram Lear	ning Outcomes	(PLO)			-		
		ability to identify i	0 1	S A ER		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:		ability to idetify th			3 7 7 7 7 7 7		4.78	12.1		•					s ex	<u>g</u>					
CLR-3:		ability to devise a			- A 180 H	~	<u></u>			ge	ta				ompl	and lifelong					
CLR-4:	To teach h	low to determine t	<mark>he methodolo</mark> gy		4 4 5 5 5 5	00	8	% ±	10.11	Med	t Da	£	ces	~	of co	a F	- T	2	~	4	2
CLR-5:	To test the	practical knowled	ge	V 4 1117	Description of the second	g (B	ienc	men		Kno	rpre	g ab	racti	Wor	ion	nt a	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PS0-5
					Sec. 355 107	inkin	rofic	ttain		ntal	Inte	onin	Ethical Practices	Team Work	nica	ande.	<u>P</u>	δ,	PS	ď	<u>a.</u>
Course Lo	earning (Outcomes (CL	O): At the en	d of this course, learners will be able to:		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethic		Communication of complex biotechnological ideas	independent and					
CLO-1:	Applying k	nowledge on aerol	bic waste water treatm	nents and its methodologies	1. T. T. T. T. T.	2	80	75		М	М	М	L	L	ŀ	Н					
	,		waste management a	•	700	2	80	75		М	Н	М	L	L	ŀ	Н					
CLO-3:	1170		c and inorganic contar			2	85	75		М	Н	L			N	1 1					-
		0 0	knowledge for waste r			2	85	75		Н	M	L	Ī	Ī	ŀ						+
				le management of environmental pollutions		3	85	75		Н	Н	L	L	M		1 L					
							,		_											,	
Duration (hour)			12	12			2						12						2		
S-1	SLO-1	Basics of Environm	ental biotechnology	Overview of atmosphere	Introduction to wast	e water				Solid wast	e manage	ement -intro	duction			leav y meta					
0.0	SLO-2	Ecosystem concept								0						Removal of		als			
S-2	SLO-1	Structure of Ecosys		Overview of hydrosphere	Sources and impact	S				Sources of	solid wa	iste materia	IS			Metals, radi			1		
C 2	SLO-2	Functions of Ecosys	stems	An over two of lith contrary	Applie appear	-	-			Too also and a	اد داد داد		المالية المناب	lala ala al		Phosphates					
S-3	SLO-1 SLO-2	Abiotic components	aamnananta	An overview of lithosphere	Aerobic process	ıto.			-	rrealment n	ietnoas pr	tysical, che	mical and bi	lological	- 1	kole ol Indiç	jenous micr	oorganisms	on blore	mediation	
S-4	SLO-2	Functions of Abiotic Biotic components	, components	An overview of biosphere	Preliminary treatmer Primary treatments	IIS		- 1	æ	Bioaugm	ontation					Phytoremedi	ation of oil	cnill			
J ²⁴	SLO-1	Functions of Biotic	components	All Overview of biospirere	Screening and grit	hamher						paugmentati	on			hytoremedi			rontamir	nations	
S-5	SLO-2	Forest ecosystems	components	Environmental pollution- Introduction	Secondary treatmen					Biostimu		vauginentali	VII			Vano-bior			Jonaniii	iutiviis	
	SLO-2	Marine ecosystems		Entirollimental policion introduction	occonduty treatment	io illotitodo				Factors af		nstimulation				ano-bioreme			llutants		
S-6	SLO-1	Global issues-introd	uction	Air pollution source	Activated sludge					Bioleach						Photocata		organio pi	aturItJ		
	SLO-2	Ozone depletion-sou		Impacts and control methods						Mechanism						hotocatalytic		on of orna	nic polluta	ints	
S-7	SLO-1	Ozone depletion-imp		soil pollution source						Bioleaching											
1-	SLO-2	Global warming		Impacts and control methods	Thorating litters					3.0.00011111	,					Biosurfactants role in degradation Degradative plasmids					
S-8	SLO-1		s of ozone depletion	water pollution source	Rotating biological	contactors				Oil spill im	pacts					J		in bioremediation			
	SLO-2	Controlling measure		Impacts and control methods	J J	Treatments of oil soil Molecular techniques in bioremediation															

S-9	SL0-1	Acid rain - Natural sources	Noise pollution sources	Oxidation pond and oxidation ditch	PAHs impacts on environment and health	Immobilization technology in waste management
	SLO-2	Acid rain due to anthropogenic activities	Impacts and control methods	Tertiary treatments	Treatment methods of PAHs contamination	Immobilization technology -advantages
S-10	SL0-1	Acid rain impacts	Thermal and light pollution	Anaerobic treatments methods -Background	Xenobiotic types and sources	Anaerobic digestion
	SLO-2	Acid rain controlling methods	Impacts and control methods	Anaerobic degradation of organic matter		Biogas production
S-11	SLO-2	Awareness on global issues	Measurements of pollutants	Anaerobic filter systems	Treatments methods for xenobiotics	Extraction of biogas
	SLO-2	Awareness on global issues	Spectroscopic methods (UV and FTIR)			Extraction of biogas
S-12	SL0-1	Sustainable approaches for management of ecosystems	Chromatography methods (GCMS, LCMS, HPLC)	Upflow anaerobic sludge blanket (UASB)	Impacts of pesticides and insecticides	Methods of odour control
	SLO-2	Sustainable approaches for management of ecosystems	AAS, ICPMS, and XRF	Advantages of anerobic process	Impact of surfactants	Discussion

Learning Resources

- Waste water engineering treatment, disposal and reuse, Metcalf and Eddy Inc., Tata McGraw Hill, New Delhi.
 Environmental Chemistry, AK. De, Wiley Eastern Ltd, New Delhi.
 Bioremidation, Baaker, KH and Herson D.S., 1994. Mc.GrawHillInc, NewYork.
- 4. Industrial and Environmental Biotechnology Nuzhat Ahmed, Fouad M. Qureshi and Obaid Y. Khan, 2006. Horizon Press.

Learning Ass	sessment			100					7.				
		7.00		E 67 10 6	Continuous Learning As	ssessment (50% weightage	e)			Final Examination(50%			
	Bloom's Levelof	CLA - 1 (1	0%)	CLA - 2 (1		CLA - 3 (CLA - 4 (10	0%)#	weightage)			
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice		
el 1	Remember			(3) (3)	7		建筑技术						
	Understand	30%	100	30%	9 - 7 - 7	30%	31 1 445	30%	-	30%	-		
el 2	Apply			N. 400	111 11 11	A LA CARRE							
	Analyze	40%	-57.64	40%	THE THERE	40%	Sec. 14.	40%		40%	-		
rel 3	Evaluate			2000		7.4.64	Vie Tiladi						
	Create	30%		30%		30%		30%	-	30%	-		
	Total	1	00 %		100 %		100 %		100 %	1	100 %		

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College,	Dr. PARTHIPAN.P, Assistant Professor,
	Chennai.	Dept. of Biotechnology, FSH,
	CARN - I FAD TRUE	SRMIST, KTR

Course Cod	le	UBT23D05J Course Name	STEM CELL BIOLOGY			Cour Catego		Ļ	D			Discipl	line Spec	cific Electi	ive Cours	se	3	T 0	P C) C 2 4
	equisite urses	Nil	Co-requisite Courses	Nil					М	7	Progr	essive Co	urses					NII		
COL		ring Department		ata Book / Cod	les/Stand	ards					₽,			Nil						
	000130 01101	and population	Diotosimology	utu Book 7 cou	iosrotana	ar u o				-										
Course Learning F	Rationale (CLR):	The purpose of learning	this course is to:	4-9		4		Lear	rning		T	4	Progra	m Learning	Outcomes ((PLO)				
		roduction of Stem cells and its Environmen			1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2: D	escribe the	Types of Ste <mark>m ce</mark> lls	7 2 2 2 3 3 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5											~	ъ					
CLR-3:	ustrate the I	solation and Culturing of Stem cells							a)					npley	ifelol					
	esearch the	Ethics and Guidelines and Controversies i	n Stem cell research	3.77	(moc	%	(%)		ledge	Data	.≧	S		roor salic	and					
0		plication of Stem cells in Various diseases	E C Pila D		evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong	PS0 - 1	PS0 - 2) – 3	PS0-4	PSO-5
OLIC-J.	3303 trio 7 tp	photon of Stem cells in Various discuses			king	oficie	tainn		tal K	Inter	ning	Pris	am /	icati	end	PS(PS(PSO	PS	PS
					Ē	d Pr	d At	6/30	men	Ze,	easc	thica	<u>a</u>	imur	deb					
Course Lea	rnina Outc	omes (CLO): At the end of this course	e, learners will be able to:	11.5	el of	ecte	ecte	9.4	unda	Analy	~	ш		Com	2. ⊑					
			All Control of the		1				110											
		es of Stem c <mark>ells and its s</mark> ources			2	75	80		Н	Н	Н	M	М	Н	М	Н		M	Н	
CLO-2 :	Distinguish the	types of Ste <mark>m cells and E</mark> volutionary Mechanism		100	2	70	75		Н	Н	M	Н	М	M	L	Н		L	Н	
CLO-3:	Execute the Iso	lation, culturi <mark>ng and differen</mark> tiation of Stem cells	TANK	N.	2	70	75		Н	Н	Н	Н	М	Н	М	Н	М	Н	Н	
CLO-4:	Debate the con	troversies in st <mark>em cell resea</mark> rch		11777	2	65	70		Н	М	L	L	Н	Н	Н	Н		Н	Н	Н
CLO-5 : /	Agree the Thera	apeutic approac <mark>h of Stem cel</mark> ls			2	65	70		М	Н	Н	Н	Н	Н	М	Н	L	M	Н	Н
	<u> </u>							l L										1		
Duration (hour)		18	18			18					-7	18					1	18		-
S-1	SLO-1	Introduction to stem cells	Embryonic stem cells	Differenti	iation of	stem cel	S		St	em cell	ethics an	d policies	6		Applicati	ons of st	tem cells	in Medic	cine	
S-2	SLO-1	Definition and basics of stem cells	Adult stem cells	Isolation	and cul	turing of	ESCs			hical Co search	ncerns ir	stem ce	ell .		Neurode	generati	ve diseas	ses		
S-3	SLO-1	Sources of stem cells	Hematopoietic stem cells Mesenchymal stem cells	Differenti	iation of	FSCs						Hyne h	one Conti	roversies	s Cardiac diseases					
	020 .	Properties of stem cells	/]] [] [] [] []			lturing of	ASCs				ell researc		opo oom		Diabet					
S-4-6	SLO-1	GLP: Stem cells	Isolation of Hematopoietic Stem cells	Charac				1	V	iability	Measu	rement	of HSC	S	Differe	ntiation	of HS	Cs		
				Flowcy																
S-7	SLO-1	Classification of stem cells	Neural stem cells	Differenti									em cellthe	erapy	Burns ai					
S-8	SLO-1	Cellular potency	Cardiac stem cells	Isolation							cell ther				Gastroin		disorders			
S-9	SLO-1	Plasticity of stem cells	iPSC	Differenti			nsdiffere	ntiation			therapy in				Liver dis					
	Stem cell niche microenvironment Similarities between iPSC and Embryonicstem of			ESCs, A	SCs,iPS	SCS.					ons. Progrnational	ress in c	linical		Pancrea	atic disea	ases			
S-10-12	SLO-1	Proper Equipment: Stem cells isolation and Maintenance	Culturing of HSCs	Cryopre	eserva	tion of I	HSCs		С		city ana	llysis of			Differe	ntiation	of HS	Cs		
S-13 SLO-1 Introduction to Stem cell niche Cancer stem cells			Fastan !	nfluonoi	og the pr	the proliferationand Challenges in clinical trials Spinal cord diseases														

			Introduction to stem cell signalingpathways	differentiation of stem cells		
S-14	SLO-1	Introduction to Types of stem cells	Molecular and evolutionary mechanisms of origin of cancer stem cells.	Hormonal Role in Differentiation	Role of stem cells in regenerative Medicine	Lung Regeneration
S-15	SLO-1	Stem cell niche and its role in cancer	Molecular and evolutionary mechanism maintenance of cancerstem cells	Asymmetric cell division Telomerase in relevance to stem cell development and differentiation	Role of stem cells in tissue engineering	Hematopoietic stem cell transplantationfor cancer.
S-16-18	SLO-1	Reagents: Stem cells isolation and Maintenance	Passaging and Sub culturing of HSCs	.Thawing of Cryopreserved HSCs	Differentiation of HSCs	Model Practical

Learning Resources	1.	Stem cells by C.S Potten., Elsevier, 2006.	
	2.	Essentials of Stem Cell Biology by Robert Lanza., fourth edition. Elsevier 2014.	
	3.	Stem cell biology and Gene Therapy by Peter Quesenberry., First Edition, Wiley-Liss, 1998.	
	4.	Embryonic Stem cells – Protocols by KursadTurksen., Second Edition Humana Press, 2002	

			10.00		Continuous Learning As	sessment (50% weightag	e)	_		Final Examin	nation(50%
	Bloom's Levelof	CLA - 1 (10%) CLA – 2 (10%)		10%)	CLA - 3 (20%)	CLA - 4 (10	%)#	weightag	
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Rem <mark>ember</mark> Understand	20	20	10	10	20	20	10	10	20	20
evel 2	Apply Analyze	15	15	20	20	20	20	30	30	20	20
evel 3	Evaluate Create	15	15	20	20	10	10	10	10	10	10
	Total	100 %		100 %	7/18//	100 %		100 %			"

CLA - 4 can be from any combination of these: Assignments, Seminars, , Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	- I Day	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr.N.Banu,Assistant Professor , Bharathi Womens College (Autonomous), Chennai	Dr.D.Sankari, Professor and Head Department of Biotechnology ,FSH ,SRMIST, KTR

Course Code	UE	BT23D06J	Course Name	A	ALGAL BIOTECHNO	LOGY	(CourseCa	ntegory	С		ı	Discipline	Specific	Elective Co	ourses		L 3	T 0	P 0) C					
	requisite Courses		NIL	Co-requisite Courses		NIL	·				7	Pro	gressive Co	urses				NIL								
	Course Offe	ring Department	BIO	TECHNOLOGY		Data Book / Codes	/Standards				- 1		4_	NI	L .											
Course	e Learning Rationa	ale (CLR):		The purpose of learning this	s course is to:	Xa. 28	194		Learnir	ng		¥			Prograr	n Learning	Outcome	s (PLO)								
CLR-1:	Learning the	collection, mainte	enance and preservation of alga	al culture.		100	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12					
CLR-2:	Studying the	basic and applied	<mark>l science beh</mark> ind the productior	of mass culture.				-							~											
CLR-3:	Teaching stu	idents about app <mark>lic</mark>	cations and future potential of a	algae.	F 10 . 77"	1.70				۵	_		-		mple	long										
CLR-4:	Educating the	e students on the	commercial production of alga-	e	1200	N 3 V.	(moo	(%)	(%)	pdi	Data	<u></u>	es		of col	nd life	_	0.1	33							
CLR-5:	Learning abo	. 488	A 19 19 19 19 19 19 19 19 19 19 19 19 19	g (Bl	enc)	ment	Y V	rpret	Reasoning ability	Ethical Practices	Team Work	ion (dent and learning	PS0 - 1	PS0 - 2	1	PS0-4	PS0-5								
02.101	Louining abo	at the Fatanette a	pprodon in algus	THE STATE OF	700		Ę	rofici	ttain	2	Inte	onin	al Pr	am	nicat	nde	PS	PS	PSO	δ,	δ,					
Course L	earning Ou	tcomes (CLO)	At the end of this	course, learners will be al	ble to:	17.1	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fiindamental Knowledge	Analyze, Interpret Data	Reas	Ethi	L .	Communication of complex biotechnological ideas	independent and lifelong learning										
CLO-1:	To acquire th	ne knowledge o <mark>f A</mark>	<mark>dgal cultur</mark> ing techniques.	- 377	11 1 1 1 1 1 1	and the same of	2	75	80	Н	L	L	М	М	L	Н	L	М	-	L	-					
CLO-2:	Understand t	the concepts of <mark>tis</mark>	sue culture techniques	100.00	100		2	70	75	Н	L	L	М	М	L	Н	М	М	-	L	-					
CLO-3:	To learn lab	organization and r	<mark>nutritional im</mark> portance of differe	nt algae.			2	70	75	М	L	L	М	М	L	Н	М	М	-	L	-					
CLO-4:	Understand a	about the algal iso	p <mark>lation, identif</mark> ication and cultiva	ition method.		1//	2	65	70	М	L	L	М	М	L	Н	М	М	-	L	-					
CLO-5:	To describe :	structure, function:	s and the economic importance	e of algae.			2	65	70	М	L	L	М	М	L	Н	М	М	-	L	-					
													<u> </u>													
Duration	,		18	18	_	41	18					18						18								
S-1	SLO-1		duction to Algae	Types of algae culture r			m for Spiruli					ae cultivati							of microa							
S-2	SLO-1		e cycle of Algae					ples			Designing of photobioreactor				Economic Importance of Microalgae											
S-3-6	SLO-1	Collection of algae. Isolation of Algae.					of algae usir	J		-	Phycoreme				Sepa					ae using TLC	<u>;</u>					
S-7	SLO-1		lgae in Ecosystem.	Chu 10 medium		TIC TREATM		- 1	p	tential of m		or SCP			Bl		conomics f									
S-8	SLO-1		Itivation of Algae in laboratory	Medium for diaton	Modern micro						rotene	l		Processing of algae Separation of essential biomolecules from algae using Column												
S-9-12	SLO-1	Microscopi	c observation of algae	Screening of Alga	Estima	tion of bioma	ISS		Inoculun	aevelopme	nt pilot sca	le production		Separation of			es from alg atography		Joiumn							
S-13	SLO-1	S	Sterilization	Medium for volvox cul	ılturing	Open pond sys	tem for alga	cultivation			Bio	ertilizer			Futuristic approaches in algal biotechnology.											
S-14	SL0-1	Preparati	ion of stock solutions	Medium for blue-green alg	gae (BG11)		culture syst				Bio	diesel														
S-15-18	SL0-1	0 0 1 7					f algal cells v	ith alginate).	Qualitat	ve estimatio	n of protei	n from algae.			Revision Model Exam										

Loorning Decourage	1.	BARSANTI, LAURA AND PAOLO GUALTIERI 2005 Algae-Anatomy, Biochemistry and Biotechnology. Taylor & Francis, London, New York. BECKER, E.W. 1994 Microalgae-Biotechnology and microbiology. Cambridge University Press.	4. 5.	Rogers K.2011. "Fungi, Algae and Protists", FirstEdition.BritanicaEducational Publishing. Encyclopaedia Britannica, 2011. Plants, Algaeand Fungi". Encyclopaedia Britannica Inc
Learning Resources	3.	TRIVEDI, P.C. 2001 Algal Biotechnology. Pointer publishers, Jaipur, India.		

					Learning Asse	essment						
			Continuous Learning Assessment (50% weightage)									
	Bloom's Level of Thinking	CLA - 1 (10%)		CLA – 2 (10%)		CL	A – 3 (20%)	CLA	- 4 (10%)#	Final Examination(50% weightage)		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
	Remember			-1 - 50	1.50 100 100					-		
Level 1	Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%	
	Apply				P 14.	10000						
Level 2	Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	
	Evaluate			E. 3 . 3	3	Vict. 1 1	A. A. S. S.					
Level 3	Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%	
	Total	100	%	100 %		100 %		100	%	100 %		

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers								
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts						
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant						
		Professor, Dept. of Biotechnology, FSH,						
		SRMIST, KTR						

Course Code		UBT23G05T	Course Name	MARINE BIOTECHNOLOGY		Course Category		С	14	Ų	1	7	Disc <mark>ipline</mark>	Specific	Core C	Course		L 4		T 0	P 0	0 C 2 4
Pre-	requisite C	ourses Nil	C	Co-requisite Courses	Nil	Progres	ssive Cour	ses			1		Α.			Nil						
							tandards				4		1			Nil						
Course I	earning Ra	tionale(CLR):		The purpose of learning this course is	s to	1111		Lear	ning					}	Progra	am Learnir	n Outcor	nes (PI (0)			
554.55	.ouig	onalogo za sy:		The part posses of rounning time obtained to		7. 50		200.		_			Ψ.		og	2001	y cutoo.	(. 2	٠,			
	To gain kno	owledge on the various m	<mark>arine habi</mark> tats and micro	oorganisms	45	288430	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	To know ab	out various animals <mark>and i</mark>	its communication meth	nods in sea		V-1828	10.00	11.5	4354							X S	g					
CLR-3:		and how marine org <mark>anism</mark>	' '				E	cy (%)	· ·		ge	et Data ability		ctices		ompl I idea	biotechnological ideas independent and lifelong learning					
		diversity, culturing <mark>of biom</mark>			37.	1700	Bloor		out (%		owlec		ability		/ork	n of c			- 2	.3	4-0	-5
CLR-5:	Application	of marine organisms in p	<mark>rodu</mark> ct production and i	its quality management	4	A Company of the	nking (oficien	tainme		ıtal Kn	Interpr	Reasoning ability	Ethical Practices	Team Work	nication	ndent an	PS0 - 1	PSO	PS0	PS0-4	PS0-5
Course Learning Outcomes (CLO): At the end of this course, learners will be able to:						evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	94	Fundamental Knowledge	Analyze, Interpret Data	Reas	Ethio	2	Communication of complex biotechnological ideas	indepe						
CLO-1:	Will know tl	he various micro <mark>organi</mark> sm	from the marine source	es and their significance		11 11 1	1	75	70		Н			L								
CLO-2: Know the higher organisms from flora & fauna and how they interact with one another						a de	1	75	70		Н	Н	Н									
CLO-3: Deals with organisms that sustain the extreme environment and its products of significance						2	75	70		-		М		Н								
CLO-4:	Knowing th	e diversity, produc <mark>tion kin</mark>	etics and products harv	vested from marine sources			2	75	70					Н	Н							
CLO-5:	Scope of m	arine industry, prod <mark>uction</mark>	<mark>i, export</mark> , maritime bene	efits and security			2	75	70			Н				Н						Н
Duration (hou	\	1	1	12			12						12	-					12			
•	SLO-1	Classification of the mar	•					Species shundance richness and diversity indices. Seefand, microbiology, factors, influencing m						ncina. mic	crobial.							
S-1				Marine plants		Marine viruses and	d Giruses			growth and activity												
S-2	SLO-1	Marine microbial habitat Ecosystems: Rocky shordunes,	res, Sand	Invertebrates: sponges, cnidarians, polyc	chaetes,	Giant bacteria and their significance			Bi	Biogeography, Recruitment, Growth, Mortality, Seafood, Borne pathogens, bacteria fungi, viruses												
	SLO-2	Salt marshes, Deep-sea mangroves and coral ree		Litin	AT.	-4.T	di/	ľ	• T	H	A.	n	r	1	ď							
S-3	SLO-1	Diversity of Marine micro Bacteria, Cyanobacteria		crustaceans, marine worms, molluscs,ec	S, Unculturable bacte exploitation	Unculturable bacteria: occurrence, characteristics and			and Cu	Culture of microalgae and invertebrates;				To	Toxins influencing food spoilage							
S 4	SLO-1	Algae, Fungi,		arthropods, Non- craniate (non-vertebrate chordates	Barophilic organisms & their applications			M: pr	Marine biomass and productivity- primary production, photosynthetic efficiency				Mic mic	Microbes as food single cell protein (SCP), microbial neutraceuticals								
S-5	SLO-1	viruses, viroids and prior	ns.	Adaptations of organisms to different habitats		Seaweeds for rem	Seaweeds for removal of metal pollutants			Se	Secondary production, productivity distribution in ocean environment					Quality management – concepts, planning, system, quality control						
S-6	SLO-1	Characteristics of marine microorganisms.	e	Marine Vertebrates	٠.,	GFP, RFP charact applications	teristics an	d their			Mechanism and factors affecting primary production,				Novel product development, marketing and sea food export							

S-7	SLO-1	Specialized microorganisms- Extremophiles: barophiles, thermophiles, psychrophiles	Marine fishes (bony, cartilaginous, jawlessfishes)	Green mussel adhesive protein	Preservation and processing – chilling methods, phenomena of rigor mortis, spoilage changes- causative factors	Marine Products Export DevelopmentAuthority (MPEDA)
\$8	SL0-1	halophiles,	Marine tetrapods (amphibians, reptiles,birds, mammals)	Chitosan : products and applications	Salt curing, pickling and smoking: Freezing and cold storage,	Novel products – nutritionpromotion
S-9	SLO-1	actinomycetes,	Plankton (phytoplankton and zooplankton)	Biomimetics	Canning procedures; Role ofpreservatives in processing.	Drugs from Sea
S-10	SLO-1	polyextremophiles,	Bio-communication in oceans, Microbe-microbe interaction	Barnacles and their effect on animals and shipping industry	Packing – handling fresh fish, frozen packs, individually quick frozen (IQF), layered and shatter packs	Pearl Production as an alternative to naturalcollection
S-11	SL0-1	anaerobes	Quorum sensing, Microbe-metazoaninteraction	Biofouling and measures to control it	Fishery by-products, cannery waste, feeds, silage,	Linkage between marine Biotechnology andShipping Industry
S 12	SL0-1	: 5	Population connectivity,	No the St. of	fish gelatin, fish glue, chitin	Discussion on economic importance of marine resources and maritime security.
		- F.		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pearl essence, fertilizer	

Learning	1.	Essentials of Marine Biotechnology, Prof. Dr. Se-Kwon Kim.
Resources	2.	Handbook of Marine Biotechnology, Prof. Dr. Se-Kwon Kim.

Learning Ass	-		Continuous Learning Assessment (50% weightage)									
	Bloom's Level of Thinking	CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3	3 (20%)	CLA – 4	(10%)#	Final Examination(50% weightage)		
	Hillikilig	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember	50%		40%	-	50%		30%	4 7	50%		
Level I	Understand			4070			-	3070		5076	-	
Level 2	Apply	40%		40%		30%		30%	N.	30%		
Level 2	Analyze	4070	2 D \	40 /0	1 14	30 /0	-	3070		3070	-	
Level 3	Evaluate	10%	9	20%		20%		40%		20%		
Level 3	Create		and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th	20 /0		2070		4070		2070	-	
	Total		100 %	47.4	100 %	100 %		100 %		100 %		

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers										
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts								
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR								

Course Code	U	BT23G06T	Course Name	Bioma	aterials				Course ategory	G				Gene	ric electi	ve		L 4	T 0	P 0	0 C 2 4
Pre	-requisite	Courses	Nil	Co-requisite Courses		N/:/				4	Dro	aroodus	Courses					Ni	:1		
		ng Department	IVII		Data Book /	Nil Codes/Stand	lards				Pro	gressive	Courses					IVI	1		
	ur so Oriorii	ig Dopartmont			Data Book 7	oodos/Otaria	iui uo														
Cours	e Learning	Rationale (CLR):		The purpose of learning this co	urse is to:		H		Lea	rning					Prog	gram Lea	arning (Outcome	s (PLO)		
CLR-1:	Learn the	basics of science L	pehind the materials	N-		50	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Understan	d the properties of	biomaterials		1, 200	7-7-1	77	-													+
CLR-3:	Learn the	characteristics and	l cl <mark>assifications o</mark> f biomater	ials	71.72.37				455						×.	long					
CLR-4:	Learn the	different types of n	naterials and composites us	sed for implantations			(mo	(%)	(%)	adue	Data	Ιλ	S		omple leas	diffe					
CLR-5:		٠,	ns and applications of biom		77 17	* 11 -	(B)	ency	nent	WOU	pret	abill	actice	Vork	of cc	dent and	PS0 - 1	0 - 2) - 3	PS0-4	PS0-5
CLIC-3.	20101111110	the beany ranetter	is and approaches of Signif	atorial in artifold organic			evel of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledne	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong	PS(PSO	PSO	PS	PS
					2 1 1 1 1 1 1 1	7	Ē	- B	ed At	ame.	yze,	Reaso	Ithic	P	unica	ebel					
Course L	earning (Outcomes (CL	O): At the end of	this course, learners will be able to:		14.	vel o	pect	pect	ju L	Ana		T.		biot	ie.					
CLO-1:	Idontify on	d classify the type	of biomaterials according to	a the ACTM standards		15	1	<u>3</u>	70	H	Н	1	Н	М	M	M					+
CLO-1 :	•	, ,,			-37/4				75			L									-
			pperties of various biomater		J. 1984		1	85	_	Н	М	L	M	M	M	L					-
CLO-3:			of biomaterials suitable for				2	75	70	Н	Н	Н	M	M	M	M					+
CLO-4:	,		es of the materials implante	,			2	85	80	Н	М	М	М	L	L	M					
CLO-5 :	Can design	n the materials spe	ecific to the body targets wi	h biocompatible parameters		-1111	3	85	75	M	L	М	L		M	M				<u> </u>	
Duration (hour)		12	12				12					12					1	2		-
S-1	SL0-1	Basics of material s	cience	Metallic biomaterial	Polym	neric and ceramic	cimplant	materials		Tissu	replacement	implants	77		T	oxicologica	al screenin	ng of biomai	terials		
	SLO-2	Definition of biomate	erials	Metals as implant material	Applic	cation medical				Medio	al compatibilit	y issues				ffects on h		•			
S-2	SLO-1	Requirements of a r	materials	Types of metallic implant materials	Natura	al polymers				Sutu	es				Е	3iocompat	tibility				
	SLO-2	Grading of materials	2	Stainless steels	Synth	etic polymers	- 1			Surgio	al tapes				P	Parameters	to check t	the biocom	oatibility		
S-3	SLO-1	Need for biomateria	ıls	Co-based alloys	Classe	es and types of p	polymers			Host t	ssue respons	ie .	7		Е	Blood compa	atibility				
	SLO-2	Usefulness of bioma	aterials	Ti and Ti-based alloys	Therm	nosets, thermopl	astics		. 1	Interfa	cial tissue rea	action			T	issue comp	oatibility				
S-4	SLO-1	Generations of impl	ants	Ceramic implant materials	Elasto	omer and merits	and deme	rits		Inflam	mation and fo	reign body i	response		T	oxicity tests	S				
	SLO-2	Opportunities and li	mitations	Bio ceramics, Aluminum oxide	Acrylic	c polymers				adapt	ve immunity				Α	Acute and cl	hronic tox	icity studies	S		
S-5	SLO-1	Classification of ma	terials	Glass ceramics and medical use	fluoro	carbon polymers				Syste	nic toxicity				lr	n situ impla	ntation				
	SLO-2	Types of biomateria	ls	Importance of stress-corrosion cracking	Silicor	n rubbers				Нуре	rsensitivity				ti	ssue cultur	е				-
S-6	SLO-1	Natural biomaterials	3	Host tissue reaction with bio metal	Viscoe	elastic behavior				Blood	coagulation				ŀ	Haemolysi	is				-
	SLO-2	PLA and PHAs		Corrosion behavior	Sree	p-recovery					materials inte				th	hrombogeni	ic potentia	al test			
S-7	SLO-1	HA, chitosan's		Importance of passive films for tissue adhesion	n Stres	ss-relaxation				Comp	osite implant	materials			S	ystemic tox	ricity				
	SLO-2	Alginate and fibroin		Hard tissue replacement implant	Strain	rate sensitivity				Mech	inics of impro	vement			lr	ntracutaneo	ous irritatio	on			
	SLO-1	Polymers, silicone b	piomaterials,	Orthopedic implants	Dentu	re base resins				Incorp	orating differe	ent elements	5		A	Artificial hem	noglobin s	ynthesis			

S-8	SLO-2	Medical fibers and synthetic polymers	Biocompatible factors	Properties of resins	Composite theory of fiber reinforcement	Artificial blood
S-9	SLO-1	Ceramics	Dental implants	Maxillofacial Prosthetic	short and long fibers	Artificial Heart
	SLO-2	Metals and semiconductors	Fixation and capping process	Materials used in prosthetics	fibers pull out	Prosthetic Cardiac Valves
S-10	SLO-1	Smart polymers	Soft tissue replacement implants	Latexes	Polymers filled with osteogenic fillers	Artificial lung
	SLO-2	Bioresorbable and bio erodible materials	Percutaneous planning	Vinyl plastisols, Sillicone rubbers	Hydroxyapatite	Oxygenator
S-11	SLO-2	Bulk properties of the materials	Skin implants	Polymers as Biomaterials	Hard tissue replacement	Artificial Kidney
	SLO-2	Surface properties	Skin compatibility	Hydrogels	Hard tissue Implants	Dialyser membrane
S-12	SLO-1	Micro and nano properties of materials	Heart valve materials	PTFE, PMMA	Host tissue reaction	Carcinogenicity
	SLO-2	Characterizations of biomaterials	Cardiac valve implants	PVDF, PE, PEG	Osseointegration	Mutagenicity

Learning Resources

Biomaterials Science: An Introduction to Materials in Medicine, By Buddy D. Ratner, et. al. Academic Press, San Diego, 1996.
 Sujata V. Bhat, Biomaterials, Narosa Publishing House, 2002.
 J B Park, Biomaterials – Science and Engineering, Plenum Press, 1984.
 John Enderle, Joseph D. Bronzino, Susan M.Blanchard, "Introduction to Biomedical Engineering", Elsevier, 2005.

Learning Asse	essment			5-9E	Continuous Learning A	ssessment (50% weightage				Final Examinati	on/50%
	Bloom's Level of Thinking	CLA - 1 (1	0%)	CLA - 2 (CLA - 3 (CLA - 4 (10	%)#	weightage)	
	Hilliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
	Remember			5 1 100 1		- Jan 111					
evel 1	Understand	20%	15%	15%	15%	15%	15%	15%	15%	20%	20%
	Apply								7		
vel 2	Analyze	25%	10%	20%	15%	20%	15%	20%	20%	20%	20%
	Evaluate							1 11			
vel 3	Create	10%	20%	20%	15%	20%	15%	15%	15%	10%	10%
	Total	1	00 %		100 %		100 %	m 4 1	00 %	1	00 %

[#] CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	LEAD LEAD	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. S. Thanigaivel Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	UBT23P04L	Course Name	INTER	NSHIP-III Course Cate	egory P Internshi	o/ Project/ Community Outreach	L T P O C 0 0 0 0 2
Pre	requisiteCourses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	
Cours	se Offering Department		Physics and Nanotechnology	Data Book / Codes/Standards		Nil	
Course Learni	ng Rationale (CLR):	sional skill developme	The purpose of learning this course is to: nt useful to employer such as teamwork, communic				
CLR-2: CLR-3:	provide unique learning o	p <mark>portunities b</mark> y exposii	ng the student to the environment and expectations area(s) of interest to enhance employability				
CLR-4:			ortunities prior to their graduation	of the same of the			
Course Learni	ng Outcomes (CLO):		At the end of this course, learners will be all rience with mentors or successful professionals to su		1 1 1 1 1 1 1		

	Continuous Learning Assessment (50% weigh	ntage)	Final Evaluation (50% we	
	Review – 1	Review – 2	Project Report	Viva-Voce
Internship	20%	30 %	30%	20 %

Course UBT23P05L	Course Name		Pr	roject Phase-I		Cours Categor		P	A		lr	nternship	s/ Project	Work		L 0		P 0 8 2	
Pre-requisite Courses Course Offering Departmen	Nil	Biotechnology	Co-requisite C	ourses Data Book / Co	Nil des/Standard	S		Progressive	Courses				Nil		Nil				
Course Learning Rationale(CLR):		The purpose of learning	g this course is to		-J)(B)	Learnir	ng			×		Program	Learning	Outcome	es (PLO)				
CLR-1: To test the ability to identify CLR-2: To test the ability to ideitfy CLR-3: To test the ability to devise CLR-4: To teach how to determine CLR-5: To test the practical knowle CLR 6 To teach how to write a dis Course Learning Outcomes (C	the problem a plan of study the methodology dge sertation	of this course, learners wil	Il be able to:		BloomsLevel	Bloom's Level	Bloom's Level	Fundamental Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	المولود الموادية الموادية الموادية الموادية الموادية الموادية الموادية الموادية الموادية الموادية الموادية الم	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning
CLO-1: Knowledge on reading the	review of literature	- 77			1	80	70	H H	H	H	H	<u>ĕ</u>		-	H	<u>ё</u> Н		H	H
CLO-2 : Knowledge on problem sol			1.00		1	85	75	Н	Н	Н	Н	-	-	-	Н	Н	-	Н	Н
CLO-3: Knowledge on devising me	thodologies				2	75	70	Н	Н	Н	Н	-	-	1	Н	Н	-	Н	Н
CLO-4: Hands- on knowledge on v					2	85	80	Н	Н	Н	Н		-	-	Н	Н	-	Н	Н
CLO-5 : Knowlwdge to interpret the CLO 6 Understanding the important		ssertation			3	85	75	H	H	H	H	-		-	H	H	-	H	H

		Continuous I	Learning Assessment(50% weightage)	The second	>/	Final Evalua weight	`	
	Seminar		Review – 3	P. I DATA	Dissertation	Presentation	Research	Viva-
		Overview of the Dissertation	Research findings	Oral Presentation and Interaction			Outcome**	Voce
Project Work	10%	10%	20%	10%	20%	10%	10%	10%
Total			50%			50%	%	

SEMESTER VIII

Course Code		UBT23801J Course Name	Biopython			Course Category		С	7			Disciplin	e Specific	: Core		2	T 0	P 0 4 2	C 4
Pre-requis		Nil	Co-requisite Courses	Nil					Pro	ogressive (Courses					Nil			
	Course Offeri	ng Department	Biotechnology Da	ata Book / Codes/Standards								ľ	Vil						
Course	Learning R	ationale(CLR):	The purpose of learning this course is to		Lea	rning				4	F	Program	Learning	Outcome:	s (PLO)				
CLR-1:	Understan	d basics of Biopython package			1	2 3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2 : CLR-3 : CLR-4 : CLR-5 :	Perform con Perform g Support po	vledge in sequence manipulation and plotting uster analysis enome analysis arsing a bioinformatics file into a format spec	ific record object	evel of Thinking(Bloom)	Expected Proficiency(%)	W.T.		FundamentalKnowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong learning	PS0 - 1	PS0 - 2	PSO - 3	PS0-4	PSO-5
Course I	To learn domain	Biopython programming language and its ap		eve				н	≥ Anal	Н	7	5	M	L	-	-	-	-	-
CLO-2:		iter challenges with <mark>handling and</mark> processing	9		2 8			М	Н	Н			L	M	-	-	-	-	-
CLO-3:		tand and solve real t <mark>ime biology r</mark> esearch pr		1974 6		0 60		М	Н	M	-	L	Н	-	-	-	М	-	-
CLO-4:	٠.	parsing, representatio <mark>n and analysis</mark> of seque		2		5 6		L	-	М	Н		M	M	-	-	-	L	-
CLO-5 :	To learn a	nd to apply Scilab in B <mark>ioinformatics</mark> Data An	alysis		8	0 70)	М	L	-	13	-	Н	M	-	-	-	-	-
Duration (ho	ur)	18	18		18					4	18			+		18			
S-1	SLO-1	Introduction to Biopython	Sequence Analysis	Calculating structural propert	ies (e.g., R	MSD, second	ary structur	e) Data Vi	sualization	4	,	A		Sequence A	nalysis				
	SLO-2	Overview of Biopython and its features	Basic sequence statistics and calculations	Superimposing protein struct	tures		7.7	Plotting	sequence da	ita (e.g., se	quence log	os)		Basic seque	nce statisti	cs and cal	Iculations		
S-2	SL0-1	Installation and setup	Searching for motifs and patterns	Visualizing protein structure	3			Visualizi	ng protein st	ructures an	d annotatio	ns		Searching fo	r motifs ar	nd patterns	i		
	SLO-2	Sequence Manipulation	Calculating sequence similarity and identity	Phylogenetics				Creating	phylogenetic	tree plots				Calculating s	equence s	similarity ar	nd identity		
S-3-6	SL0-1 SL0-2	parsing sequence file	Bio.Seq module	python string operations slicing, counting, concatena	tion in sec	juences		find, spl	t and strip ir	sequences	• , ,			creating new	complem	ent sequen	ice		
S-7	SLO-1	Sequence objects and methods	Finding open reading frames (ORFs)	Introduction to phylogenetic to	ees and th	eir represer	tation	Integrati visualiza	ng Biopython tion	with Matplot	lib and Bio.0	Graphics fo	r advanced	Introduction to	phylogen	etic trees ar	nd their rep	resentatio	'n
	SLO-2	Sequence parsing from files and strings	Sequence Alignment	Reading and writing tree files	(e.g., Newi	ck format)		Advance	d Topics					Reading and	writing tree	files (e.g.,	Newick for	mat)	

S-8	SL0-1	Sequence alignment and	Pairwise sequence alignment algorithms	Constructing phylogenetic trees using different algorithms	Working with large datasets efficiently	Constructing phylogenetic trees using different algorithms
		manipulation			/ /).	
	SL0-2	Transcription, translation, and reverse complement	Multiple sequence alignment methods	Calculating evolutionary distances and branch support	Integration of Biopython with machine learning libraries (e.g., scikit-learn)	Calculating evolutionary distances and branch support
S-9-12	SL0-1	creating reverse_complement sequence	GC Content prediction	Transcription	Translation	Bio.AlignIO
5-13	SL0-1	File Format Handling	Handling alignment files and formats	Database Access	Customizing Biopython functionalities and creating extensions	Handling alignment files and formats
	SLO-2	Reading and writing FASTA files	Analyzing and visualizing sequence alignments	Accessing NCBI's Entrez utilities for database queries	Accessing NCBI's Entrez utilities for database queries	Analyzing and visualizing sequence alignments
-14	SL0-1	Parsing GenBank and other sequence-related file formats	Protein Structure Analysis	Retrieving data from online biological databases (e.g., UniProt, KEGG)		Protein Structure Analysis
	SLO-2	Parsing PDB files for protein structures, Working with BLAST output files	Parsing and analyzing PDB files	Parsing and analyzing data obtained fromdatabases	Parsing and analyzing data obtained fromdatabases	Parsing and analyzing PDB files
-15-18	SL0-1	Pairwise Alignments	Clustal Alignments	Bio import motifs	Creating Simple DNA Motif	Creating a Sequence Log

Learning	1.	Biopython Tutorial and Cookbook , Jeff Chang, Brad Chapman, Iddo Friedberg, Thomas Hamelryck, Michiel de Hoon, Peter Cock, Tiago Antao, Eric Talevich, Bartek Wilczy'nsk
Resources	2.	ttps://biopython.org/wiki/Documentation

				W. 30	Continuous Learning A	ssessment (50% weightage		7		Final Examina	
	Bloom's Levelof Thinking	CLA - 1 (10	%)	CLA - 2 (1	0%)	CLA - 3 (2	0%)	CLA - 4 (10	%)#	weightage)	
	Hillikilig	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
el 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze				148			1 1			
13	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	1	00 %	T TO A	100 %	F2 4 75	100 %		100 %	1	100 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Vidhya VG, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	UB	T23D07T Course Name	HUN	MAN PHYSIOLO	OGY		Cours Categor		D	V		Dis	scipline :	Specific	Elective (Course		L 4	T 0	P 0	0 C 2 4
Pre-requ Cour		Nil	Co-requisite Courses		Nil				essive	ĮΚ	7	2			N	Vil					
Cours	se Offering	Department	Biotechnology	Dat	a Book / Codes/St	andards									Nil						
				- 50		1															
Course Learning	Rationale (CLF): The purpose of learn	ing this course is to:		Su 50	Le	earning					Prog	gram Learn	ing Outco	mes (PLO)						
CLR-1:	Inderstand a	bout blood and its components		-4-	-300	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
					F-34-E		2	3		'		J	7	J	U	_	U	7	10	11	12
		ge on digestive s <mark>ystem</mark>	-				4.70	9			CD.				lex as	arnin					
		ge on excretory <mark>and cardiova</mark> scular sy	Stem	C. 77.	-70-1	E	(%)	(9)	15.3		Analyze, Interpret Data	lity .	es		omb	ng le					
		bout respiratory and nervous system			- Jan 2 K	Bloo	Cy(9	ent (%		ntal dge	rpre	g abi	actic	Nork	ofo n	ifelor	~	-5	3	4-(-5
CLR-5: (Sain knowled	ge on reprodu <mark>ctive system</mark> and endoc	rine glands		1000	Thinking (Bloom)	ficier	inme		Fundamental Knowledge	lufe	Reasoning ability	Ethical Practices	Team Work	ation	andl	PS0-1	PS0-2	PS0-3	PS0-4	PS0-5
					761 L	<u>i</u>	Pro	Atta	10	Fund Kno	ılyze	Reas	Ethic	Te	nunic	dent			_		
Course Lea	irning Ou	tcomes (CLO):	of this course, learners will be able to):		evel of	Expected Proficiency(%)	Expected Attainment(%)	1		Ans				Communication ofcomplex biotechnological ideas	Independent and life long learning					
CLO-1 : L	earn about	he structure and functions of RBC, Wi	3C, and platelets	7 30 50		1	85	80		Н	L	L	- 1	-	L	Н	-	-	-	-	М
CLO-2 :	Inderstand t	ne process of digestion	100			2	80	75		Н	М	L	- 16		L	Н	-	-	-	-	М
CLO-3 : L	earn about	he anatomy of t <mark>he heart</mark>				1	85	80		Н	М	М	-		Н	L	-	-	-	-	М
CLO-4 : L	earn about	he functioning of the brain and spinal o	cord		The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	2	80	75		Н	М	L	-		Н	М	-	-	-	-	Н
CLO-5 :	Inderstand a	bout hormones and its functions	7/4			1	80	75		Н	L	М	-		Н	Н	-	-	-	-	Н
								"					. \					,			
Duration (h		12	12		1/46	1:	_						12						12		
S-1	SLO-1	Human physiology - overview	Introduction to digestive system	n	Introduction to ex					Introduction			,			Introducti			re syster	n	
S-2	SLO-1	Cellular physiology - Introduction	Salivary gland		Excretory system	-	ation			Anatomy		-	it .			Reproduc					
S-3 S-4	SLO-1	Cell lineages	Anatomy of stomach		Formation of urin					Mechanic			-			Spermat					
S-4 S-5	SLO-1	Cell lineages	Anatomy of pancreas	AK-	Regulation of uring					Mechanic			on			Spermat					
S-5 S-6	SL0-1 SL0-1	Blood components RBC - structure	Anatomy of small intestine		Introduction to ca		ılar syste	m		Factors re	0					Structure Ovulatio					
S-0 S-7	SL0-1	RBC - Structure	Anatomy of large intestine Anatomy of liver		j	l				Introduction		,	tem			Menstrua					
S-8		Erythropoiesis	Secretions in fundus		Cardiac cycle Cardiac cycle					Central ne Periphera						Endocrine		Introdu	ıction		
S-9	SL0-1	WBC - structure	Secretions in duodenum		Principles of circu	Ilation				Autonomi		,				Pituitary (- muout	ucliUII		
S-10	SL0-1	WBC - functions	Secretions of pancreas		Heart rate	aiutiUII				Structure						Thyroid g	•				
S-10	SL0-1	Platelet - structure	Bile and its significance		Factors regulating	n heart rat	te			Anatomy						Parathyro					
S-12	SLO-1	Platelet – functions	Absorption by small intestine		Factors influencing					Anatomy						Endocrine	<u> </u>		ncreas		
5-12	SLU-I	Plateiet - Tunctions	Absorption by small intestine		ractors initiencing	ig BP				Anatomy	ine sp	ınaı cord				Endocune	e iuncilo	iis oi pa	ncreas		

Learning	1.	"Text Book of Medical Physiology", <mark>G. K. Pal, 4th Edition</mark> , Elsevier, 2014.
9	2.	"Textbook of Medical Physiology", Indu Khurana, 3 rd Edition, Elsevier. 2018.
Resources	3.	"Text Book of Human Anatom <mark>y", T.S. Ranganath</mark> an, 5 th Edition, S. Chand & Co. Ltd., 1996.

Learning Asse			Continuous Learning Assessment (50% weightage)											
Level	Bloom's Level of	CLA - 1	I (10%)	CLA – 2		CLA - 3 (CLA - 4 (1	10%) #	Final Examination(50% weightage)				
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice			
Level 1	Remember Understand	40%		40%	Sec. 35	40%	-	40%		40%	-			
Level 2	Apply Analyze	40%	*v /	40%	188	40%	h	40%		40%	-			
Level 3	Evaluate Create	20%	7.	20%	1000	20%	Y	20%		20%	-			
	Total		100 %	1	00 %	10	00 %	1	00 %	10	00 %			

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	(4) 日本 元 一次を一、本ではどれてでします。	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. G. Swamynathan, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR



Course Code		UBT23D08T	Course Name		MEDICAL BIO	OTECHNOLOG	GΥ		Cou Cate	urse gory	D	1		Disc	cipline S	pecific I	Elective Co	urses		L 4	T 0	P 0 0 2	C 4
Pre-rec	uisiteCourses Course Offeri	ng Department		NIL	Co-requisiteCourses Biotechnology	Da	NIL ata Book / Codes/Standa	ırds				4	Pro	gressive	Courses	N	IIL			NIL	-		
Course Learn	ning Rationale (CLR):	The	purpose of learning	this course is to:		Learning	J	ıE			Progra	am Learning	Outcome	s (PLO)								
CLR-1:		•			logy & drug design	-6	Sec. 27	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Understan	iding the techniqu	ues us <mark>ed for</mark>	disease diagnos	sis	# 1 E	77,917																
CLR-3:	Knowledg	e on ART & ACC	;				to here a			450		a)					×	and					
CLR-4:	Knowledg	e on the types of	vaccines			1	Tables or	(moc	(%)	(%)	1	ledge	Data	₹	es	~	mple	ant a					
CLR-5:	Knowleda	e on gene therap	ov & its applic	cations		77) (Bic	ency	nent	5.3	(now	pret	g abi	actic	Worl	of co	ende	PS0 - 1	PS0 - 2) - 3	PS0-4	PS0-5
OLIV 5.		3	7			Ber in	2007 60	nking	ofici	tainr		ıtal	Inter	Reasoning ability	Ethical Practices	Team Work	ation	independent	PS	PS(PS0	PS	PS
								Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		Fundamental Knowledge	Analyze, Interpret Data	Reas	Ethic	_	Communication of complex biotechnological ideas	_⊆	<u> </u>				
Course	Learning (Outcomes (C	LO):	At the end of	this course, learners will be able to:			velo	pect	pect	10	Fund	Ana				mmc						
CLO-1:	To unders	stand the applicat	tions of medi	ical biotechnolog	у		7 5	<u>a</u>	80	70	177	Н	L	М	М	М	-	-	-	-	-	-	-
CLO-2 :	Application	n of techniques fo	or the diagno	osis of diseases			12 8	1	85	75		Н	L	М	М	М	-	-	-	-	-	-	-
CLO-3:	Applying R	knowledge to und	derstand the	use of animal ce	Il culture			1	75	70		Н	L	М	М	М	-		-	-	-	-	+
CLO-4:	Understar	nd the vaccination	n process an	nd the use of var	ous vaccines			2	85	80		Н	L	М	М	М	-	-	-	-	-	-	+ -
CLO-5:	Having kn	owledge on gene	e therapy and	d stem cell thera	ру			2	85	75		Н	L	М	М	М	_	-	-	-	-	-	-
OLO J.			- 13												_	-							
Duration (h	our)		1	2	12				12						12	7				1	12		
S-1	SL0-1	Medical Biotechnol	logy -Intr <mark>oduct</mark>	tion	Diagnosis techniques –Invasive Techniques		Assisted Reproductive	e technolog	Jy			Introducti	on to Vaccir	ies	1		H	lybridoma	Technique				
S-2	SL0-1	Medical Biotechno concepts	logy -Basic		Diagnosis techniques – Non-Invasive Techniques		Assisted Reproductive	e technolog	ly .			Vaccines	- Formulatio	n		7	(Gene therap	y				
S-3	SL0-1	Medical Biotechno concepts	logy -Basic		Point-of-care Diagnosis technology and Advan	ncements	Pregnancy Diagnostic	S				Vaccines	- Conventio	nal	> [(Gene therap	y – ex viv	0			
S-4	SL0-1	Medical Biotechno	logy -Scope		Diagnosis of pathogenic microbes – Classical methods	FIF	Pregnancy Diagnostic	S	u	- 1	ŀ	Vaccines	- Recombin	ant	7		(Gene therap	y – in vivo)			
S-5	SL0-1	Medical Biotechno Applications	logy –		Diagnosis of pathogenic microbes – Modern me	ethods	Animal cell culture					Synthetic	peptide	7			C	Cell and Tis	sue Engin	eering			
S-6	SL0-1	Medical Biotechno	ology -Applica	itions	Introduction to Next generation Sequencing and applications	nd its diagnostic	Animal cell culture -	Media				DNA Va	ccines				S	Stem cell th	erapy				
S-7	SL0-1	Drug designing -Ir	ntroduction		Polymerase Chain Reaction and its Diagnostic	c applications	Cell line developmen	t and chai	acterization	l		Vaccine's	administratio	n and adv	erse effect n	nonitoring	j S	Stem cell th	erapy				
S-8	SL0-1	Drug designing –N	/lethods		Diagnosis using enzyme markers		Maintenance of cell I	nes				Vaccines impact	preventable	diseases –	common tarç	get and glo	bal	Vanomedi	cines				
S-9	SL0-1	Drug designing -N			Diagnosis using DNA markers		Cell culture quality co	ontrol				Antibio						harmacoge				nes	
S-10	SL0-1	Developmental pr	ocess		Diagnosis using Protein markers		Organ culture					Antibiotic	s – mode of	action			В	Bioinformatio	s in medi	cal biotech	nology		

S-11	SL0-2	Developmental process	Immunodiagnostics	Organ culture - Applications	Antibiotics application	Biopharmaceutical production anddevelopment
S-12	SL0-1	Developmental process	Biosensors for disease diagnosis	Imaging and Analytical Techniques for organ culture studies	Antibiotic resistance	Challenges in Global Health Diagnostics

	1.	Jogdand, S. N. Medical Biotech <mark>nology, Himalaya</mark> Publishing house, Mumbai, 20	05.
Learning	2.	Trevan. "Biotechnology: The <mark>Biological Principl</mark> es	

Trevan. 'Biotechnology: The Biological Principles
B. R. and Pasternak. Molecular Biotechnology: Principle and applications ofrecombinant DNA. Resources

					Continuous Learning As	sessment (50% weightage	e)			Final Examina	ation(50%
	Bloom's Levelof	CLA - 1 (1	0%)	CLA - 2 (1	0%)	CLA - 3 (2	20%)	CLA - 4 (10	%)#	weightage)	
	Thinking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
1.4	Remember	000/		2004	A. 4	2004		2004		000/	
el 1	Understand	30%		30%	P. Carlo	30%		30%		30%	-
10	Apply	4007		400/	1.00	400/	1000	400/		400/	
el 2	Analyze	40%	-	40%	10 mon 8	40%	10 M	40%		40%	-
10	Evaluate	2007		2004	The same of	200/		200/		200/	
el 3	Create	30%	16.00	30%	300	30%	NA-103-7	30%	-	30%	-
	Total		100%	20000	100%	1. 1. 3.	100%		00%	100%	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	一 一	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code			UBT23D09T		Course Name	CANCE	R BIOLOGY	1		ourse egory	D			Disci	pline Spe	ecific El	ective Co	ourse	-	L 4	T 0	P 0	C 4
Pre-requi	isite Courses	6	NIL		Co-requisite Courses		NIL				4	M	Pro	gressive C	ourses					Nil			
	Course Offerin	g Department		BIOTE	CHNOLOGY	Da	ta Book / Codes/Standard	S								N	il						
Course Learn	ing Rationale (C	LR):	The purpose of learning	ng this course i	s to:	A		Lea	arning				_	Pro	gram Learn	ng Outcor	mes (PLO)						
CLR-1:	Explain the	complex nature	e of can <mark>cer and eleme</mark> nts to	that causes o	cancer		10. 57	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:	Orientation	to behavioral c	hange <mark>s in cell basic</mark> functio	on- growth, d	division and death cycle	100	52 KUT 1										_	βu					
CLR-3:	Comprehe	nsive ideology o	f genetics behind Cancer			277.7	1.00			35/4		Ф	_				npley	lifelol					
CLR-4:	· ·		ada <mark>ptation of can</mark> cer cell to	microenviro	onment and its growth		Marin	(moo	(%)	(%)		vledg	Data	<u>F</u>	ses		of cor	and	_	0.1	~		
CLR-5:	-		an <mark>d throw the l</mark> ights on pos		- v	F 77	1. 16. 16.	g (Bl	ienc)	Attainment (Knov	rpret	Reasoning ability	Ethical Practices	Team Work	imunication of compley biotechnological ideas	independent and lifelong learning	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PS0-5
						THE P. P.	- 1m2 84 8	iž	Profic	∖ttain		ental	, Inte	sonin	SalP	eam	unical techr	hed	PS	P. 0.	PS	ď	9,
						W		evel of Thinking (Bloom)	Expected Proficiency	ted /	١.,	Fundamental Knowledge	Analyze, Interpret Data	Reas	ΕË		Communication of complex biotechnological ideas	inde					
Course I	Learning C	outcomes (C	LO): At the end of the	his course	e, learners will be able to:			evel	edx	Expected ,		듄	A				S						
CLO-1:	Understand	d the important t	erminology in cancer and i	potent carcir	nogens		21 0 1	1	85	80	T .	Н	М	Н	-	-	М	L	-	-	-	-	-
CLO-2 :	Have clear	idea on the cell	basic function		<u> </u>	A	77. 14. 14	2	80	70	J. 7	М	Н	Н		-	L	М	-	-	-	-	-
CLO-3:	Understand	d role of genes i	n <mark>cell and der</mark> egulation of g	genes in Car	ncer	7 1/2 17	Company of	3	70	60	-	М	Н	М	-	L	Н	-	-	-	М	-	-
CLO-4:			cancer and how its survive			W. 1 K.		2	75	65	н	L	-	М	Н		М	М	-	-	-	L	-
CLO-5 :			ays involved in detection a				100	3	80	70		М	L	-			Н	М	-	-	-	-	-
							120				_				-	-							
Duration (ho			12		12		1/10/2	12)					1.	2					1	2		
S-1	SL0-1	General ideol of Cancer	ogy ab <mark>out Cancerand</mark> Prop	perties	Cell cycle: different phase, role CDK	e ofCyclin and	Cancer critical general Concogenes, Tume VirusesLoss of no formutation	our Su _l			d	(Cancer In	vasion: R	outes of t	ransport		<u>Identificati</u>	on and d	detectio	n of can	cergene.	5
	SL0-2	General ideol of Cancer	ogy about Cancerand Prop	<mark>perties</mark>	Cell cycle: different phase, role CDK	e ofCyclin and	Cancer critical general Oncogenes,	es :				(Cancer In	vasion: R	outes of t	ransport		Identificati	on and o	detectio	n of can	cergene:	3
S-2	SL0-1	Origin of Can heterogeneity			Cell cycle: different phase, role CDK	e ofCyclin and	Cancer critical general Concogenes,	es :	P	• [ll recogn M intera				1	Drug resis	tance –	Drug m	netabolis	n	
	SLO-2	Origin of Can heterogeneity			Cell cycle: different phase, role CDK	e ofCyclin and	Mutation- genetic Instabi	lity -Types	of DNA da	mage			ll recogn M intera					Drug resis	tance –	Drug m	netabolis	n	
S-3	SLO-1	Pathological cancer	grade, Different formsand	Stages of	Regulation of Cyclin and CDk		Mutation- genetic Instabi	lity -Types	of DNA da	mage			ll recog <mark>n</mark> M intera					Chemothe	raphy- A	Alkylatin	g agents	i	
	SLO-2	Pathological cancer	grade, Different formsand	Stages of	Regulation of Cyclin and CDk		Loss of mutation an	nd gain					ll recogn M intera					Chemothe	raphy- A	Alkylatin	g agents	ì	
S-4	SL0-1		nfluence cancer		Regulation of Cyclin and CDk		Tumour Suppresso	J				Cancer		ules- Cad		0		Chemothe	, ,	,	5 5		
	SLO-2	Epidemiolog Factors that i	ny: nfluence cancer		Regulation of Cyclin and CDk		Tumour Suppresso	or gene:	s : pRB			Adhesio Cancer		ules- Cad	herins,Int	egrins in)	Chemothe	raphy- A	Alkylatin	ig agents	ì	

S-5	SLO-1	Epidemiology: Factors that influence cancer	Checkpoints G1/S, G2/M and M-phase	Tumour Suppressor genes : p53	Adhesion molecules- Cadherins, Integrins in Cancer	Chemotheraphy- Anti-metabolitesagents
	SLO-2	Epidemiology: Factors that influence cancer	Checkpoints G1/S, G2/M and M-phase	Tumour Suppressor genes : p53	Adhesion molecules- Cadherins, Integrins in Cancer	Chemotheraphy- Anti-metabolitesagents
S-6	SL0-1	Pathology in Oncology	Checkpoints G1/S, G2/M and M-phase	Proto-oncogene and mutation thatconvert to oncogene	Proteolytic enzymes in Cancer	Natural products as Inhibitors
	SLO-2	Pathology in Oncology	Checkpoints G1/S, G2/M and M-phase	Proto-oncogene and mutation thatconvert to oncogene	Proteolytic enzymes in Cancer	Natural products as Inhibitors
S-7	SL0-1	Pathology in Oncology	DNA damage regulation	Proto-oncogene in growth factorand altered behavior in cancer	Proteolytic enzymes in Cancer	Radiotherapy
	SLO-2	Pathology in Oncology	DNA damage regulation	Proto-oncogene in growth factorand altered behavior in cancer	Proteolytic enzymes in Cancer	Radiotherapy
S-8	SLO-1	Carcinogens: Physical andChemical carcinogens	DNA damage regulation	Proto- oncogene in Growth factor receptor: RTK and dysfunction ofRTK in Cancer	Three step invasion process	Hormone therapy
	SLO-2	Carcinogens: Physical andChemical carcinogens	DNA damage regulation	Proto- oncogene in Growth factorreceptor: RTK and dysfunction of RTK in Cancer	Three step invasion process	Hormone therapy
S-9	SLO-1	Carcinogens: Physical and Chemical carcinogens	Apoptosis- Intrinsic and extrinsicpathway	Altered pathway :Receptor kinases pathway :RAS- RAF-MEK-ERK-MAPK	Metastatic cascade	Immunotherapy
	SLO-2	Carcinogens: Physical and Chemical carcinogens	Apoptosis- Intrinsic and extrinsicpathway	Altered pathway :Receptor kinases pathway :RAS- RAF-MEK-ERK-MAPK	Metastatic cascade	Immunotherapy
10	SLO-1	Types of Chemical carcinogens:Direct and indirect carcinogens	Apoptosis- Intrinsic and extrinsicpathway	Altered Kinase signaling pathway: PI-3K-PDK1- PKB Pathway	Metastatic cascade	Photodynamic therapy
	SLO-2	Types of Chemical carcinogens:Direct and indirect carcinogens	Apoptosis- Intrinsic and extrinsicpathway	Altered Kinase signaling pathway: PI-3K-PDK1- PKB Pathway	Metastatic cascade	Photodynamic therapy
5-11	SLO-2	Types of Chemical carcinogens:Direct and indirect carcinogens	Defects of the apoptosis machinery incancer cells	Viral Oncogenesis and types ofvirus that cause cancer	Growth at secondary site- Tumor angiogenesis and lymphagenesis	Gene therapy
	SLO-2	Types of Chemical carcinogens:Direct and indirect carcinogens	Defects of the apoptosis machinery incancer cells	Viral Oncogenesis and types ofvirus that cause cancer	Growth at secondary site- Tumor angiogenesis and lymphagenesis	Gene therapy
-12	SL0-1	Other factors that influence cancer	Defects of the apoptosis machinery incancer cells	Different ways by which Viruscause Cancer in host cell	Cancer Screening: Biomarkers	REVISION
	SLO-2	Other factors that influence cancer	Defects of the apoptosis machinery in	Different ways by which Virus	Cancer Screening: Biomarkers	MODEL EXAM
			cancer cells	cause Cancer in host cell	173	

Learning Resources

- King R.J.B., Cancer Biology, Addision Wesley Longmann Ltd, U.K., 1996
 Maly B.W.J., Virology a practical approach, IRL press, Oxford, 1987.
 Dunmock.N.J and Primrose S.B., Introduction to modern Virology, Blackwell Scientific Publications.
 Ruddon.R.W., Cancer Biology, Oxford University Press, Oxford, 1995.

Learning Ass	essment						7 4					
	DI			THE D	Continuous Learning As	sessment (50% weightage	e)			Final Examir	ation(50%	
	Bloom's Levelof Thinking	CLA – 1 (10%)		CLA - 2 (10%)		CLA - 3 (2	20%)	CLA - 4 (1	0%)#	weightage)		
	Tilliking	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember		AND			i de c						
	Understand	30%		30%	4700	30%	-	30%		30%	-	
Laural D	Apply				R	546.17.2						
Level 2	Analyze	40%	· /	40%	12 But 3	40%		40%		40%	-	
aud 1	Evaluate		C 4 /		44.325	7887						
Level 3	Create	30%		30% -		30%		30%		30%	-	
	Total	100 %		100 %		100 %		1	00 %	100 %		

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr.G. Sw <mark>amynathan, As</mark> sistant Professor, Dept. of Biotech <mark>nology, FSH,</mark> SRMIST, KTR

Course Code	UBT23D10T	Course Name	DIAGN	DIAGNOSTIC TOOLS		Course D Category		Discipline Specific Elective Courses						L 4	T 0	P 0 0 2	C 4				
Pre-requisiteCourses Nil Co-requisiteCourses Nil								Prog	gressive	Course	S					N	il				
Course	Offering Department		Biotechnology		Data Book / Codes/Standa	rds						٩,		Nil							
Course Learn	ning Rationale(CLR):		The purpose of learning	g this course is to			Learnin	ıg				0	Pro	gram L	_earning	Outcom	es (PLC))			
CLR-1: Und	derstanding the scope a	and significance of	diagnostic products		7.389,77	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12
CLR-2: Kno	owledge on ELISA and	other disease diag	nostics	200	AND SERVICE AND		100	t di							×	ıng					
CLR-3: Kno	ow how diagnosis of he	art is performed		10/20/20						ge	9		-		complex al ideas	lifelc					
CLR-4: Kee	eping up to date with ca	ınc <mark>er diagnosis</mark>			7 . N. W. Mar	(Bloom)	.y (%	rt (%)		wled	et Dat	ollity	ices	논	of co	t and ng	_	2	ç	4	ıς
CLR-5: Imp	oortance of biomarkers	in the current scer	nario of diagnosis			Thinking (F	Expected Proficiency (%)	Attainment		Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of co biotechnological	independent and lifelong learning	PS0 -	PS0 - 3	- 0Sd	PS0-4	PS0-5
Course Learn	ning Outcomes (C	LO): At the 6	end of this course, learners will be	able to:		Level of T	Expected	Expected		Fundam	Analyz	Rei	吉		Comm	ind					
CLO-1: To	understand the scope,	s <mark>ignificance o</mark> f dia	gnostic industry and basic diagnostics	S. 12.21	The second	1	75	70		Н			L								
CLO-2: To use ELISA and Spectrometry as a diagnostic tool					2	75	70	6.4	- 4	Н		M								Н	
CLO-3: medical tests to diagnose heart conditions					2	75	70			Н		Н								Н	

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Ourati	ion (hour)	12	12	12	12	12
S-1	SLO-1	9-1 Diagnostic findustry - finitoduction ELISA		medical tests to diagnose heartconditions	Introduction to Cancer diagnosis- Physical, laboratory, Imaging, Biopsy	Biomarker
S-2	SL0-1	Diagnostic industry – scope	ELISA for Infection detection andQuantification	Blood tests	Lab tests used in cancer diagnosis	Diagnosing diseases or predictingrisks of disease
S-3	SLO-1	Diagnostic industry - significance	ELISA for Immunological assays	Electrocardiogram (ECG)	Lab tests used in cancer diagnosis	ABO biomarker
S 4	SL0-1	Enzyme assays- Invasive	UV spectrophometer applications indiagnostics	How to read ECG Demo Virtual class	Types of biopsy procedures used todiagnose cancer- Needle & Endoscopy	cytogenetic and molecular genetic biomarkers
S-5	SLO-1	Enzyme assays- Non – invasive	Cell staining and microscopy.	Exercise stress test	Skin biopsy, Bone marrow biopsy	1. biomarker Philadelphia chromosome
S 6	SLO-1	Blood sample analysis for diseasediagnosis	Malaria pathology and diagnostics.	Echocardiogram (ultrasound)	Surgical biopsy, Biopsy analysis andresults	2. Protein C deficiency
5-7	SLO-1	Démonstration of drawing BloodVirtually	Tuberculosis pathology anddiagnostics.	How is ECHO performed Demo	Introduction to diagnosis for digestivedisorders	3. EGFR Expression G6PD deficiency

2

75

75

70

70

Н

Н

Н

Н

Н

Н

Н

Н

CLO-4: Having knowledge on Cancer diagnosis and its applications

CLO-5 : Introductory knowledge to use biomarkers in diagnostics

S-8	SLO-1	Urine sample analysis for diseasediagnosis	HIV/AIDS pathology, diagnostics, and	Coronary angiogram- Demo class (Virtual)	Lab tests- Fecal occult blood test &Stool culture	Biomarkers in clinical trialsand drug discovery
S-9	SLO-1	Démonstration of Urine analysisVirtually	HIV/AIDS disease monitoring	Coronary computed tomography angiogram (CCTA)	Imaging tests- Barium beefsteak mealvirtual demo	Examples/case studies
S-10	SLO-1	Blood/sputum cultures.	HIV reporting procedures and ethicsinvolved in it	Virtual sessions for Heart conditions	Colorectal transit study	Examples/case studies
S-11	SLO-1	Principle of sphygmomanometer	General procedure for Sexuallytransmitted diseases	Virtual sessions for arterial block release	Endoscopic procedures-Colonoscopy,	Discussions
S-12	SLO-1	Blood Pressure Monitors & itsAdvancements	Handling procedures for satety atdiagnostic centers		Endoscopic retrograde cholangiopancreatography (ERCP)	Discussions
S-13	SLO-1	157	- A		Capsule endoscopy, Gastricmanometry	

Learning	1.	Dr. Rajneesh Prajapat, Textbook Medical Diagnostics:
Resources	2.	Hem Raj. Vinesh Medical Diagnostic (Skill Enhancement Course)
	3.	Maxine A. Papadakis, Stephen J. McPhee, Michael W. Rabow, Kenneth R. McQuaid. Current Medical Diagnosis & Treatment 2022
	•	

Learning Asse	ssment		3.5.77	1.725	7777 77		No. of the Control					
	Bloom's Level of		Final Examination(50%									
Level	Thinking	CLA - 1 (10%)	CLA – 2 (10%)		CLA - 3 ((20%)	CLA - 4 (10	1%) #	weightage)		
	Hillikilly	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
Level 1	Remember	40%	1000	40%		40%		40%		40%		
Level I	Understand	40%	1000	40%		40%		40%	-	4070	-	
Level 2	Apply	40%		40%		40%		40%		40%		
LCVCI Z	Analyze	4070		4070		4070	-	4070		4070	-	
Level 3	Evaluate	20%		20%		20%		20%		20%		
rever 2	Create	2070		2070	-	2070	-	2070		2070	-	
Total	Total	10	00 %	10	0 %	10	00 %	10	0 %	10	0 %	

[#] CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers	ANY FAD IDID	
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr. Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr.N.Prasanth BhattAssistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course		UBT23G07T Course	DIC	EASE MANAGEMENT	Cours D				Discipline Specific Elective Courses							L	T	P 0	С
Code		UBT23G07T Name	Disi	EASE MANAGEMENT		Ca	ategory								4	0	0 2	4	
Pre-rec	quisite urses	NIL	Courses					Progressive Courses				NIL							
	Course (Offering Department	Biotechnology	Data Book / Codes/Standar	ds							NIL							
Course Lea	rning Ratior	ale (CLR): The purpose of	learning this course is to:	30.4.32	Le	arning				Prog	ram Learnin	ng Outcom	nes (PLO)						
CLR-1:	Unde	rstanding the basic concepts of Health			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12
CLR-2:		rstanding about the com <mark>municable dis</mark> eas	es	Z07 17.15	100	745	- 1				7		× 10	guc					
CLR-3:	.	ledge on Occupational health hazards		· 10 10 10 11	<u></u>	(9		ge	ata		-		Communication of complex biotechnological ideas	independent and lifelong learning					
CLR-4:	'	ledge on the Manage <mark>ment of Infect</mark> ious D	Bloor	6)	nt (%)	owlec	et Da	abilit	tices	美	of co	nt an ng	-	. 2	-3	4	ب		
CLR-5:	Know	ledge on the health in <mark>dicators</mark>	Y		evel of Thinking (Bloom)	Expected Proficiency (%)	inme	- Kn	nterpr	Reasoning ability	Ethical Practices	Team Work	ation	endent a learning	PS0 - 1	PS0 - 2	PS0 - 3	PS0-4	PS0-5
(98. 981 R.	T Xi	Prof	Atta	nenta	ze, Ir	easor	thical	Te	munic iotec	depe	_		4		_
Course	Course Learning Outcomes (CLO): At the end of this course, learners will be able to:						Expected Attainment	Fundamental Knowledge	Analyze, Interpret Data	č			Comr	.⊑					
CLO-1 :	. To ki	now about the good healthy habits	17/2	Title on the No.	1	75	70	Н				L		Н					
CLO-2 :		entive measures for Co <mark>mmunicable</mark> diseas	ses		1	75	70	Н	M	М	Н	L							
CLO-3 :		nsure safety in the work <mark>ing environm</mark> ent			1	75	70	Н			Н								
CLO-4 :	. To ki	now about the control of <mark>Infectious dis</mark> ease	es	1//	1	75	70	Н		М									
CLO-5 :		ng knowledge on situation <mark>of hea</mark> lt <mark>h in I</mark> ndi	a	1.0	1	75	70	Н			М			Н					
						1					7								
Duration (h	/	12	12			12				-77	12						12		
S-1	SLO-1	Basic concepts and Definition	Communicable diseases		itional Hea				isease: Int						and Dis		c. III		
S-2	SLO-1	Need for good health	Mode of disease transmission		ational he		ds		Principles (of diseas	e control					s and De	efinition		
S-3 S-4	SLO-1	Factors affecting health Basic sanitation	Epidemic diseases Endemic diseases		al hazards cal hazard				Infection Portal of er	ntry of Inf	oction				se contr	oi eventior	,		
S-5	SL0-1	Personal hygiene	Vaccination		cal hazaro				Types of di		ection					of health			
S-6	SL0-1	Balanced diet	Management of Hygiene in public pla						Types of a Deficiency						tors of h		I		
S-7	SL0-1	Food habits	Hygiene in Railwaystations	S Occupational diseases Prevention of occupational diseases					nfectious (n in Indi	а		
S-8	SL0-1	Cleanliness	Hygiene in Bus stands	Control of occupational diseases				Pollution di								n aids in	India		
S-9	SLO-1	Food adulterants	Hygiene in other public places				es for workers		Microbial flo		man			Interna	ational b			rotection	and
S-10	SL0-1	Avoiding smoking	Hospitals – Nosocomial	Health education			Host - Parasite relationship					promotion Role of guarantine Rules and Laws in health				alth			
S-11	SLO-2	Drugs	Hospital acquired infections	First a					Manageme			le diseas	ses	Enforcement in the preventive measuresof pandemic diseases					
S-12	SL0-1	Alcohol	Hygiene in educational institutions	Manag	ement of i	nedical e	mergencies		Manageme	nt of No	n commur	nicabled	iseases						

Learning	1.	Robbin, Cotran and Kumar ., "Robbin's Textbook of Pathology" 6th edition, Elsevier publisher, 2013.
Resources	2.	Ananantanarayan, R. and Paniker, C.J.K "Textbook of Microbiology" 8th edition. Universities Press, Orient Blackswan, 2005.
	3.	Roger Detels, Robert Beaglehole, Mary Ann Lansang, Martin Gulliford., "Oxford Textbook of Public Health", 5th edition. Oxford press, 2011
	4.	Park K. "Textbook of Preventive & Social Medicine" 22nd edition. Banarsidas Bhanot publishers, 2013.

Learning Asses	ssment				Continuous Loarning A	ssessment (50% weightage)				51.15.1.1	1 (500)	
	Bloom's Level of Thinking	CLA - 1 (10	%)	CLA - 2 (1		CLA – 3 (2		CLA - 4 (10	%)#	Final Examination(50% weightage)		
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	
	Remember		- / T	-d to 5	1.000							
rel 1	Understand	30%	7.7	30%	A STATE OF	30%		30%		30%	-	
	Apply				4 Mars. 1	-17	114 .1					
rel 2	Analyze	40%		40%	1. 2.72	40%	100	40%		40%	-	
1.0	Evaluate	2004		0004	11,000	200	17 17	2004		000/		
vel 3	Create	30%		30%		- 30%		30%	-	30%	-	
	Total	1	00%	2000	100%	100%		100%		100%	•	

CLA - 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Dr.Arumugam Perumal, Director ARMATS BIOTEK Training and Research Institute, Chennai	Dr. N. Banu, Assistant Professor, Department of Botany, Bharathi Womens College, Chennai.	Dr. Infant Santhose.B, Assistant Professor, Dept. of Biotechnology, FSH, SRMIST, KTR

Course Code	UBT23P06L	Course Name		Project Phase-II	Course Category	P	Internships/ Project Work	L T P O C 0 0 12 2 6
Pre-re	equisite Courses		Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	
Cour	se Offering Departmen	nt	Biotechnology	Data Book / Co	odes/Standards		Nil	
Course Lear	rning Rationale(CLR):	The	nurnose of learning this course is to		Learning		Program Learning Outcomes (PLO)	

Course L	Learning Rationale(CLR):	The purpose of learning this course is to,		Learning]			P	rogram L	earning C
CLR-1:	To test the ability to identify research	arch gap	5 T	2	3	1	2	3	4	5
CLR-2:	To test the ability to idetify the pr	oblem	455 1 2	·	100					
CLR-3:	To test the ability to devise a plan	n of study				e de	e e	ability	lices	
CLR-4:	To teach how to determine the m	nethodology	(Bloom)) (%)	ıt (%)	wledc	t Dat			놑
CLR-5:	5 : To test the practical knowledge				Attainment	Kno	Interpret Data	ing a	Praci	Team Work
Course L	earning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking	Expected Proficiency	Expected Att	Fundamental Knowledge	Analyze, I	Reasoning	Ethical Practices	Je
CLO-1:	Knowledge on reading the review	<mark>v of lite</mark> rature	3	75	70					
CLO-2:	Knowledge on problem sol <mark>ving n</mark>	nethods	3	75	70	200				4
CLO-3:	Knowledge on devising methodo	logies	3	75	70					
CLO-4:	Hands- on knowledge on various	3	75	70						
CLO-5:	Knowlwdge to interpret the results									

			- 5	J		33 (1 20)					
1	2	3	4	5	6	7	8	9	10	11	12
Fundamental Knowledge	Analyze, Interpret Data	Reasoning ability	Ethical Practices	Team Work	Communication of complex biotechnological ideas	independent and lifelong learning	PS0 - 1	PS0 - 2	PS0 - 3	PSO-4	PSO-5
11											
- 4	4		4								

			Learning Assessment								
	1316	Continuous Learning Assessment (50% weightage)					Final Evaluation(50% weightage)				
	Seminar		Dissertation	Presentation	Research	Viva-					
	Schilla	Overview of the Dissertation	Research findings	Oral Presentation and Interaction	>/	rosomaton	Outcome**	Voce			
Project Work	10%	10%	20%	10%	20%	10%	10%	10%			
Total		50%									