

Annexure - II

B.Sc. Microbiology (R2023)

SEMESTER-I										
S.No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23TAT101C A23FRT101C	Tamil-I/ French-I	MIL	3	0	0	3	25	75	100
2	A23GET101C	General English –I	ENG	3	0	0	3	25	75	100
3	A23MBT101D	General Microbiology	DSC	4	0	0	4	25	75	100
4	A23MBT102D	Bacteriology	DSC	4	0	0	4	25	75	100
5	A23MBD101D	Biomolecules	IDC	4	0	0	4	25	75	100
Practical										
6	A23MBL101D	General Microbiology and Bacteriology Practical	DSC	0	0	4	2	50	50	100
7	A23MBI101D	Biomolecules Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23ENSA02C	Soft skills	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
9	A23AETA01C	Public Administration	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
10	A23MBC101D	Certification course –I	EEC	2	0	2	0	100	0	100
							25	525	475	1000
SEMESTER- II										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23TAT202C A23FRT202C	Tamil-II /French-II	MIL	3	0	0	3	25	75	100
2	A23GET202C	General English-II	ENG	3	0	0	3	25	75	100
3	A23MBT203D	Microbial Diversity	DSC	4	0	0	4	25	75	100
4	A23MBT204D	Microbial Instrumentation	DSC	4	0	0	4	25	75	100
5	A23MBD202D	Microbial Physiology	IDC	4	0	0	4	25	75	100
Practical										
6	A23MBL202D	Microbial Diversity and Microbial Instrumentation Practical	DSC	0	0	4	2	50	50	100
7	A23MBI202D	Microbial Physiology Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23ENSA01C	Communication Skills lab	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
9	A23AETA02C	Environmental Studies	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
10	A23MBC202D	Certification course- II	EEC	2	0	2	0	100	0	100
Extension Activities										
11	A23EAS201C	National Service Scheme	EA	0	0	2	1	100	0	100
							26	625	475	1100

SEMESTER – III

S. No	Course Code	Course Title	category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23BTT305D	Molecular Biology	DSC	4	0	0	4	25	75	100
2	A23MBT305D	Virology	DSC	4	0	0	4	25	75	100
3	A23NDD301C	Food Analysis and Quality control	IDC	4	0	0	4	25	75	100
4	A23MBE3XXD	DSE-I	DSE	3	0	0	3	25	75	100
5	A23XXO3XXC	Open Elective–I	OE	2	0	0	2	25	75	100
Practical										
6	A23MBL303D	Molecular Biology and Virology Practical	DSC	0	0	4	2	50	50	100
7	A23NDI301C	Food Analysis and Quality control Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23MASA01C	Quantitative Aptitude and Logical Reasoning	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
9	A23AETA03C	Indian constitution	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
10	A23MBC303D	Certification course- III	EEC	2	0	2	0	100	0	100
24							525	475	1000	

SEMESTER– IV

S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23BTT407D	Genetic Engineering	DSC	4	0	0	4	25	75	100
2	A23BTT408D	Immunology	DSC	4	0	0	4	25	75	100
3	A23MAD411D	Biostatistics	IDC	4	0	0	4	25	75	100
4	A23MBE4XXD	DSE-II	DSE	3	0	0	3	25	75	100
5	A23XXO4XXC	Open Elective– II	OE	2	0	0	2	25	75	100
Practical										
6	A23BTL404D	Genetic Engineering and Immunology Practical	DSC	0	0	4	2	50	50	100
7	A23MAI401D	Biostatistics Practical	IDC	0	0	4	2	50	50	100
Internship										
8	A23MBN401D	Internship	DSC	0	0	6	3	40	60	100
Skill Enhancement Course										
9	A23MBS401D	Medical Lab Technology	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
10	A23AETA04C	Value Education	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
11	A23MBC404D	Certification course- IV	EEC	2	0	2	0	100	0	100
27							565	535	1100	

SEMESTER-V										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23MBT506D	Food Microbiology	DSC	4	0	0	4	25	75	100
2	A23MBT507D	Industrial Microbiology	DSC	4	0	0	4	25	75	100
3	A23MBT508D	Agricultural Microbiology	DSC	4	0	0	4	25	75	100
4	A23MBE5XXD	DSE-III	DSE	3	0	0	3	25	75	100
Practical										
5	A23MBL504D	Food Microbiology and Industrial Microbiology Practical	DSC	0	0	4	2	50	50	100
6	A23MBL505D	Agricultural Microbiology Practical	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A23MBS502D	Research Methodology	SEC	0	0	4	2	100	0	100
8	A23MBM501D	Online Course	OCC	0	0	2		100	0	100
							21	400	400	800

SEMESTER-VI										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23MBT609D	Medical Microbiology	DSC	4	0	0	4	25	75	100
2	A23MBT610D	Environment Microbiology	DSC	4	0	0	4	25	75	100
3	A23BTT614D	Biosafety, Bio-ethics and IPRs	DSC	4	0	0	4	25	75	100
4	A23MBE6XXD	DSE- IV	DSE	3	0	0	3	25	75	100
Practical										
5	A23MBL606D	Medical Microbiology and Environment Microbiology Practical	DSC	0	0	4	2	50	50	100
Project										
6	A23MBP601D	Project	DSC	0	0	10	5	40	60	100
Skill Enhancement Course										
7	A23MBS603D	R & D and Bioentrepreneurship	SEC	4	0	0	2	100	0	100
							24	290	410	700

DISCIPLINESPECIFIC ELECTIVES										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Discipline Specific Electives (DSE - I) - offered in Third Semester										
1	A23MBE301D	Genetics	DSE	3	0	0	3	25	75	100
2	A23MBE302D	Ecology and Evolution	DSE	3	0	0	3	25	75	100
3	A23MBE303D	Medical Parasitology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - II) - offered in Fourth Semester										
1	A23MBE404D	Computer Application in Biology	DSE	3	0	0	3	25	75	100
2	A23MBE405D	Public Health Microbiology	DSE	3	0	0	3	25	75	100
3	A23MBE406D	Clinical and Diagnostic Microbiology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - III) - offered in Fifth Semester										
1	A23MBE507D	Enzymology	DSE	3	0	0	3	25	75	100
2	A23MBE508D	Genomics and Proteomics	DSE	3	0	0	3	25	75	100
3	A23MBE509D	Marine Microbiology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - IV) - offered in Sixth Semester										
1	A23MBE610D	Pharmaceutical Microbiology	DSE	3	0	0	3	25	75	100
2	A23MBE611D	Basic Biotechnology	DSE	3	0	0	3	25	75	100
3	A23MBE612D	Bioinformatics	DSE	3	0	0	3	25	75	100

Department	Bioscience			Programme: B.Sc. Microbiology																							
Semester	I			Course Category Code: MIL *End Semester Exam Type: TE																							
Course Code	A23TAT101C			Periods / Week		Credit	Maximum Marks																				
				L	T	P	C	CAM	ESE	TM																	
Course Name	Tamil - I			3	0	0	3	25	75	100																	
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)																											
Prerequisite	Basic knowledge of Tamil language																										
Course Objectives	The main objectives of the course are,																										
	செவ்விலக்கிய தன்மை கொண்ட தமிழ்மொழியின் சிறப்பினை எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.																										
	இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.																										
	தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்றமாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது																										
	வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.																										
சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது																											
Course Outcome	On completion of the course, the students will be able to								BT Mapping (Highest Level)																		
	CO1	இலக்கியங்கள் உணர்த்தும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.								K3																	
	CO2	நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.								K3																	
	CO3	தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.								K3																	
	CO4	தாய்மொழியின் சிறப்பை அறிதல்								K3																	
	CO5	இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.								K3																	
UNIT-I	அலகு-1 இக்கால இலக்கியம்						Periods: 09																				
மரபுக்கவிதைகள்	பாரதியார் - வெள்ளிப் பனிமலையின் மீதுலாவுவோம்... (13 பாடல்கள்) பாரதிதாசன் - புரட்சிக்கவி (பேரன்புக் கொண்டவரே...முதல் - கவிஞனுக்கும் காதலிக்கும் மீட்சித்தார வரை) தங்கப்பா - பனிப்பாறை நுணிகள் - வாழ்க்கை ஓவியம் புதுக்கவிதைகள் அப்துல் ரகுமான் - வடலூரும் வார்தாவும் யுகி - உயிர்ப்பு (இயற்கையின் எலும்பு முறிப்பு) சிறுகதை ஆர்.சூடாமணி - சாம்பலுக்குள்									CO1																	
UNIT-II										அலகு-2 நாடகம்						Periods: 09											
நாடகம்										பிரபஞ்சன் - முட்டை உரைநடை இரா.வேங்கடாசலபதி - அந்தக் காலத்தில் காப்பி இல்லை நாவல் இரா.முருகவேள் - மிளிர்கல்									CO2								
UNIT-III																			அலகு:3 பக்தி இலக்கியம்						Periods: 09		
சைவம்																			திருஞானசம்பந்தர் - முதல் திருமுறை - தோடுடையசெவியன்...பாடல் மட்டும் திருநாவுக்கரசர் - நான்காம் திருமுறை - கூற்றாயினவாறு...பாடல் மட்டும் சுந்தரர் - ஏழாம் திருமுறை - பித்தாபிறைகூட...பாடல் மட்டும் மாணிக்கவாசகர் - திருவாசகம் - புல்லாய் புழுவாய்...பாடல் மட்டும் திருமூலர் - திருமந்திரம் - ஆர்க்கும் இடுமின்...பாடல் மட்டும் காரைக்காலம்மையார்-திருவிர்ட்டை மணிமாலை - அன்பால் அடைவதெவ்வாறு...பாடல் மட்டும் வைணவம் பொய்கையாழ்வார் - வையம் தகளியாய்...பாடல் மட்டும் பூதத்தாழ்வார் - அன்பே தகளியாய்...பாடல் மட்டும் பேயாழ்வார் - திருக்கண்டேன் பொன்மேனி...பாடல் மட்டும் நம்மாழ்வார் - திருவாய்மொழி - உள்ள என்ன...பாடல் மட்டும் பெரியாழ்வார் - பெரியாழ்வார் திருமொழி - வாக்குத் தாய்மை...பாடல் மட்டும் ஆண்டாளர் - நாச்சியார் திருமொழி-என்பு உருகி இனவேல்...பாடல் மட்டும் கிறித்துவம் இரட்சணிய மனோகரம் - ஆவிக்குறுவெந்துயர்...முதல் உணையல்லது பற்றுதோ வரை இஸ்லாம் குணங்குடி மஸ்தான் சாகிபு- ரகுமான் கண்ணி -அடைத்த மனக்கோட்டை...முதல் என்கண் வரை								
UNIT-IV	அலகு 4 - சிற்றிலக்கியம்						Periods: 09																				

முத்தொள்ளாயிரம் 1.வேறுகைப்பிச் சுரையாய்... 2.மாலை விலைபகர்வார்... 3.என்னை உரையல் ...எனத் தொடங்கும் பாடல்கள் மட்டும் உலா குலோத்துங்கசோழன் உலா - தாளை அரவிந்தச் சாதி...முதல் நிலவென்றாள் வரை கலம்பகம் திருவரங்கக்கலம்பகம் - உருமாறிப் பலபிறப்பும்...முதல் ஆடர் வாசல் வரை பள்ளு முக்கூடற்பள்ளு - நாட்டுவளம் - கறைபட்டுள்ளது...எனத்தொடங்கும் பாடல் மட்டும் தூது அழகர் கிள்ளைவிடு தூது - இன்சொல்லை....முதல் உபதேசமாக உரைப்பாய் வரை இடைக்காலப் புலவர்கள் இராமலிங்க அடிகள் - மஹாதேவமாலை-படித்தேன்...முதல் பொய் உலகியல் வரை வீரமாமுனிவர் - திருக்காவலூர் கலம்பகம் - தழை-போதவிழ்ப்...எனத்தொடங்கும் பாடல் மட்டும் மு.முஹம்மதுதஹா - .கொள்துமுஹியித்தீன் பிள்ளைத் தமிழ் - வயிறுபுடைக்க உண்கின்றீர்...பாடல் மட்டும்			CO4
UNIT-V	அலகு- 5 மொழிப்பயிற்சி	Periods: 09	
1.வலிமிகும் இடங்கள் ,வலிமிகா இடங்கள். 2.அகரவரிசைப்படுத்துதல் 3.நேர்காணல் இலக்கிய வரலாறு இக்கால இலக்கியம், பக்தி இலக்கியம், சிற்றிலக்கியம் குறித்த பாடப்பகுதியை ஒட்டியது.			CO5
Lecture Periods: 35	Tutorial Periods: 10	Practical Periods: -	Total Periods: 45
Text Books			
1. பாரதியார் – பாரதியார் கவிதைகள், குமரன் பதிப்பகம், சென்னை.2011. 2. சிவகுமார். எஸ்., - கொங்குதேர் வாழ்க்கை, பாடல் தொகுப்பு நூல் - தொகுதி -1 யுணைடெட் ரைட்டர்ஸ், சென்னை -86. முதற்பதிப்பு 2003. 3. சூடாமணி.ஆர். - தனிமைத் தளிர், தேர்ந்தெடுத்த சிறுகதைகள், காலச்சுவடு பதிப்பகம், முதல் பதிப்பு: செப்டம்பர் 2013. 4. பிரபஞ்சன் - ஜீவநதி (நாடகங்கள்) – கவிதா பப்ளிகேஷன், 8, மாசிலாமணி தெரு, பாண்டிபுஜார், தி.நகர், சென்னை -600 017 முருகவேள். இரா., - மிளிர்கல், ஐம்பொழில் பதிப்பகம், திருப்பூர், இரண்டாம் பதிப்பு, 2014			
Reference Books			
1. சிற்பிபாலசுப்பிரமணியம் மற்றும் நீலபத்மநாபன் (ப.ஆசி.) – புதிய தமிழ் இலக்கிய வரலாறு, தொகுதி-1,2,3, சாகித்திய அகாதெமி, புதுடெல்லி, 2013. 2. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு (செம்மை மற்றும் விரிவுப் பதிப்பு), பாரிநிலையம். சென்னை, 3. ஆனந்தன், முனைவர்.சு., - தமிழ் இலக்கிய வரலாறு, கண்மணி பதிப்பகம், திருச்சி-2. இருபத்தி மூன்றாம் பதிப்பு- 2015. 4. பரந்தாமனார், அ.கி., - நல்ல தமிழ் எழுத வேண்டுமா, பாரி நிலையம், சென்னை, 1998. 5. வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், அன்னம், சிவகங்கை. 1992.			
Web References			
1. http://www.tamilvu.org 2. http://www.tamilweb.com 3. http://www.tamilkodal.com			

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	1	-	-	3	2	2	3	-	-	2
2	-	-	-	-	-	1	-	-	2	1	3	2	-	-	3
3	-	-	-	-	-	2	-	-	3	3	3	3	-	-	2
4	-	-	-	-	-	1	-	-	3	2	3	2	-	-	2
5	-	-	-	-	-	1	-	-	2	2	2	3	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology								
Semester	I		Course Category Code: MIL			*End Semester Exam Type: TE					
Course Code	A23FRT101C		Periods / Week			Credit	Maximum Marks				
			L	T	P	C	CAM	ESE	TM		
Course Name	French - I		3	0	0	3	25	75	100		
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)											
Prerequisite	Basic knowledge of French language										
Course Objectives	The main objectives of the course are,										
	To introduce the basics of French language to the students										
	To enable the students to read, understand and write simple sentences										
	To help them to grasp the fundamentals of French grammar										
	To make the students to formulate correct phrases										
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)			
	CO1	have a general understanding of the language						K2			
	CO2	analyze and interpret simple phrases written in French						K4			
	CO3	have the basics of French grammar						K1			
	CO4	communicate and ask basic questions in French language						K6			
	CO5	appreciate the diversity and multiplicity of French and Francophone world						K5			
UNIT-I	S'introduire					Periods: 09					
	1. Le francais, les Francais, la France 2. Je m'appelle Elise, et vous ? 3. Saluer, se presenter, remercier 4. Vous dansez ? D'accord 5. Interroger quelqu'un et donner des informations								CO1		
UNIT-II	Demander des questions sur quelqu'un					Periods: 09					
	1. Monica, Yokiko et compagnie 2. Dire ce qu'on l'aime 3. Les voisins de Sophie 4. Demander des informations sur quelqu'un								CO2		
UNIT-III	Expliquer quelque chose					Periods: 09					
	1. Tu vas au Luxembourg ? 2. Dire où on va, dire d'où on vient 3. Nous venons pour l'inscription 4. A vélo, en train, en avion... 5. Expliquer un itinéraire, proposer quelque chose								CO3		
UNIT-IV	Poser des questions et commander					Periods: 09					
	1. Pardon monsieur, le BHV s'il vous plait 2. Au marché 3. Acheter quelque chose, demander le prix 4. On déjeune ici ? 5. Aller au restaurant, comprendre un menu								CO4		
UNIT-V	Inviter et proposer quelque chose					Periods: 09					
	1. On va chez ma copine ? 2. Proposer quelque chose 3. Demander et donner des informations sur quelqu'un 4. Chez Susana 5. Etre invité chez quelqu'un								CO5		
Lecture Periods: 45			Tutorial Periods: -			Practical Periods: -			Total Periods: 45		

Text Books

1. Sylvie Poisson Quinton and Michèle Maheo, *Festival 1 Méthode de Français*, CLE editions, 2009
2. Nathalie Hirschsprung and Tony Tricot, *Cosmopolite 1*, Hachette editions, 2017

Reference Books

1. Régine Mérieux and Yves Loiseau, *Latitudes 1*, Didier editions, 2017
2. Annie Berthet and Emmanuelle Daili, *Alter Ego + A1*, Hachette editions, 2012
3. Bruno Girardeau, *Réussir le Delf A1*, Didier editions, 2019

Web References

1. <https://www.tv5monde.com>
2. <https://www.rfi.fr>
3. <https://www.lemonde.fr>
4. <https://www.frenchpodcasts.com>
5. <https://www.coursera.org>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	2	-	-	2	2	2	3	-	1	2
2	-	-	-	-	-	2	-	-	2	1	2	2	-	1	2
3	-	-	-	-	-	1	-	-	3	3	3	3	-	2	2
4	-	-	-	-	-	1	-	-	2	2	3	2	-	2	2
5	-	-	-	-	-	2	-	-	2	2	2	1	-	1	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: ENG *End Semester Exam Type: TE						
Course Code	A23GET101C		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	General English - I		3	0	0	3	25	75	100
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)									
Prerequisite	Basic knowledge of English language								
Course Objectives	The main objectives of the course are,								
	To recognize the rhythms, metrics and other aspects of Literature								
	To read a variety of texts critically and proficiently								
	To enable the students to enjoy the flair of literature through the work of great writer								
	To make the students to know the functions of basic grammar								
Course Outcome	To enable them understanding the intrinsic nuances of writing in English language								
	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	comprehend and discuss the various facets of selected poems						K6	
	CO2	analyze and interpret texts written in English						K5	
	CO3	read drama with graduate-level interpretive and analytical proficiency						K1	
	CO4	improve the fluency and formation of grammatically correct sentence						K6	
CO5	enhance the writing skills for specific purposes						K6		
UNIT-I	Poetry					Periods: 09			
	1. Rudyard Kipling – <i>IF</i> 2. William Wordsworth – <i>Daffodils</i> 3. Percy Bysshe Shelley – <i>Ozymandias</i> 4. William Ernest Henley – <i>Invictus</i> 5. Rabindranath Tagore – <i>On the Nature of Love</i>								CO1
UNIT-II	Prose					Periods: 09			
	1. Bertrand Russell – <i>The Road to Happiness</i> 2. Charles Lamb – <i>A Dissertation upon Roast Pig</i>								CO2
UNIT-III	Short stories					Periods: 09			
	1. Oscar Wilde – <i>The Devoted Friend</i> 2. R. K. Narayan – <i>God and the Cobbler</i>								CO3
UNIT-IV	Drama					Periods: 09			
	1. H H Munro – <i>The Death Trap</i> 2. J.M. Synge – <i>Riders to the Sea</i>								CO4
UNIT-V	Grammar and composition					Periods: 09			
	1. Parts of Speech 2. Subject-Verb Agreement 3. Letter Writing 4. Essay Writing								CO5
Lecture Periods: 35			Tutorial Periods: 10			Practical Periods: -		Total Periods: 45	
Text Books									
1. 1 Narayan, R.K, <i>Malgudi days</i> , Indian Thought Publication, 2019 2. Synge John Millington, <i>Riders to the Sea</i> , Sahitya Sarowar Publisher, 2022 3. P. C. Wren, H. Martin, <i>High School Wren and Martin English Grammar and Composition</i> , S. Chand & Company Pvt. Ltd, 2022. 4. J.M. Synge, S.C. Narula. <i>Riders to the Sea</i> . Surjeet Publication. 2018. 5. S.C.Gupta. <i>A Handbook for Letter Writing</i> . Arihant Publication. 2016.									

Reference Books (Minimum 5– Latest editions to be given)

1. Lamb, Charles, *Selected Prose*, Penguin Classics Publication, 2nd Edition, 2013.
2. S.C. Gupta, *English Grammar & Composition Very Useful for All Competitive Examinations*, Arihant Publications, 2014.
3. Saki, H. H. Munro, F. Carruthers Gould, *The Complete Works of Saki: Illustrated Edition: Novels, Short Stories, Plays, Sketches & Historical Works, including Reginald, The Chronicles of Clovis, ... The Death-Trap, The Westminster Alice* Kindle Edition, e-artnow, 2018.

Web References

1. <https://www.englishcharity.com/of-love-by-francis-bacon-explanation/>
2. https://www.poetry-archive.com/n/the_queens_rival.html
3. <https://www.gradesaver.com/lady-windermere-fan/study-guide/summary-act-i>

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	3	-	-	3	2	2	3	-	1	2
2	-	-	-	-	-	2	-	-	2	1	3	2	-	1	3
3	-	-	-	-	-	2	-	-	3	3	3	3	-	2	2
4	-	-	-	-	-	1	-	-	3	2	3	2	-	2	2
5	-	-	-	-	-	2	-	-	2	2	2	3	-	1	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology							
Semester	I		Course Category Code: DSC			*End Semester Exam Type: TE				
Course Code	A23MBT101D		Periods / Week			Credit	Maximum Marks			
			L	T	P	C	CAM	ESE	TM	
Course Name	General Microbiology		4	0	0	4	25	75	100	
Prerequisite	Basic knowledge of Microbiology									
Course Objectives	The main objectives of the course are,									
	To provide a fundamental knowledge about history of microbiology and classification of microorganisms for advanced studies in biological sciences, particularly to improve their skills in microbiology field.									
	To understand the working principle, components, types and applications of microscope									
	To provide an overview of the classification of microorganisms									
	To describe the unique characteristics of microorganisms									
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)		
	CO1	Clearly understand the contributions of various scientists for development of microbiology field and skills associated with it.							K2	
	CO2	Demonstrate the diversity of microbes and their applications.							K2	
	CO3	know about the various field of Microbiology							K3	
	CO4	know about the staining techniques and microscopic techniques							K3	
	CO5	understand the sterilization methods							K2	
UNIT-I	History of microbiology					Periods: 10				
Definition and scope microbiology, History- spontaneous generation, biogenesis. Contribution of Anton von Leewenhoek, Golden era of Microbiology Louis Pasteur, Robert Koch, Joseph Lister, Alexander Flemming, Lazaro Spallanzani, and John Tyndall. Germ theory of disease, Establishment of fields of medical microbiology and immunology through the work of Paul Ehrlich, Ellie Metchnikoff, Edward Jenner									CO1	
UNIT-II	Classification of microorganisms					Periods: 12				
Microbial taxonomy, Binomial Nomenclature, Whittaker's Five Kingdom and Carl Woese's three kingdom classification system and their utility. Principles of Classification – morphological, physiological, biochemical, numerical, and molecular taxonomy Classification of bacteria according to Bergey's manual. General characteristics of Actinobacteria.									CO2	
UNIT-III	Structural organisation					Periods: 12				
Characteristic features of Prokaryotes and Eukaryotes: Prokaryotes – structure and function of cell wall, plasma membrane, flagella, slime, S layer, capsule, pili, cytoplasmic inclusion bodies, spore. Eukaryotes – structure & function of cell wall, plasma membrane, cilia, nucleus, mitochondria, chloroplast, lysosome, endoplasmic reticulum and Golgi complex.									CO3	
UNIT-IV	Microscopes					Periods: 12				
Microscope – principles and application – simple and compound microscope – Light microscopes (bright field, dark field, phase contrast, fluorescent microscope)- Electron microscopes (Transmission and Scanning Electron Microscope). Stains and Staining – principles of staining, types and classification of stains, definition of auxochrome, chromophores, Acidic and Basic dyes; Simple and differential staining: theories of staining, mordant and its function.									CO4	
UNIT-V	Media and sterilization					Periods: 12				
Media – Types and preparation – Sterilization – Principle and methods – dry heat, moist heat, filtration, radiation, antiseptics and disinfectants. Types of preservation methods. Culture technique – aerobic, anaerobic and semi aerobic. Culture collection centers in India (ITCC, MCC, and MTCC) and Abroad (ATCC, ECCO, JCM).									CO5	
Lecture Periods: 45			Tutorial Periods: 15			Practical Periods: -		Total Periods: 60		

Text Books

1. Tortora, G.J., Funke, B.R., and Case CL. (2014). Microbiology: An Introduction. 9th edition. Pearson Education.
2. Madigan, M.T., Martinko J.M., Dunlap, P.V., and Clark, D.P. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition.
3. Cappucino, J., and Welsh CT. (2020). Microbiology: A Laboratory Manual. 12th edition. Pearson Education Limited.
4. Wiley, J.M., Sherwood, L.M., and Woolverton, C.J. (2013) Prescott's Microbiology. 9th edition. McGraw Hill International.

Reference Books

1. Atlas, R.M. (1997). Principles of Microbiology. 2nd edition. W.M.T. Brown Publishers.
2. Pelczar, M.J., Chan, E.C.S., and Krieg, N.R. (1993). Microbiology. 5th edition. McGraw Hill Book Company.
3. Stanier, R.Y., Ingraham, J.L., Wheelis, M.L., and Painter, P.R. (2005). General Microbiology. 5th edition. McMillan. 8
4. Duby, R.C. (2014) Textbook of Microbiology. 5th edition. S. Chand Publishing.
5. Talaro., Kathleen, P.T., Chess., and Berry, C., (2018). Foundations in Microbiology. (10th Ed). McGraw-Hill Higher Education, United States.

Web References

1. http://www.tutorials point.com/biological_classification/index.asp
2. <http://www.encyclopedia.com/science/encyclopedias-almanacs-trascipts-and-maps/bacterial-ultrastructure>
3. <http://www.anburn.edu/academic/classes/biol/4101/estridge2/tutorial1a/pdf>
4. <http://www.scientistcindy.com/microbial-nutrition-and-growth.html>
5. <http://www.lamination.edu/lifesciences/lecturenote/mic20/Chap07Control.pdf>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	3	2	1	3	3	2	1	1	3	2	2
2	3	3	3	2	2	1	3	2	2	3	2	2	3	3	2
3	3	2	2	3	2	2	3	3	2	3	2	2	3	3	3
4	3	2	3	3	3	2	2	2	3	3	2	3	3	3	2
5	3	3	3	3	2	2	3	3	2	3	3	2	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: DSC			*End Semester Exam Type: TE			
Course Code	A23MBT102D		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	Bacteriology		4	0	0	4	25	75	100
Prerequisite	Basic knowledge of Bacteriology								
Course Objectives	The main objectives of the course are,								
	To provide a strong base in the fundamentals of bacteria that improves their chances in employability.								
	To learn techniques and methods used in the cultivation and isolation of bacteria.								
	To learn various physical and chemical means of sterilization								
	To know about the culture media								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Understand the basic microbial structure and function and this course provide an understanding of the concepts of bacteriology which is one of the basic requirements for their employability						K2	
	CO2	Demonstrate theory and practical skills in staining procedures						K2	
	CO3	Understand various Culture media and their applications						K2	
	CO4	Understand various physical and chemical means of sterilization						K2	
	CO5	Know General bacteriology and microbial techniques for isolation of pure culture of bacteria						K3	
UNIT-I	Structure of bacteria					Periods: 12			
Cell shape and arrangement - Structure ,chemical compositions and functions of :Capsule and slime layer, Cell wall : Gram positive and Gram negative bacteria, Cell Membrane: Gram-positive and Gram-negative, Flagella : Arrangement, mechanism of flagellar movement, Chemotaxis, phototaxis, Magneto taxis, fimbriae, pili, Ribosomes, Nuclear material, Endospore – Structure, formation, stages of sporulation, Reserved food material: Poly beta hydroxy butyric acid granules, glycogen and polyphosphate granules.									CO1
UNIT-II	Bacterial staining					Periods: 10			
Dye and its types – Staining Techniques : Specimen Preparation for Light microscope and Electron microscope, Principle and types of staining techniques - Simple Staining, Negative Staining, Gram Staining, Endospore staining, Capsule Staining, Flagella Staining, Nuclear Staining.									CO2
UNIT-III	Cultivation and reproduction of bacteria					Periods: 14			
Culture media-Classification based on consistency: Solid medium, Semisolid media, Liquid (Broth) medium - composition: Synthetic or chemically defined medium, Non synthetic or chemically undefined medium - purpose/ functional use/ application: General purpose media/ Basic media, Enriched medium (Added growth factors), Selective and enrichment media, Differential/ indicator medium, Transport media, Anaerobic media, Assay media. Pure culture technique: Serial dilution, Streak plate, Pour plate ad spread plate technique -microbial preservation-cultivation of anaerobic bacteria. Asexual methods of reproduction, logarithmic representation of bacterial populations, Growth: Binary fission, phases of growth. Calculation of generation time and specific growth rate.									CO3
UNIT-IV	Control of Bacterial Growth and its and mode of action					Periods: 12			
Pattern of Bacterial death – concepts. Sterilization by physical methods - High temperature, tyndallization and pasteurization. - Low temperature .Non ionizing and ionizing radiations - Bacteriological filters. Sterilization by chemical means; Disinfectants and antiseptics: Effectiveness, mode of action & application. Phenolics, alcohols, halogens, heavy metals, quaternary ammonium compounds, aldehydes. Sterilization using gases sulfur dioxide, ethylene oxide, Beta propiolactone. Control of microorganisms using sugars, nitrates, organic acids. Action of antibiotics and enzymes on the cell wall (sphaeroplasts, protoplasts, and L-forms).									CO4

UNIT-V	Archae bacteria and Eubacteria	Periods: 12	
Archae bacteria and Eubacteria- General characteristics, Classification (Overview), Origin and evolution, Structure and composition, metabolism, Ecology and Significance in technology and industry. Difference between Archaeobacteria and Eubacteria. Gram Positive and Gram Negative (Low G+C and High G+C)- General characteristics with suitable examples. Taxonomy, physiology and natural products of Actinobacteria. Cyanobacteria: Bioresource in agriculture & ecosystem.			CO5
Lecture Periods: 45	Tutorial Periods: 15	Practical Periods: -	Total Periods: 60
Text Books			
1. Willey, J.M., Sherwood, L.M., and Woolverton, C.J. (2019). Prescott's Microbiology. 11 th edition. McGrawHill. 2. Madigan, M.T., Kelly, S.B., Daniel, H.B, Mathew, S and David, A.S (2017). Brock Biology of Micro-organisms. 15 th edition. Parker J. Prentice Hall International, Inc. 3. Benson's Microbiological Applications Laboratory Manual-Complete Version, 2015, 13 th Edition, McGraw Hill.			
Reference Books			
1. Kathleen Park Talaro and Barry Chess, 2018. Foundations in Microbiology: Basic Principles, 10 th Edition, McGraw Hill 2. Joanne Willey and Kathleen Sandman and Christopher J. Woolverton and Linda Sherwood. 2019. Prescott's Principles of Microbiology. 2 nd Edition. McGraw Hill 3. Pelczar, J.r M.J., Chan, ECS., and Krieg, N.R. (2004). Microbiology. 5 th edition. Tata McGrawHill. 4. Tortora, G.J., Funke, B.R., and Case, C.L. (2008). Microbiology: An Introduction. 9 th edition. Pearson Education. 5. Stanier, R.Y., Ingraham, J.L., Wheelis, M.L., and Painter, P.R. (2005). General Microbiology. 5 th edition. McMillan. 6. Cappucino, J., and Sherman. N. (2010). Microbiology: A Laboratory Manual. 9 th edition. Pearson Education Limited.			
Web References			
1. https://unacademy.com/content/kerala-psc/study-material/general-microbiology 2. https://biologydictionary.net/archaeobacteria/ 3. https://en.wikipedia.org/wiki/Gram-negative_bacteria 4. https://www.biologyonline.com/dictionary/eubacteria 5. https://www.vinmec.com/en/news/health-news/bacterial-growth-and-reproduction			

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	3	2	2	3	1	2	3	2	2	3	2	3
2	3	1	1	2	2	1	2	2	1	2	2	3	3	2	2
3	3	2	2	2	3	2	1	3	2	2	1	2	3	3	2
4	3	2	2	1	2	3	3	2	1	2	3	2	3	3	2
5	3	3	3	2	2	2	3	2	3	2	3	1	3	3	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: IDC		*End Semester Exam Type: TE				
Course Code	A23MBD101D		Periods / Week		Credit	Maximum Marks			
			L	T	P	C	CAM	ESE	TM
Course Name	Biomolecules		4	0	0	4	25	75	100
Prerequisite	Basic knowledge of Biomolecules								
Course Objectives	The main objectives of the course are,								
	To provide the knowledge on basics of biochemistry and its applications and to highlight the technical skill.								
	To describe the classification and functions of lipids.								
	To summarize the structure and classification of enzymes								
	To state the Structure and types of DNA and RNA								
To understand about storage and structural polysaccharides.									
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Understand the structures of enzymes, proteins, carbohydrates and fats						K2	
	CO2	Understand the functions of biomolecules						K2	
	CO3	Analyze the process of metabolism						K4	
	CO4	Demonstrate the Structure and classification of enzymes, specificity of enzymes						K3	
CO5	Understand the DNA & RNA structure and base pairing schemes						K2		
UNIT-I	Carbohydrates				Periods: 12				
Monosaccharides-families, stereo isomerism, epimers, Mutarotation and anomers. Forms of glucose and fructose, Fischer and Haworth projection. Sugar derivatives. Disaccharides- occurrence, concept of reducing and non-reducing sugars and Haworth projections. Polysaccharides-storage and structural polysaccharides.								CO1	
UNIT-II	Lipids				Periods: 10				
Classification and functions of lipids. Storage lipids- structure and function of fatty acids. Triacylglycerols. Saponification. Structural lipids- structure, functions and properties of phosphoglycerides: glycogen and sphingolipids.								CO2	
UNIT-III	Amino acids and Proteins				Periods: 15				
Classification and functions of proteins and amino acids, Structure of amino acids and concept of zwitterion. Ninhydrin reaction. Natural modifications of amino acids in proteins. Non protein amino acids, Primary and Secondary structure of proteins- alpha helix, beta pleated sheet. Tertiary and quaternary structures of proteins. Structure of haemoglobin in mammals.								CO3	
UNIT-IV	Enzymes				Periods: 11				
Structure and classification of enzymes, specificity of enzymes. Michaelis-Menten equation, Km, Vmax, isoenzymes. Allosteric enzyme and its mechanism. Multienzyme complex. Enzyme inhibition.								CO4	
UNIT-V	Nucleic Acids				Periods: 12				
Nucleic Acids-Purines &Pyrimidines nucleotides, RNA, & DNA base pairing schemes, types of RNA: mRNA, rRNA, tRNA, Secondary structure of DNA, Watson and Crick model.								CO5	
Lecture Periods: 45		Tutorial Periods: 15		Practical Periods: -		Total Periods: 60			
Text Books									
<ol style="list-style-type: none"> 1. Berg JM, Tymoczko JL, and Stryer L. (2011). Biochemistry. 7th edition. Newyork: W.H. Freeman & Company. 2. Murray RK, Bender DA, Botham KM, and Kennelly P.J. (2018). Harper's illustrated Biochemistry. 31th edition. London: McGraw-Hill Medical. 3. Nelson DL, and Cox MM. (2017). Lehninger: Principles of Biochemistry. 7th edition. New York: W.H. Freeman and Company. 									

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1. Zubey G. Principles of Biochemistry, Oscar Publication (2000).
2. Devlin T. M. Text Book of Biochemistry with Clinical Correlations (4th Edition) Wiley & Sons Publication (2005).
3. Hopkins WG, and Huner P.A. (2008). Introduction to Plant Physiology. 4nd edition. John Wiley & Sons
4. Buchanan B, Grissem W, and Jones R. (2015). Biochemistry and Molecular Biology of Plants. 2nd edition. American Society of Plant Biologists.

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1. <https://www.toppr.com/guides/chemistry/biomolecule/carbohydrates/>
2. [https://www.tutorialspoint.com.cache3.com/class_11th_proteins/protein_amino_acids.asp.html](https://www.tutorialspoint.com/cache3.com/class_11th_proteins/protein_amino_acids.asp.html)
3. <https://byjus.com/biology/enzymes/>
4. <https://sciencemusicvideos.com/ap-biology/module-6-menu-biochemistry/biochemistry-3-lipids-interactive-tutorial/>
5. <https://www.britannica.com/science/nucleic-acid/Deoxyribonucleic-acid-DNA>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	3	2	1	2	2	3	2	1	2	3	2	2
2	3	3	2	2	3	2	2	3	2	1	1	2	2	2	3
3	2	3	2	2	2	3	2	2	3	2	1	2	3	2	2
4	3	1	2	2	3	2	1	1	1	2	1	2	3	1	2
5	3	2	2	2	3	2	1	1	2	1	2	1	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: DSC			*End Semester Exam Type: LE			
Course Code	A23MBL101D		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	General Microbiology Practical		0	0	4	2	25	75	100
Prerequisite	Basic knowledge of Microbiology practical								
Course Objectives	The main objectives of the course are,								
	to isolate and culture techniques of microbes								
	to know the external feature of microbes by staining techniques and colony characteristics.								
	to understand the sterilization of heat sensitive materials								
	to know the counting of microorganism in the environment								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	build the student to describe and distinguish the bacterial colonies.						K3	
	CO2	understand the sterilization techniques.						K2	
	CO3	handle the pathogens safely.						K6	
	CO4	describe the bacteria, algae, fungi and protozoans						K6	
	CO5	handle the instruments in the microbiology laboratory						K6	
Practical's									
<ol style="list-style-type: none"> Laboratory safety measures Principles and applications of microbiology laboratory instruments Preparation of media and sterilization techniques Preparation of slant, stabs & plating techniques Pure culture techniques – streak, spread & pour plate techniques Motility of bacteria – hanging drop, soft agar methods Enumeration of bacteria and fungi from environmental samples Staining techniques – fungal staining Observation of permanent slides to study the structural characteristics of bacteria, algae, fungi & protozoan. 									
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 60		Total Periods: 60	
Text Books									
<ol style="list-style-type: none"> Atlas R.M., A.E.Brown and L.C. Parks, Mosby, St. Louis, 1995, Laboratory Manual of Experimental Microbiology Cappuccino J.G. and N. Sherman 2002, Microbiology: A Laboratory Manual, Addison-Wesley. 									
Reference Books									
<ol style="list-style-type: none"> Holt J.G, N.R.Krieg, 2000, Bergey's Manual of Determinative Bacteriology. Ninth edition, Lippincott Williams & Wilkin Publishers. Kannan N, 2002, Laboratory Manual in General Microbiology, Panima Publishers. Sundararaj T, 2003, Microbiology Laboratory Manual, 2nd Edition, A. Sundararaj No.5, I cross street, Thirumalai Nagar, Perungudi, Chennai 600 096. 									
Web References									
<ol style="list-style-type: none"> https://microbiologysociety.org/static/uploaded/23cbf9c5-f8c8-4f91-b092a4ad819e6357.pdf https://profiles.uonbi.ac.ke/jamesmuthomi/files/acp101_microbiology_practical_exercises.pdf 									

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	2	2	3	2	2	3	2	2	3	3	3
2	3	3	3	3	2	3	3	2	2	3	2	2	3	2	2
3	3	3	3	3	2	2	2	3	2	3	2	2	3	2	3
4	3	3	3	3	3	2	2	3	2	2	2	2	3	2	3
5	3	3	3	3	3	2	3	3	2	3	3	2	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: DSC			*End Semester Exam Type: LE			
Course Code	A23MBL101D		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	Bacteriology Practical		0	0	4	2	25	75	100
Prerequisite	Basic knowledge of Bacteriology practical								
Course Objectives	The main objectives of the course are,								
	To provide a strong base in the fundamentals of bacteria.								
	To learn techniques and methods used in the cultivation and isolation of bacteria.								
	To develop skills related to preservation of bacterial cultures.								
	To learn about bacterial specialized structure using staining methods								
Course Outcome	On completion of the course, the students will be able to								BT Mapping (Highest Level)
	CO1	Develop the practical skills in staining procedures							K3
	CO2	Perform the Various Culture media and their applications							K6
	CO3	Handle the various microbial culture techniques to obtain isolation of pure cultures of bacteria							K6
	CO4	Handle the bacterial endospore and capsule staining							K6
	CO5	explain the bacterial motility and flagella							K2
Practicals							Periods: 10		
<ol style="list-style-type: none"> Preparation of different media: synthetic media BG-11, Complex media - Nutrient agar, McConkey agar, EMB agar. Examination of bacterial colony with morphological features. Estimation of Colony Forming Unit (CFU) count by spread plate method/pour plate method. Isolation of pure cultures of bacteria by streaking method - Quadrant, Continuous and T-streaking. Preservation of bacterial cultures by various techniques - Agar slants and deeps - Mineral Oil, Glycerol stocks Micrometry. Simple staining Negative staining Gram's staining Acid fast staining Capsule staining Endospore staining. 									
Lecture Periods: 0			Tutorial Periods: 0			Practical Periods: 60		Total Periods: 60	
Text Books									
<ol style="list-style-type: none"> Madigan, M.T., Kelly, S.B., Daniel, H.B, Mathew, S and David, A.S (2017). Brock Biology of Micro-organisms. 15th edition. Parker J. Prentice Hall International, Inc. Willey, J.M., Sherwood, L.M., and Woolverton, C.J.(2019). Prescott's Microbiology. 11th edition. McGrawHill. Talaro., Kathleen, P.T., Chess., and Berry, C., (2018). Foundations in Microbiology, 10th Ed., McGrawHill. 									
Reference Books									
<ol style="list-style-type: none"> Benson's Microbiological Applications Laboratory Manual-Complete Version, 2015, 13th Edition, McGraw Hill. Kathleen Park Talaro and Barry Chess, 2018. Foundations in Microbiology: Basic Principles, 10th Edition, McGraw Hill Cappucino, J., and Sherman. N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited 									

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1. <https://www.udemy.com/course/practical-bacteriology-from-scratch/>
2. <https://www.routledge.com/Methods-in-Practical-LaboratoryBacteriology/Chart/p/book/9780849386923>
3. https://profiles.uonbi.ac.ke/jamesmuthomi/files/acp101_microbiology_practical_exercises.pdf

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	2	3	3	2	3	3	3	2	3	3	3
2	3	3	3	3	2	3	3	3	2	3	2	3	3	2	3
3	3	3	3	3	3	2	3	3	3	2	3	2	3	3	3
4	3	3	3	3	3	2	3	3	2	2	3	3	3	2	3
5	3	3	3	3	3	2	2	2	3	2	3	2	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: IDC			*End Semester Exam Type: LE			
Course Code	A23MBI101D		Periods / Week			Credit		Maximum Marks	
			L	T	P	C	CAM	ESE	TM
Course Name	Biomolecules Practical		0	0	4	2	25	75	100
Prerequisite	Basic knowledge of Biomolecules practical								
Course Objectives	The main objectives of the course are,								
	To acquire skill on various experimental methods and techniques on order to analyze the given biological samples.								
	To know the standard procedures for handling the biochemical assays and instruments.								
	To know the threshold levels of primary biochemical markers.								
	To analyze common organic reagents and compounds based on their properties.								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	gain skills on quantitative estimation methods for various biomolecules from natural sources.						K6	
	CO2	acquire handling skills to handle the spectroscopy instrumentations.						K6	
	CO3	obtain skills on primary screening of biochemical markers in samples.						K6	
	CO4	develop skills to prepare useful reagents in the laboratory.						K3	
	CO5	use of handling of glass wares, minor equipment for conducting experiments.						K3	
Practicals	<ol style="list-style-type: none"> 1. Qualitative tests for Carbohydrates, lipids and proteins 2. Principles of Colorimetry: (i) Beer's law (ii) To study relation between absorbance and % transmission 3. Estimation of carbohydrates 4. Estimation of proteins 5. Estimation of lipids 6. Separation of Amino acids by paper chromatography/Thin layer chromatography 7. Determination of enzymes activity using different parameters 								
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30		Total Periods:30	
Text Books									
<ol style="list-style-type: none"> 1. Berg JM, Tymoczko JL, and Stryer L. (2011). Biochemistry. 7th edition. Newyork: W.H. Freeman & Company. 2. Buchanan B, Grissem W, and Jones R. (2015). Biochemistry and Molecular Biology of Plants. 2nd edition. American Society of Plant Biologists. 									
Reference Books									
<ol style="list-style-type: none"> 1. Hopkins WG, and Huner P.A. (2008). Introduction to Plant Physiology. 4nd edition. John Wiley & Sons. 2. Murray RK, Bender DA, Botham KM, and Kennelly P.J. (2018). Harper's illustrated Biochemistry. 31th edition. London: McGraw-Hill Medical. 3. Nelson DL, and Cox MM. (2017). Lehninger: Principles of Biochemistry. 7th edition. New York: W.H. Freeman and Company. 									
Web References									
<ol style="list-style-type: none"> 1. https://practicalbiology.org/bio-molecules 2. https://byjus.com/biology/biomolecules/ 3. https://uomus.edu.iq/img/lectures21/MUCLecture_2022_1032325.pdf 									

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	2	2	3	2	2	3	2	2	3	3	3
2	3	3	3	3	2	3	3	2	2	3	2	2	3	2	2
3	3	3	3	3	2	2	2	3	2	3	2	2	3	2	3
4	3	3	3	3	3	2	2	3	2	2	2	2	3	2	3
5	3	3	3	3	3	2	3	3	2	3	3	2	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	I		Course Category Code: SEC			*End Semester Exam Type: TE			
Course Code	A23ENSA02C		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	Soft Skills		4	0	0	2	25	75	100
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)									
Prerequisite	Basic knowledge of soft skills								
Course Objectives	The main objectives of the course are,								
	To train students in Soft skills in order to enable them to be professionally competent								
	To facilitate the students for Goal setting and Goal Achieving skills								
	To enrich the sense of social responsibility and accountability of the students								
	To help the students to train them for Stress Management and Time Management								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	enhance the Soft skills and compete professionally						K3	
	CO2	achieve Goal setting and Goal Achieving skills						K3	
	CO3	improve their social responsibility and accountability skills						K6	
	CO4	enrich Stress Management and Time Management						K6	
	CO5	Demonstrate the quality of a Team ship and Creative thinking						K2	
UNIT-I	POSITIVE ATTITUDE					Periods: 06			
Skills-Personal Skills: Knowing Oneself/Self-Discovery-Confidence Building- Defining Strengths of Attitude -formation of attitudes - psychological factors - the power of positive attitude -the benefits of positive attitude – developing positive attitude - negative attitude – the causes of negative attitude -the consequences of negative attitude -how to change negative attitude									CO1
UNIT-II	GOAL SETTING					Periods: 06			
Introduction - importance of goal setting - goal definition – types of goals -what exactly goal setting why people don't set goals -how to choose the right goals - SMART GOALS -Career goals -benefits of career goal setting -goal setting tips									CO2
UNIT-III	STRESS AND TIME MANAGEMENT					Periods: 06			
Definition of Stress management - types of stress - causes of stress - stress management and reduction techniques Definition of Time management - Setting goals, planning – prioritizing - setting deadlines - multi-tasking - practicing self-discipline - overcoming procrastination									CO3
UNIT-IV	TEAMWORK SKILLS					Periods: 06			
Communication as Social Construction - Dynamics of professional Group communication - Group and Team - Team Building Process - Managing conflict and appreciating/respecting differences - Decision making & effective negotiation - Types of teams - Understanding, Identity and nurturing sensitivity (in terms of gender, orientation, language)									CO4
UNIT-V	PROBLEM SOLVING THROUGH CREATIVE THINKING					Periods: 06			
Thinking Creatively-Improving Perceptions -Creative thinking as an essential skill - Techniques of creative thinking (such as brainstorming, lateral thinking, mind mapping, rich pictures, role play) - Practical problem solving through creative thinking - Case Study									CO5
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30		Total Periods:30	
Text Books									
<ol style="list-style-type: none"> Sabina Pillai, Agna Fernandez, <i>Soft Skills and Employability Skills</i>, Cambridge University Press, 2017. Jeff Butterfield, <i>Soft Skills for Everyone</i>, Cengage India Private Limited, 2nd Edition, 2020. Alex K, <i>Soft Skills</i>, S Chand & Company, 1st Edition, 2014 									

Reference Books

1. Barun Mitra, *Personality Development and Soft Skills 2*, Oxford University Press, 2016
2. Prashant Sharma, *Soft Skills 3rd Edition: Personality Development for Life Success*, BPB Publications, 2021.
3. Ghosh, B.N, *Managing Soft Skills for Personality Development*, Tata McGraw Education Publication, 1st Edition, 2012.

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1. <https://www.mindtools.com/a5ykiuq/personal-goal-setting>
2. <https://www.healthlinkbc.ca/health-topics/stress-management-managing-your-time>
3. <https://www.herzing.edu/blog/7-important-teamwork-skills-you-need-school-and-your-career>

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	3	-	-	3	3	2	3	2	2	3
2	-	-	-	-	-	3	-	-	2	3	3	2	3	2	3
3	-	-	-	-	-	2	-	-	3	3	3	3	2	2	3
4	-	-	-	-	-	2	-	-	3	2	3	2	3	2	3
5	-	-	-	-	-	2	-	-	2	2	2	1	2	1	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Department	Bioscience		Programme: B.Sc. Microbiology							
Semester	I		Course Category Code: AECC* End Semester Exam Type: TE							
Course Code	A23AETA101C		Periods / Week			Credit	Maximum Marks			
			L	T	P	C	CAM	ESE	TM	
Course Name	Public Administration		2	0	0	1	25	75	100	
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)										
Prerequisite	Basic knowledge of public administration									
Course Objectives	The main objectives of the course are,									
	To introduce the elements of public administration									
	To help the students obtain a suitable conceptual perspective of public administration									
	To introduce them the growth of institution devices to meet the need of changing times									
To instill and emphasize the need of ethical seriousness in contemporary Indian Public Administration										
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)		
	CO1	Understand the concepts and evolution of Public Administration.							K2	
	CO2	Be aware of what is happening in the Public Administration in the country.							K1	
	CO3	Explain the Territory Administration in the State and the Centre.							K2	
	CO4	Appreciate emerging issues in Indian Public Administration.							K6	
UNIT-I	INTRODUCTION TO PUBLIC ADMINISTRATION					Periods: 07				
Meaning, nature and Scope of Public Administration and its relationship with other disciplines- Evolution of Public Administration as a discipline — Woodrow Wilson, Henry Fayol , Max Weber and others - Evolution of Public Administration in India – Arthashastra – Colonial Administration upto 1947									CO1	
UNIT-II	PUBLIC ADMINISTRATION IN INDIA					Periods: 08				
Enactment of Indian Constitution - Union Government – The Cabinet – Central Secretariat — All India Services – Training of Civil Servants – UPSC – NitiAyog – Statutory Bodies: The Central Vigilance Commission – CBI - National Human Rights Commission – National Women’s Commission –CAG									CO2	
UNIT-III	STATE AND UNION TERRITORY ADMINISTRATION					Periods: 08				
Differential Administrative systems in Union Territories compared to States Organization of Secretariat: - Position of Chief Secretary, Functions and Structure of Departments, Directorates – Ministry of Home Affairs supervision of Union Territory Administration – Position of Lt.Governor in UT – Government of Union Territories Act 1963 – Changing trend in UT Administration in Puducherry and Andaman and Nicobar Island.									CO3	
UNIT-IV	EMERGING ISSUES IN INDIAN PUBLIC ADMINISTRATION					Periods: 07				
Changing Role of District Collector – Civil Servants – Politicians relationship – Citizens Charter - Public Grievance Redressal mechanisms — The RTI Act 2005 – Social Auditing and Decentralization – Public Private partnership.									CO4	
Lecture Periods: 30			Tutorial Periods: -			Practical Periods: -		Total Periods:30		
Text Books										
<ol style="list-style-type: none"> 1. Avasthi and Maheswari, “Public Administration”, Lakshmi Narain Agarwal, 1st Edition, 2016. 2. Ramesh K.Arora, “Indian Public Administration: Institutions and Issues”, New Age InternationalPublishers, 3rd Edition, 2012. 3. RumkiBasu, “Public Administration: Concept and Theories”, Sterling, 1st Edition, 2013. 										

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1. Siuli Sarkar, "Public Administration in India", Prentice Hall of India, 2nd Edition, 2018.
2. M. Laxmikanth, "Public Administration", McGraw Hill Education, 1st Edition, 2011.
3. R.B.Jain, "Public Administration in India, 21st Century Challenges for Good Governance", Deep and Deep Publications, 2002.

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1. <http://cic.gov.in/>
2. <http://www.mha.nic.in/>
3. <http://rti.gov.in/>
4. <http://www.cvc.nic.in/>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	2	-	-	3	3	2	3	2	2	3
2	-	-	-	-	-	3	-	-	2	3	2	2	2	2	3
3	-	-	-	-	-	2	-	-	2	3	2	2	2	2	3
4	-	-	-	-	-	2	-	-	3	2	3	2	2	1	3
5	-	-	-	-	-	1	-	-	2	2	2	2	2	1	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

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(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107



SCHOOL OF ARTS AND SCIENCE

DEPARTMENT OF BIOSCIENCE

B.Sc. MICROBIOLOGY

MINUTES OF BOARD OF STUDIES THIRD MEETING

Venue

ONLINE MEETING

**DEPARTMENT OF BIOSCIENCE,
SCHOOL OF ARTS AND SCIENCE, SMVEC,
PONDICHERRY**

Date and Time

21.11.2023 from 10.30am to 12.30 pm

**SCHOOL OF ARTS AND SCIENCE**
3rd BOARD OF STUDIES ON B.Sc.MICROBIOLOGY**Minutes of Board of Studies Meeting**

The Board of Studies Second meeting of the Department of Bioscience for B.Sc. Microbiology Programme was held on 21.11.2023 from 10.30 am to 12.30 pm through onlie mode at Department of Bioscience, SAS, Sri Manakula Vinayagar Engineering College (Autonomous), Puducherry.

The following members were present for the BoS meeting.

SL. NO	NAME OF THE MEMBER WITH DESIGNATION AND OFFICIAL ADDRESS	MEMBERS AS PER UGC NORMS
1	Dr.T.R.Rajaram , Professor & Head Department of Bioscience - Microbiology School of Arts and Science, SMVEC, Pondicherry hodbiotech@smvec.ac.in ,8220765723	Chairman
2	Prof. Daman Saluja , Joint Director Delhi School of Claimate Changes & Sustainability,Delhi dsalujach1959@gmail.com ,9310018699	Subject Expert (University Nominee)
3	Dr. T.Ramanathan , Associate Professor CAS in Marine Biology, Annamali University, Chidanbaram, ramanathant05990@annamaliuniversity.ac.in , 9894175200	Subject Expert (Academic Council Nominee)
4	Dr. A.Rajasekar , Professor Department of Biotechnology, Thiruvalluvar University,Vellore rajasekargoo@gmail.com ,7639186598	Subject Expert (Academic Council Nominee)
5	Dr.Joseph Selvin , Professor Department of Microbiology, Pondicherry University, Pondicherry, josephselvinss@gmail.com ,9944263367	Subject Expert (Co-opt Member)
6	Dr.Agiesh Kumar , Deputy Director, Central Inter- Disiplinary Research Facility, Sri Balaji Vidyapeeth Deemed to be University,Pondicherry agiesh.b@gmail.com ,8220028031	Subject Expert (Industry & Research Expert)
7	Mr.A.Jagadesh , AssistantProfessor Department of Biosciences-Biotechnology,School of Arts and Science SMVEC, Madagadipet, Pondicherry	(Internal member)
8.	Mr.C.Arthi , AssistantProfessor Department of Biosciences-Biotechnology,School of Arts and Science SMVEC, Madagadipet, Pondicherry	(Internal member)
9	Dr.Krishnaveni , Assistant Professor Department of Bioscience, School of Arts and Science, SMVEC, Pondicherry	(Internal Member)
10	Dr.Subasankari , Assistant Professor Department of Bioscience, School of Arts and Science, SMVEC, Pondicherry	(Internal Member)



SCHOOL OF ARTS AND SCIENCE
DEPARTMENT OF BIOSCIENCE
BOARD OF STUDIES THIRD MEETING ON B.Sc.MICROBIOLOGY
AGENDA OF THE MEETING ON 21.11.23

S.No	ITEM NO.	AGENDA
1	Item No.: BoS/2023/SAS/UG/MB 3.1	Welcome address, Introduction about the Institution, Department and BoS Members.
2	Item No.: BoS/2023/SAS/UG/MB 3.2	To review and confirm the minutes of the Third BoS meeting.
3	Item No.: BoS/2023/SAS/UG/MB 3.3	To discuss the curriculum and syllabi for V and VI semester based on (R 2020).
4	Item No.: BoS/2023/SAS/UG/MB 3.4	To discuss and approve the curriculum (I – VI semester) and syllabi for II semester for B.Sc. Microbiology programme under Regulations R- 2023.
5	Item No.: BoS/2023/SAS/UG/MB 3.5	To discuss and approve the Academic calendar for the even Semesters (semester II, IV & VI) of Academic year 2023-24.
6	Item No.: BoS/2023/SAS/UG/MB 3.6	To appraise and approve the Discipline Specific Elective (DSE) courses and Skill Enrichment Courses (SEC) offered to the IV semester and VI semester (R-2020) and II semester (R2023)
7	Item No.: BoS/2023/SAS/UG/MB 3.7	To deliberate about the NPTEL / MOOC online certification courses and its outcome (to be approved by board of studies) for the students admitted from the academic year 2023-2026 under Regulations R 2023.
8	Item No.: BoS/2023/SAS/UG/MB 3.8	To propound the department research activities (Publications, patents, funds) and its outcome. To inform about the remarkable achievements of staff and students
9	Item No.: BoS/2023/SAS/UG/MB 3.9	To discuss and get information regarding the admission strategies, Internship trainings and placements from the BOS experts.
10	Item No.: BoS/2023/SAS/UG/MB 3.10	Any other item with the permission of the chair.





Minutes of Meeting

S.No	ITEM NO.	AGENDA
1	Item No.: BoS/2023/SAS/UG/MB 3.1	Welcome address, Introduction about the Institution, Department and BoS Members.
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3	Item No.: BoS/2023/SAS/UG/MB 3.3	To discuss the curriculum and syllabi for V and VI semester based on (R 2020). Annexure I
4	Item No.: BoS/2023/SAS/UG/MB 3.4	To discuss and approve the curriculum (I – VI semester) and syllabi for II semester for B.Sc. Microbiology programme under Regulations R- 2023. Annexure II
5	Item No.: BoS/2023/SAS/UG/MB 3.5	To discuss and approve the Academic calendar for the even Semesters (semester II, IV & VI) of Academic year 2023-24.
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The meeting deliberated on the agenda items that have been approved by the Chairman.

The meeting concluded at 12.30 pm with vote of thanks.

The Minutes of the Meeting of the Third Board of Studies of the Department of Bioscience- B.Sc. Microbiology was held on 21-11-2023 is signed by the members who attended the meeting:

SL. NO	NAME OF THE MEMBER WITH DESIGNATION AND OFFICIAL ADDRESS	MEMBERS AS PER UGC NORMS	SIGNATURE
1	Dr.T.R.Rajaram , Assistant Professor & HOD Department of Bioscience - Microbiology School of Arts and Science, SMVEC, Pondicherry.	Chairman	
2	Prof. Daman Saluja , Joint Director Delhi School of Claimate Changes & Sustainability, Delhi	Subject Expert (University Nominee)	
3	Dr. T.Ramanat Dr.Ramanathan , Associate Professor Associate CAS in Marine Biology, Annamali University, Chidanbaram.	Subject Expert (Academic Council Nominee)	
4	Dr. A.Rajasekar , Professor Department of Biotechnology, Thiruvalluvar University, Vellore.	Subject Expert (Academic Council Nominee)	
5	Dr. Joseph Selvin , Professor Department of Microbiology, Pondicherry University, Pondicherry.	Subject Expert (Co-opt Member)	
6	Dr. Agiesh Kumar , Deputy Director, Central Inter- Disiplinary Research Facility, Sri Balaji Vidyapeeth Deemed to be University, Pondicherry	Subject Expert (Industry & Research Expert)	
7	Mr.A.Jagadeesh , Assistant Professor Department of Bioscience School of Arts and Science, SMVEC, Pondicherry	Internal Member	
8	Ms.C.Arthi , Assistant Professor Department of Bioscience School of Arts and Science, SMVEC, Pondicherry	Internal Member	
9	Dr.Krishnaveni , Assistant Professor Department of Bioscience, School of Arts and Science, SMVEC, Pondicherry	(Internal Member)	
10	Dr.Subasankari , Assistant Professor Department of Bioscience, School of Arts and Science, SMVEC, Pondicherry	(Internal Member)	

HOD

DEAN-SAS

DEAN- ACADEMICS

Annexure I

SEMESTER-V										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20MBT510	Food Microbiology	DSC	3	1	0	4	25	75	100
2	A20MBT511	Industrial Microbiology	DSC	3	1	0	4	25	75	100
3	A20MBT512	Agricultural Microbiology	DSC	3	1	0	4	25	75	100
4	A20MBE5XX	DSE-III	DSE	3	0	0	3	25	75	100
Practical										
5	A20MBL513	Food Microbiology and Industrial Microbiology Practical	DSC	0	0	4	2	50	50	100
6	A20MBL514	Agricultural Microbiology Practical	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A20MBS505	In-Plant training / Internship	SEC	0	0	4	2	100	0	100
							21	300	400	700

SEMESTER-VI										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A20MBT615	Medical Microbiology	DSC	3	1	0	4	25	75	100
2	A20MBT616	Environment Microbiology	DSC	3	1	0	4	25	75	100
3	A20BTT620	Biosafety, Bio-ethics and IPRs	DSC	3	1	0	4	25	75	100
4	A20MBT617	Pharmaceutical Microbiology	DSC	3	1	0	4	25	75	100
5	A20MBE6XX	DSE- IV	DSE	3	0	0	3	25	75	100
Practical										
6	A20MBL618	Medical Microbiology and Environment Microbiology Practical	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A20MBS606	R & D and Bioentrepreneurship	SEC	4	0	0	2	100	0	100
8	A20MBS607	Seminar presentation	SEC	4	0	0	2	100	0	100
							25	375	425	800

DISCIPLINE SPECIFIC ELECTIVE COURSES

DISCIPLINESPECIFICSELECTIVES										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Discipline Specific Electives (DSE - III) - offered in Fifth Semester										
1	A20MBE507	Enzymology	DSE	3	0	0	3	25	75	100
2	A20MBE508	Genomics and Proteomics	DSE	3	0	0	3	25	75	100
3	A20MBE509	Marine Microbiology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - IV) - offered in Sixth Semester										
1	A20MBE610	Applied Microbiology	DSE	3	0	0	3	25	75	100
2	A20MBE611	Basic Biotechnology	DSE	3	0	0	3	25	75	100
3	A20MBE612	Bioinformatics	DSE	3	0	0	3	25	75	100

Curriculum
1st Year – II Semester

Annexure - II

B.Sc. Microbiology (R2023)

SEMESTER-I										
S.No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23TAT101C A23FRT101C	Tamil-I/ French-I	MIL	3	0	0	3	25	75	100
2	A23GET101C	General English –I	ENG	3	0	0	3	25	75	100
3	A23MBT101D	General Microbiology	DSC	4	0	0	4	25	75	100
4	A23MBT102D	Bacteriology	DSC	4	0	0	4	25	75	100
5	A23MBD101D	Biomolecules	IDC	4	0	0	4	25	75	100
Practical										
6	A23MBL101D	General Microbiology and Bacteriology Practical	DSC	0	0	4	2	50	50	100
7	A23MBI101D	Biomolecules Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23ENSA02C	Soft skills	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
9	A23AETA01C	Public Administration	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
10	A23MBC101D	Certification course –I	EEC	2	0	2	0	100	0	100
							25	525	475	1000
SEMESTER- II										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23TAT202C A23FRT202C	Tamil-II /French-II	MIL	3	0	0	3	25	75	100
2	A23GET202C	General English-II	ENG	3	0	0	3	25	75	100
3	A23MBT203D	Microbial Diversity	DSC	4	0	0	4	25	75	100
4	A23MBT204D	Microbial Instrumentation	DSC	4	0	0	4	25	75	100
5	A23MBD202D	Microbial Physiology	IDC	4	0	0	4	25	75	100
Practical										
6	A23MBL202D	Microbial Diversity and Microbial Instrumentation Practical	DSC	0	0	4	2	50	50	100
7	A23MBI202D	Microbial Physiology Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23ENSA01C	Communication Skills lab	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
9	A23AETA02C	Environmental Studies	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
10	A23MBC202D	Certification course- II	EEC	2	0	2	0	100	0	100
Extension Activities										
11	A23EAS201C	National Service Scheme	EA	0	0	2	1	100	0	100
							26	625	475	1100

SEMESTER – III										
S. No	Course Code	Course Title	category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23BTT305D	Molecular Biology	DSC	4	0	0	4	25	75	100
2	A23MBT305D	Virology	DSC	4	0	0	4	25	75	100
3	A23NDD301C	Food Analysis and Quality control	IDC	4	0	0	4	25	75	100
4	A23MBE3XXD	DSE-I	DSE	3	0	0	3	25	75	100
5	A23XXO3XXC	Open Elective–I	OE	2	0	0	2	25	75	100
Practical										
6	A23MBL303D	Molecular Biology and Virology Practical	DSC	0	0	4	2	50	50	100
7	A23NDI301C	Food Analysis and Quality control Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23MASA01C	Quantitative Aptitude and Logical Reasoning	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
9	A23AETA03C	Indian constitution	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
10	A23MBC303D	Certification course- III	EEC	2	0	2	0	100	0	100
							24	525	475	1000
SEMESTER– IV										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23BTT407D	Genetic Engineering	DSC	4	0	0	4	25	75	100
2	A23BTT408D	Immunology	DSC	4	0	0	4	25	75	100
3	A23MAD411D	Biostatistics	IDC	4	0	0	4	25	75	100
4	A23MBE4XXD	DSE-II	DSE	3	0	0	3	25	75	100
5	A23XXO4XXC	Open Elective– II	OE	2	0	0	2	25	75	100
Practical										
6	A23BTL404D	Genetic Engineering and Immunology Practical	DSC	0	0	4	2	50	50	100
7	A23MAI401D	Biostatistics Practical	IDC	0	0	4	2	50	50	100
Internship										
8	A23MBN401D	Internship	DSC	0	0	6	3	40	60	100
Skill Enhancement Course										
9	A23MBS401D	Medical Lab Technology	SEC	0	0	4	2	100	0	100
Ability Enhancement Compulsory Course										
10	A23AETA04C	Value Education	AECC	2	0	0	1	100	0	100
Employment Enhancement Course										
11	A23MBC404D	Certification course- IV	EEC	2	0	2	0	100	0	100
							27	565	535	1100

SEMESTER-V										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23MBT506D	Food Microbiology	DSC	4	0	0	4	25	75	100
2	A23MBT507D	Industrial Microbiology	DSC	4	0	0	4	25	75	100
3	A23MBT508D	Agricultural Microbiology	DSC	4	0	0	4	25	75	100
4	A23MBE5XXD	DSE-III	DSE	3	0	0	3	25	75	100
Practical										
5	A23MBL504D	Food Microbiology and Industrial Microbiology Practical	DSC	0	0	4	2	50	50	100
6	A23MBL505D	Agricultural Microbiology Practical	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A23MBS502D	Research Methodology	SEC	0	0	4	2	100	0	100
8	A23MBM501D	Online Course	OCC	0	0	2		100	0	100
							21	400	400	800

SEMESTER-VI										
S. No	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	A23MBT609D	Medical Microbiology	DSC	4	0	0	4	25	75	100
2	A23MBT610D	Environment Microbiology	DSC	4	0	0	4	25	75	100
3	A23BTT614D	Biosafety, Bio-ethics and IPRs	DSC	4	0	0	4	25	75	100
4	A23MBE6XXD	DSE- IV	DSE	3	0	0	3	25	75	100
Practical										
5	A23MBL606D	Medical Microbiology and Environment Microbiology Practical	DSC	0	0	4	2	50	50	100
Project										
6	A23MBP601D	Project	DSC	0	0	10	5	40	60	100
Skill Enhancement Course										
7	A23MBS603D	R & D and Bioentrepreneurship	SEC	4	0	0	2	100	0	100
							24	290	410	700

DISCIPLINE SPECIFIC ELECTIVES										
S. No.	Course Code	Course Title	Category	Periods			Credits	Max.Marks		
				L	T	P		CAM	ESM	Total
Discipline Specific Electives (DSE - I) - offered in Third Semester										
1	A23MBE301D	Genetics	DSE	3	0	0	3	25	75	100
2	A23MBE302D	Ecology and Evolution	DSE	3	0	0	3	25	75	100
3	A23MBE303D	Medical Parasitology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - II) - offered in Fourth Semester										
1	A23MBE404D	Computer Application in Biology	DSE	3	0	0	3	25	75	100
2	A23MBE405D	Public Health Microbiology	DSE	3	0	0	3	25	75	100
3	A23MBE406D	Clinical and Diagnostic Microbiology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - III) - offered in Fifth Semester										
1	A23MBE507D	Enzymology	DSE	3	0	0	3	25	75	100
2	A23MBE508D	Genomics and Proteomics	DSE	3	0	0	3	25	75	100
3	A23MBE509D	Marine Microbiology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - IV) - offered in Sixth Semester										
1	A23MBE610D	Pharmaceutical Microbiology	DSE	3	0	0	3	25	75	100
2	A23MBE611D	Basic Biotechnology	DSE	3	0	0	3	25	75	100
3	A23MBE612D	Bioinformatics	DSE	3	0	0	3	25	75	100

Department	TAMIL			Programme: B.A.(TAMIL)								
Semester	II			Course Category Code: MIL		*End Semester Exam Type: TE						
CourseCode	A23TAT202C			Periods/Week		Credit	MaximumMarks					
Course Name	TAMIL – II			L	T	P	C	CAM	ESE	TM		
				3	0	0	3	25	75	100		
(Common to B.A, B.Sc., BBA., B.COM., BCA., B.COM CS.,)												
Prerequisite	பன்னிரண்டாம்வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்கவேண்டும்.											
Course Objectives	<ul style="list-style-type: none"> செவ்விலக்கியதன்மைகொண்டதமிழ்மொழியின் சிறப்புகளை எடுத்துரைப்பதாக இப்பாத்திட்டம் அமைக்கப்பட்டுள்ளது. ஆரண்டபிரம்ம ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாத்திட்டம் அமைக்கப்பட்டுள்ளது. தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றைக் கவனத்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கற்றுக்கொடுக்க இப்பாத்திட்டம் அமைக்கப்பட்டுள்ளது. வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், நூலியல் எனப் பல கருவிகளை மூலக்கருக்களாகக் கொண்டு எடுத்துரைக்கும் விதத்தில் இப்பாத்திட்டம் உருவாக்கப்பட்டுள்ளது. சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பை அணுகி இப்பாத்திட்டம் அமைக்கப்பட்டுள்ளது. 											
	On completion of the course, the students will be able to								BT Mapping (Highest Level)			
	CO1	இலக்கியங்கள் உணர்த்தும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.								K3		
	CO2	நமது எண்ணத்தையெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.								K3		
	CO3	தகவல் தொடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்த்தல்.								K2		
CO4	தாய்மொழியின் சிறப்பை அறிதல்.								K3			
CO5	இலக்கிய இனங்களையும் திறன்களையும் உணர்த்தல்.								K3			
UNIT-I	காரியம்						Periods: 09					
சிலப்பதிகாரம்	-- வழக்குரைகதை—காவியுக்கும் . . . முதல் தோற்றான் உயிவரை (8 வரிகள்)											
மணிமேகலை	-- பனிக்கறைபுக்ககதை—மதுமல உக் கூந்தல் . . . முதல் புறமறிப் பராய் வரை (106–121 வரிகள்)											
பெரியபுராணம்	-- சிவசாயனக் குடியாறநாயனாபுராணம் -- உள்ளம் அன்புகொண்டு . . . (17 ஆவது பாடல் மட்டும்)											
கம்புராசாயணம்	-- கும்பகாணவதைப் படலம் -- உறங்குகின்றதும் புகளின் . . . (45 ஆவது பாடல் மட்டும்)											
தேவபாவணி	-- பாலமர்சிப் படலம் -- உழப்பனாவு அருள் . . . (29 பாடல் மட்டும்)											
சீரார் புராணம்	-- மழையழைப்பிடுதல் படலம் -- வேயினை முறித்து எடுத்த தொங்கும் (15 ஆவது பாடல் மட்டும்)											
UNIT-II	புதினங்கள் கீழ்க்கணக்கு நூல்கள்						Periods: 09					
திருக்குறள்	-- வலியறிதல் (48), நெஞ்சொருகின்றதல் (125)											
நாலடியாள்	-- அரும்பெறல் . . . (பாடல் எண்: 34)											
சிறுபஞ்சமலர்	-- பூவாதுகாய்க்கும் . . . (பாடல் எண்: 22)											
ஐந்திணைப்பது	-- கணவாய்ச் சிறுநீர் . . . (பாடல் எண்: 38)											
காடநாற்பது	-- கருவினைகண்மலையேல் பூத்தன . . . (பாடல் எண்: 34)											
களவழிநாற்பது	-- ஞாடின்னுள்ளேயே (பாடல் எண்: 2)											
UNIT-III	rq;f ,yf;fpak; - vl;Lj;njhif						Periods: 09					
ஐங்குறுநூறு	-- பாடல் எண்: 44 -- தோழி கூற்று											
குறுந்தொகை	-- பாடல் எண்: 224 -- தலைவி கூற்று											
நற்றிணை	-- பாடல் எண்: 284 -- தலைவன் கூற்று											
அகநானூறு	-- பாடல் எண்: 145 -- செவிவி கூற்று											
புறநானூறு	-- பாடல் எண்: 102 -- ஓளவையாள்											
பரிபாடல்	-- பாடல் எண்: 3 -- திருமால் வாழ்த்து (1–11 வரிகள்)											
UNIT-IV	பத்துப்பாட்டு						Periods: 09					
பொருநராற்றுப்படை	-- வாரியும் வடித்தும் . . . முதல் பெருந்தகுபாடிவரை (25–47)											
சிறுபாணாற்றுப்படை	-- ஸந்தனை அவிவரை . . . முதல் வென்றிவேலு எய்தின் வரை (164–173)											
பெரும்பாணாற்றுப்படை	-- பாடலையாத்த . . . முதல் பதம் மிகப் பெருக்கீடவரை (95–105)											
குறிஞ்சிப்பாட்டு	-- அண்ணல் நெடுங்கோடு . . . முதல் சிவந்தகண்ணைவரை (54–81)											
மதுரைக்காஞ்சி	-- மைபுபெருந்தோள் . . . முதல் பெரும்பெய உழுவரை (687–699)											
நெடுநல்வாடை	-- குளிக் காலக்காட்டி -- கல்வெண் துவவைத் . . . முதல் பண்ணுமுறைநிறுப்பவரை (64–70)											
UNIT-V	மொழிப்பெய்தி, இலக்கியவரலாறு						Periods: 09					

1.முதல்,கரு,உரிப்பொருள் அறிதல் 2.அலகிட்டுவாய்ப்பாடு 3.அணிகள் அறிதல் இலக்கியவரலாறு காப்பியம்,அறஇலக்கியம்,சங்க இலக்கியம் குறித்துப் பாடல்குதியைஒட்டிய இலக்கியவரலாறு.	CO5
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LecturePeriods: 45	TutorialPeriods:-	PracticalPeriods:-	TotalPeriods:45
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TextBooks
<ol style="list-style-type: none"> சிவகுமாரன்., -கொங்குதேவ்வாழ்க்கை,பாடல் தொகுப்பு நூல் - தொகுதி -1,புனைபட்டி ஹைட்டென்,சென்னை -86, முதற்பதிப்பு,2003. சாமிநாதையடபட்டே.உ.வே. குறுந்தொகை மூலமும் உரையும்,பாட்டே.உ.வே.சாமிநாதையட நூல் நிவையம்,வெளியிட்.வெண்: 277,பெசன்ட் நகர., சென்னை- 600 090,எட்டாம் பதிப்பு- 2020. வேங்கடராமன்,வித்துவான்,ஹெச். (பதி.) - நற்றிணை மூலமும் உரையும்,பாட்டே.உ.வே.சாமிநாதையட நூல் நிவையம்,வெளியிட்.வெண்: 277,பெசன்ட் நகர.,சென்னை- 600 090, எட்டாம் பதிப்பு- 2020. திருவள்ளுவ- சேயோன் பாட்டே - திருக்குறள்,மயிலைத் திருவள்ளுவ-தமிழ்ச் சங்கம்,184,பிரே.வே.சென்னை 600 108 வேங்கட,சாமிநாடே.ந.மு., - காலநூற்புகள்,கனவழிநூற்புகள்-சாந்திராதிப்புகம்,சாந்திராதிப்புகம், ஸ்ரீகிருஷ்ணமூலம் நெடு, சிராய்பேட்டை,சென்னை -14, முதற்பதிப்பு: 2005.

ReferenceBooks
<ol style="list-style-type: none"> சிற்பிபாலகப்பிரமணியம் மற்றும் நீலபத்மநாயன் (பு.ஆ.சி.) -புதியதமிழ் இலக்கியவரலாறு, தொகுதி-1,2,3,சாகித்தியஅகாடெமி,புதுவடல்வி, 2013. பாக்கியமேரி,வகைமைநோக்கில் தமிழ் இலக்கியவரலாறு (பெரும்புலவர் விநிஷப் பதிப்பு),பாதிநிவையம், சென்னை. ஆனந்தன், சு. முனைவட., - தமிழ் இலக்கியவரலாறு,கண்மணிபதிப்பகம், திருச்சி-2, இருபத்தி மூன்றாம் பதிப்பு- 2015. புத்தமாமனாடே.ஆ.கி.,நல்லதமிழ் எழுதவேண்டாமா,பாதிநிவையம்,சென்னை, 1998. சம்பத், சிரா., (பதி) -தொல்காப்பியக் கவிதைமீயல் வரலாம்-பாடப்பொருள்-உத்தி-வகைமை,புதுச்சேரிமொழியியல் பண்பாட்டுஆராய்ச்சிநிறுவனம், புதுச்சேரி-605 001, முதற்பதிப்பு-அக்டோபர். 2015.

Web References
<ol style="list-style-type: none"> http://www.tamilvu.org http://www.tamilweb.com http://www.tamilkodal.com www.store.tamillexican.com www.kala.tamilforu.blogspot.com www.noolagam.com

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3
3	3	2	3	3	3	2	2	3
4	2	3	2	3	2	2	3	2
5	3	2	3	2	3	3	3	3

Correlation Level: 1:Low, 2:Moderate, 3:High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B.Sc. Biochemistry						
Semester	II		Course Category Code: MIL			*End Semester Exam Type: TE			
Course Code	A23FRT202C		Periods / Week			Credit	Maximum Marks		
Course Name	French - II		L	T	P	C	CAM	ESE	TM
			3	0	0	3	25	75	100
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)									
Prerequisite	Basic knowledge of French language								
Course Objectives	The main objectives of the course are,								
	To enable the students read, understand, and write simple sentences								
	To grasp relevant grammar for communication								
	To learn about the land, people and culture of France.								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	have a general understanding of the language						K2	
	CO2	analyze and interpret simple phrases written in French						K4	
	CO3	have the basics of French grammar						K1	
	CO4	communicate and ask basic questions in French language						K6	
	CO5	appreciate the diversity and multiplicity of French and Francophone world						K5	
UNIT-I						Periods: 09			
1. Qu'est -ce qu'on leur offre? 2. On solde ! 3. Découvrir Paris en bus avec l'open Tour									CO1
UNIT-II						Periods: 09			
1. Si vous gagne vous ferez quoi 2. Parasol ou parapluie ?									CO2
UNIT-III						Periods: 09			
1. Quand il est midi á Paris 2. Vous allez Vivre 3. L'avenir du Français									CO3
UNIT-IV						Periods: 09			
1. Souvenirs d'enfance 2. j'ai fait mes études á Lyon 2									CO4
UNIT-V						Periods: 09			
1. Retour des Antilles Au 2.Voleur ! Au voleur									CO5
Lecture Periods: 45			Tutorial Periods: -			Practical Periods: -		Total Periods: 45	
Text books									
1.Prescribed Text book : <i>FESTIVAL 1</i> - Méthode de Français 2.Sylvie POISSON-QUINTON 3.Michèle MAHEO-LE COADIC 4.International, Nouvelle Édition révisée : 2009.									
Reference Books									
Festival 1									

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	2	-	-	2	2	2	3	-	1	2
2	-	-	-	-	-	2	-	-	2	1	2	2	-	1	2
3	-	-	-	-	-	1	-	-	3	3	3	3	-	2	2
4	-	-	-	-	-	1	-	-	2	2	3	2	-	2	2
5	-	-	-	-	-	2	-	-	2	2	2	1	-	1	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B. A.						
Semester	II		Course Category Code: ENG		End Semester Exam Type: TE				
Course Code	A23GET202C		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	GENERAL ENGLISH - II		3	0	0	3	25	75	100
(Common to B.A., B.SC., and BCA Branches)									
Prerequisite	Basic part-two language and knowledge gained from Grammar and Composition								
Course Objectives	To train students to identify poetic forms and issues related to contexts								
	To enable the student in the skill of reading for ideas								
	To enable the students to enjoy the literature through the work of great writer								
	To introduce drama as a social product and a literary form								
	To hone composition skills in students								
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	comprehend and discuss the various facets of selected poems						K3	
	CO2	evaluate and Criticize the prose texts.						K3	
	CO3	illustrate various reflections and instances in short stories with personal experiences						K3	
	CO4	develop critical appreciation based on the understanding of the prescribed texts						K3	
	CO5	enhance the writing skills for specific purposes						K3	
UNIT-I	POETRY					Periods: 09			
1. Nissim Ezekiel - <i>Minority Poem</i> 2. Sarojini Naidu – <i>Indian Weaver</i> 3. Walt Whitman – <i>O Captain My Captain</i> 4. William Blake – <i>Tyger</i> 5. Rabindranath Tagore – <i>Paper Boat</i>								CO1	
UNIT-II	PROSE					Periods: 09			
3. Jawaharlal Nehru – <i>A Tryst With Destiny</i> 4. Martin Luther King – <i>I have a dream</i> 5. Swami Vivekananda – <i>Speech at world Parliament of Religion Chicago</i>								CO2	
UNIT-III	SHORT STORIES					Periods: 09			
4. Arthur Canon Doyle – <i>A Scandal in Bohemia</i> 5. Stephen Crane – <i>The Open Boat</i>								CO3	
UNIT-IV	DRAMA					Periods: 09			
1. Cedric Mount Short – <i>The Never Never Nest</i> 2. Fritz Karinthy – <i>Refund</i>								CO4	
UNIT-V	GRAMMAR AND COMPOSITION					Periods: 09			

1. Cause and Effect Analysis 2. Note Making 3. Picture Comprehension 4. Sentence Pattern 5. Sentence Punctuation	CO5
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Lecture Periods: 45 Tutorial Periods: 0 Practical Periods: - Total Periods: 45

Text Books

1. Pegasus, *Scandal in Bohemia & Other Stories*, B Jain Publisher, 2016.
2. Stephen Crane, *The Open Boat and Other Stories*, Createspace Independent Publisher, 2017.
3. Wren & Martin, *Primary School English Grammar and Composition*, Generics Publication, 2023.

Reference Books

1. Anjali Sehrawat, *Mother's Day : Bhagat Phoolsingh Women's University*, Notion Press Publication, 2022.
2. Martin Luther, Heming Daoudi, *Martin Luther King's I have a dream speech*, Kindle Edition, 2020.
3. Stephen Crane, *The Open Boat Stephen Crane*, Createspace Independent Publication, 2013.
4. Rabindranath Tagore, William Radice, *Selected Poems: Rabindranath Tagore*, Penguin Publication, 2000.
5. Swami Tapasyananda, *Swami Vivekananda his life and Legacy*, Ramakrishna Math Publication, 2008.

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1. <https://allpoetry.com/Minority-Poem>
2. http://www.sourcecodeonline.com/list?q=the_never_never_nest_author_cedric_mount
3. <https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html>
4. <https://poets.org/poem/tyger>
5. <https://www.poetryfoundation.org/poems/45474/o-captain-my-captain>

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3
1	3	2	3	2	3	3	2	3
2	2	3	1	3	2	2	2	2
3	3	2	2	2	2	3	2	3
4	2	3	3	2	1	2	3	2
5	3	3	3	3	3	3	2	

Correlation Level

High	Moderate	Low
3	2	1

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	II		Course Category Code: DSC			*End Semester Exam Type: TE			
Course Code	A23MBT203D		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	MICROBIAL DIVERSITY		4	0	0	4	25	75	100
Prerequisite	Basic knowledge of Diversity of Microbes								
Course Objectives	The main objectives of the course are,								
	Apply Molecular techniques for microbial diversity analysis								
	Demonstrate proficiency in identifying and classifying microorganisms.								
	Evaluate the impact of environmental factors on microbial diversity.								
	Analyze the role of microbial diversity in ecosystem function.								
Course Outcome	Stay informed about recent developments in microbial diversity								
	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Understand the concept and significance of microbial diversity.						K2	
	CO2	Analyze the factors influencing microbial community structure.						K2	
	CO3	Demonstrate knowledge of techniques for studying microbial diversity.						K3	
	CO4	Evaluate the ecological roles of diverse microorganisms.						K3	
CO5	Stay updated on advancements in microbial diversity research						K2		
UNIT-I	Classification of microorganisms					Periods: 10			
Taxonomy — Whittaker's five-kingdom concept – Modern approaches - Numerical, Molecular taxonomy and Chemotaxonomy - Characters in microbial taxonomy (morphological, physiological, ecological, genetics protein content, nucleic acid sequence and base composition)-Importance of microbial diversity.									CO1
UNIT-II	Characteristics of microorganisms					Periods: 10			
General characteristics of different groups: Acellular microorganisms (Viruses, Viroids, Prions) and Cellular microorganisms (Bacteria, Algae, Fungi and Protozoa) with emphasis on distribution and occurrence, morphology, mode of reproduction and economic importance.									CO2
UNIT-III	Classification of Algae					Periods: 15			
Algae : History of phycology with emphasis on contributions of Indian scientists; General characteristics of algae including occurrence, thallus organization, algae cell ultra-structure, pigments, flagella, eyespot food reserves and vegetative, asexual and sexual reproduction. Different types of life cycles in algae with suitable examples: Haplobiontic, Haplontic, Diplontic, Diplobiontic and Diplohaplontic life cycles. Applications of algae in agriculture, industry, environment and food.									CO3
UNIT-IV	Classification of Fungi					Periods: 15			
Fungi: Historical developments in the field of Mycology including significant contributions of eminent mycologists. General characteristics of fungi including habitat, distribution, nutritional requirements, fungal cell ultra- structure, thallus organization and aggregation, fungal wall structure and synthesis, asexual reproduction, sexual reproduction, heterokaryosis, heterothallism and parasexual mechanism. Economic importance of fungi with examples in agriculture, environment, Industry, medicine, food, biodeterioration and mycotoxins.									CO4
UNIT-V	Classification of Protozoa					Periods: 10			

Protozoa: General characteristics with special reference to Amoeba, Paramecium, Plasmodium, Leishmania and Giardia, Drug Development against protozoa Infection - the economic importance **CO5**

Lecture Periods: 45 **Tutorial Periods: 15** **Practical Periods: -** **Total Periods: 60**

Text Books

1. Joanne Willey and Kathleen Sandman and Dorothy Wood, (2020). Prescott's
2. Microbiology 11thEd. Mc Graw Hill Book. Michael J. Pelczar, Jr. E.C.S. Chan, Noel R.Krieg, (1993). Microbiology 5thEd.
3. Mc Graw Hill Book Company. Brown J.W. (2015) Principles of Microbial Diversity, ASM Press

Reference Books

1. Madigan, Michael T., Martinko, John M., Dunlap, Paul V., Clark, David P, (2015). Brock's Biology of Microorganisms Global Ed. Pearson Publications.
2. Whitman, W.B., Goodfellow, M., Kämpfer, P., Busse, H.-J., Trujillo, M.E., Ludwig and Suzuki, K, (2012). Bergey's Manual of Systematic Bacteriology, 2ndEd., Vol. 5. Parts A and B, Springer-Verlag, New York, NY.
3. Madigan M.T., Bender K.S., Buckley D.H., Sattley W.M. and Stahl D.A. (2017) Brock Biology of Microorganisms, 15thEdn. (Global Edn.) Pearson Education.
4. Wiley JM, Sherwood LM and Woolverton CJ. (2013) Prescott's Microbiology. 9th Edition. McGraw Hill International.
5. Atlas RM. (1997). Principles of Microbiology. 2nd edition.

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1. www.microbiologyresearch.org/ijsem
2. www.ncbi.nlm.nih.gov/books/NBK2228/
3. www.nature.com/scitable/knowledge/library/microbial-diversity-72678286/
4. archive.bio.ed.ac.uk/jdeacon/microbes/biodiv.htm
5. link.springer.com/book/10.1007/978-3-319-32940-5

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	3	3	3	3
2	3	3	2	3	2	2	3	2
3	1	2	3	2	3	3	2	3
4	2	2	3	3	2	2	3	2
5	3	2	3	2	3	3	1	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	II		Course Category Code: DSC			*End Semester Exam Type: TE			
Course Code	A23MBT204D		Periods / Week			Credit		Maximum Marks	
			L	T	P	C	CAM	ESE	TM
Course Name	Instrumentation in Microbiology		4	0	0	4	25	75	100
Prerequisite	Basic knowledge of Instrumentations for analysis and identification								
Course Objectives	The main objectives of the course are								
	1. Operate and maintain microbial analysis instruments.								
	2. Apply instrumental methods for microbial identification.								
	3. Demonstrate proficiency in data interpretation from microbial instruments.								
	4. Evaluate the suitability of instrumentation for specific microbial analyses.								
Course Outcome	5. Stay informed about recent developments in microbial instrumentation								
	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	1. Understand the principles and applications of microbial instrumentation.						K2	
	CO2	2. Demonstrate proficiency in operating microbiological instruments.						K2	
	CO3	3. Apply instrumental techniques for microbial analysis and detection.						K2	
	CO4	4. Evaluate the role of advanced instrumentation in microbial research.						K2	
CO5	5. Stay updated on emerging technologies in microbial instrumentation						K3		
UNIT-I	Basics of instrumentation					Periods: 10			
Buffers, Molar and Normal solutions, pH meter, pH electrodes – Colomel and glass electrode. Beer-Lamberts law, pH meter, absorption and emission spectroscopy, Principle and law of absorption fluorimetry, colorimetry, spectrophotometry (visible, UV, infrared).									CO1
UNIT-II	Microscopes					Periods: 15			
Microscope-History of microscopes, Types of microscopes (Simple microscope, Compound Microscope, Bright field and Dark field microscope, Phase contrast microscope, fluorescent microscope ; electron microscope- TEM & SEM- Principle, working and applications.									CO2
UNIT-III	Laboratory instruments					Periods: 15			
Principles and Applications of Autoclave, Hot air oven, Incubator, Laminar air flow chamber / Biosafety cabinets, BOD incubator, Metabolic shaker, Incinerator									CO3
UNIT-IV	Centrifugation					Periods: 15			
Centrifugation – Principle & types, sedimentation co-efficient, sedimentation velocity, ultra centrifugation, separation of macromolecules, subcellular fractionation. Introduction to Biosensors and Nanotechnology and their applications..									CO4
UNIT-V	Electrophoresis					Periods: 15			
Introduction to electrophoresis. Starch-gel, polyacrylamide gel (native and SDS-PAGE), agarose-gel electrophoresis, pulse field gel electrophoresis, immuno- electrophoresis, Western blotting, isoelectric focusing									CO5
Lecture Periods: 45			Tutorial Periods: 15			Practical Periods: -		Total Periods: 60	

Text Books

1. Upadhyay., Biophysical Chemistry-, Himalaya Publication, Edition III
2. Ghatak, K.L., 2003. Techniques and Methods In Biology. PHI Learning Private Ltd. New Delhi
3. Zubay.G.L., 1993. Biochemistry, 4thEdi. WmC. Brown Publishers

Reference Books

1. Joseph Sambrook and David. W. Russel, Molecular Cloning- A laboratory manual, 4th edition, 2012, Cold spring harbor press.
2. Physical Biochemistry, Applications to Biochemistry and Molecular Biology - D, Freifelder.
3. H.V. Volkones., General Biophysics, Vol I&II
4. Wilson, K. and Walker, J. Practical Biochemistry – Principles and techniques 7th edition, 2010, Cambridge University Press,
5. Brawer, I M., Perce, A.M., Experimental techniques in Biochemistry. Prentice Hall Foundation, New York 2012

Web References

1. www.sciencedirect.com/science/article/pii/S0580951708601475
2. www.labcompare.com/Laboratory-Instruments/11632-Microbial-Physiology-and-Biochemistry-Laboratory-Instruments/
3. www.beckman.com/industries/environmental/microbial-analysis
4. himedialabs.com/TD/Microbial-Culture-Instruments
5. www.microbiologyinfo.com/introduction-to-microbial-instruments-and-techniques/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	3	3	3	3
2	2	3	2	3	3	3	2	3
3	3	2	3	2	3	1	3	3
4	2	3	2	3	2	2	3	2
5	3	3	2	2	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	II		Course Category Code: IDC			*End Semester Exam Type: TE			
Course Code	A23MBD202D		Periods / Week			Credit		Maximum Marks	
Course Name	MICROBIAL PHYSIOLOGY		L	T	P	C	CAM	ESE	TM
			4	0	0	4	25	75	100
Prerequisite	Basic knowledge of Physiology of Microbes								
Course Objectives	The main objectives of the course are,								
	1. Analyze microbial metabolic pathways and regulation.								
	2. Apply physiological principles to optimize microbial processes.								
	3. Demonstrate proficiency in measuring microbial growth parameters.								
	4. Evaluate the effects of environmental stress on microbial function.								
Course Outcome	5. Stay informed about recent developments in microbial physiology								
	On completion of the course, the students will be able to								BT Mapping (Highest Level)
	CO1	1. Understand the physiological processes of microorganisms.							K2
	CO2	2. Apply knowledge of microbial metabolism to biotechnological applications.							K2
	CO3	3. Demonstrate proficiency in analyzing microbial growth and adaptation.							K4
CO4	4. Evaluate the impact of environmental factors on microbial physiology.							K3	
CO5	5. Stay updated on advancements in microbial physiology research.							K2	
UNIT-I	Microbial Nutrition					Periods: 10			
Microbial Nutrition Nutritional types; Requirement of Nutrients for microbes and classification of microorganisms based on carbon, energy and electron sources viz. Photoautotrophs; Photoorganotrophs; Chemo-lithotrophs (ammonia, nitrate sulphur, hydrogen, iron oxidizing bacteria); Chemo-organotrophs. Primary and secondary active transport; Passive and facilitated diffusion.									CO1
UNIT-II	Media & Preservation of bacteria					Periods: 10			
Media type and Preservation Components; criteria and role of macro and micro-nutrients. Natural, Synthetic, Complex, Selective media & Differential Media; Methods for culturing aerobic and anaerobic bacteria; Colony and broth culture characteristics; Maintenance and preservation of Microorganisms									CO2
UNIT-III	Microbial Growth					Periods: 15			
Microbial Growth (growth phases, generation time, growth curve). Measurement of cell mass and cell number; Factors affecting microbial growth; Continuous and batch cultures; details of synchronous and Diauxic growth curve. Physical factors influencing growth: Temperature; PH; Atmospheric Pressure; Salt Concentration. Chemical factors: heavy metal (copper), surfactants. Control of Microorganisms: patterns of microbial death, control of microorganism growth by antiseptics.									CO3
UNIT-IV	Microbial Photosynthesis					Periods: 15			
Microbial Photosynthesis: Concept of photosynthesis and associated pigments in microbes; photosynthetic apparatus in pro and eukaryotes; anoxygenic and oxygenic photosynthesis; light and dark reaction; photorespiration and its significance; Effect of light, temperature; pH and CO2 concentration on photosynthesis; measurement of net photosynthetic yield									CO4
UNIT-V	Microbial Metabolism					Periods: 10			
Metabolism – EMP – HMP – ED pathways – TCA cycle- Electron transport chain –Oxidative and Substrate level phosphorylation.									CO5
Lecture Periods: 45			Tutorial Periods: 15			Practical Periods: -		Total Periods: 60	

Department	Bioscience		Programme: B.Sc. Microbiology						
Semester	II		Course Category Code: DSC			*End Semester Exam Type: LE			
Course Code	A23MBL202D		Periods / Week			Credit	Maximum Marks		
Course Name	MICROBIAL DIVERSITY PRACTICALS		L	T	P	C	CAM	ESE	TM
			0	0	4	2	25	75	100
Prerequisite	Basic knowledge of Microbes and their isolation practical								
Course Objectives	The main objectives of the course are,								
	Utilize taxonomic keys for microbial identification.								
	Conduct field sampling to study microbial diversity in natural environments.								
	Investigate the ecological roles of microorganisms in diverse ecosystems.								
	Establish and maintain microbial cultures representing different taxa.								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Identify and classify microorganisms through practical taxonomic techniques.						K3	
	CO2	Explore the diversity of microbial ecosystems using sampling and analysis.						K2	
	CO3	Analyze the role of microorganisms in various environments.						K6	
	CO4	Develop skills in preserving and studying diverse microbial cultures.						K6	
	CO5	Apply molecular tools to assess microbial diversity in different habitats.						K6	
Practical's	<ol style="list-style-type: none"> 1. Microbiology Good Laboratory Practices and Biosafety 2. Culture characteristics of Microorganisms- colony morphology, shape, margin. 3. Microflora(Bacteria) in the environment by exposing NA plates to air 4. Microflora(Fungi) in the environment by exposing PD plates to air 5. Isolation of Bacteriophage from sewage sample 6. Anaerobic cultivation- candle jar, gas pack method. 7. Study of Rhizopus, Penicillium, Aspergillus. 8. Study of Amoeba, Entamoeba, Paramecium and Plasmodium. 9. Study of Spirogyra, Volvox and Chlamydomonas. 								
Lecture Periods: -	Tutorial Periods: -		Practical Periods: 60			Total Periods: 60			
Text Books									
<ol style="list-style-type: none"> 1. Atlas R.M., A.E.Brown and L.C. Parks, Mosby, St. Louis , 1995, Laboratory Manual of Experimental Microbiology 2. Cappuccino J.G. and N. Sherman 2002, Microbiology: A Laboratory Manual, Addison-Wesley. 									
Reference Books									
<ol style="list-style-type: none"> 1. Holt J.G, N.R.Krieg, 2000, Bergey's Manual of Determinative Bacteriology. Ninth edition, Lippincott Williams & Wilkin Publishers. 2. Kannan N, 2002, Laboratory Manual in General Microbiology, Panima Publishers. 3. Sundararaj T, 2003, Microbiology Laboratory Manual, 2nd Edition, A. Sundararaj No.5, I cross street, Thirumalai Nagar, Perungudi, Chennai 600 096. 									
Web References									
<ol style="list-style-type: none"> 1. www.sciencebuddies.org/science-fair-projects/project-ideas/MicroBio_p034/microbiology/microbial-physiology 2. www.slideshare.net/bioupdates/experiments-on-microbial-physiology 3. www.biocyclopedia.com/index/microbiology_methods/microbial_physiology_methods.php 									

* TE – Theory Exam, LE – Lab Exam

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	2	3	3	3
2	3	2	2	2	3	3	3	3
3	3	2	3	3	2	3	2	2
4	2	3	2	3	2	2	3	2
5	3	2	3	2	3	2	3	3

COs/POs/PSOs Mapping

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience			Programme: B.Sc. Microbiology						
Semester	II			Course Category Code: DSC		*End Semester Exam Type: LE				
Course Code	A23MBL202D			Periods / Week			Credit	Maximum Marks		
Course Name	MICROBIAL INSTRUMENTATION PRACTICALS			L	T	P	C	CAM	ESE	TM
				0	0	4	2	25	75	100
Prerequisite	Basic knowledge of Instrumentation techniques									
Course Objectives	The main objectives of the course are,									
	Calibrate and operate microbial detection instruments.									
	Utilize microscopy and imaging tools for microbial analysis.									
	Apply molecular techniques using advanced instrumentation for microbial studies.									
	Interpret and analyze data obtained from microbial instrumentation.									
Course Outcome	Demonstrate effective troubleshooting skills for microbial instruments.									
	On completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Gain proficiency in handling and calibrating microbial instrumentation.							K3	
	CO2	Apply techniques for microbial detection and quantification using specialized instruments.							K6	
	CO3	Understand the principles behind commonly used microbial analytical tools.							K6	
	CO4	Analyze experimental data obtained from microbial instrumentation.							K6	
CO5	Demonstrate proper maintenance and troubleshooting of microbial instruments.							K2		
Practicals										Periods: 10
<ol style="list-style-type: none"> 1. pH meter and Preparation of Buffer – Acidic and Basic 2. Molarity and normality solution preparation 3. Isolation of sub-cellular organelles. 4. Density gradient centrifugation 5. Spectrophotometry (visible & UV) 6. Paper chromatography 7. Thin layer chromatography 8. Column chromatography 9. Affinity chromatography 										
Lecture Periods: 0			Tutorial Periods: 0			Practical Periods: 60			Total Periods: 60	

Text Books

1. Madigan, M.T., Kelly, S.B., Daniel, H.B, Mathew, S and David, A.S (2017). Brock Biology of Micro-organisms. 15thedition. Parker J. Prentice Hall International, Inc.
2. Willey, J.M., Sherwood, L.M., and Woolverton, C.J.(2019). Prescott's Microbiology. 11thedition.McGrawHill.
3. Talaro., Kathleen, P.T., Chess., and Berry, C., (2018). Foundations in Microbiology, 10th Ed., McGrawHill.

Reference Books

1. Benson's Microbiological Applications Laboratory Manual-Complete Version, 2015, 13th Edition,McGraw Hill.
2. Kathleen Park Talaro and Barry Chess, 2018. Foundations in Microbiology: Basic Principles,10th Edition, McGraw Hill
3. Cappucino, J., and Sherman. N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited

Web References

1. www.microbiologynotes.com/microbiology-questions/microbial-instrumentation/
2. www.slideshare.net/rajivshah/microbiology-laboratory-instrumentation
3. www.sciencedirect.com/topics/immunology-and-microbiology/microbiological-instrumentation

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	3	3	3	3
2	3	3	3	3	2	3	3	3
3	3	3	2	2	2	3	3	3
4	2	3	2	3	3	3	2	3
5	3	2	3	2	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience			Programme: B.Sc. Microbiology						
Semester	II			Course Category Code: IDC		*End Semester Exam Type: LE				
Course Code	A23MBI202D			Periods / Week		Credit	Maximum Marks			
Course Name	MICROBIAL PHYSIOLOGY PRACTICALS			L	T	P	C	CAM	ESE	TM
				0	0	4	2	25	75	100
Prerequisite	Basic knowledge of Instrumentation techniques									
Course Objectives	The main objectives of the course are,									
	To provide a strong base in the fundamentals of bacteria.									
	To learn techniques and methods used in the cultivation and isolation of bacteria.									
	To develop skills related to preservation of bacterial cultures.									
	To learn about bacterial specialized structure using staining methods									
Course Outcome	To learn the bacterial special structure capsule and spore									
	On completion of the course, the students will be able to									BT Mapping (Highest Level)
	CO1	Conduct experiments to study microbial metabolism and energy production.								K3
	CO2	Utilize laboratory techniques to measure microbial growth rates.								K6
	CO3	Investigate the impact of environmental factors on microbial physiology.								K6
	CO4	Develop skills in using specialized equipment for microbial physiology studies.								K6
CO5	Analyze and present data from microbial physiology experiments								K2	
Practicals	Periods: 10									
<ol style="list-style-type: none"> 1. Introduction of media and its constituents for microbial growth. 2. Different methods for isolation and maintenance of microorganisms. 3. Isolation of microbes using differential media. 4. Effect of temperature, pH and salt on growth of E. coli 5. Biochemical test- Oxidase test, Catalase test, Urease test, Nitrate reduction test 6. To study and plot the growth curve of Aspergillus niger by radial growth measurements. 7. To study the effect of temperature of Aspergillus niger by dry weight method. 8. Demonstration of the thermal death time and decimal reduction time of E. coli. 9. Enzymatic Hydrolysis of Starch, Gelatin, Casein 										
Lecture Periods: 0			Tutorial Periods: 0			Practical Periods: 60			Total Periods: 60	
Text Books										
<ol style="list-style-type: none"> 1. Madigan, M.T., Kelly, S.B., Daniel, H.B, Mathew, S and David, A.S (2017). Brock Biology of Micro-organisms. 15th edition. Parker J. Prentice Hall International, Inc. 2. Willey, J.M., Sherwood, L.M., and Woolverton, C.J.(2019). Prescott's Microbiology. 11th edition. McGrawHill. 3. Talaro., Kathleen, P.T., Chess., and Berry, C., (2018). Foundations in Microbiology, 10th Ed., McGrawHill. 										

Reference Books

1. Benson's Microbiological Applications Laboratory Manual-Complete Version, 2015, 13th Edition, McGraw Hill.
2. Kathleen Park Talaro and Barry Chess, 2018. Foundations in Microbiology: Basic Principles, 10th Edition, McGraw Hill
3. Cappucino, J., and Sherman. N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited

Web References

1. www.sciencebuddies.org/science-fair-projects/project-ideas/MicroBio_p034/microbiology/microbial-physiology
2. www.slideshare.net/bioupdates/experiments-on-microbial-physiology
3. www.biocyclopedia.com/index/microbiology_methods/microbial_physiology_methods.php

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	2	1	2	2	2	3	3	3
2	3	3	1	2	2	3	2	3
3	3	3	2	2	2	2	3	2
4	3	2	2	2	3	3	2	2
5	3	2	3	3	3	2	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	ENGLISH		Programme: B. A.							
Semester	II		Course Category Code: SEC			End Semester Exam Type:-				
Course Code	A23ENSA01C		Periods / Week			Credit	Maximum Marks			
			L	T	P	C	CAM	ESE	TM	
Course Name	COMMUNICATION SKILLS		0	0	4	2	100	0	100	
Prerequisite	Knowledge gained from Communication and New paper reading									
Course Objectives	To improve the skill of rapid reading and communicate efficiently									
	To decode and impart speaking skills with confidence									
	To train students in analyzing articles and Newspaper									
	To enhance the sense of social responsibility and accountability of the students									
	To expound the significance in Managerial skills									
Course Outcomes	<i>On completion of the course, the students will be able to</i>							BT Mapping		
								(Highest Level)		
	CO1	understand the pattern to communicate effectively							K3	
	CO2	impart Speaking skills with self-confidence							K3	
	CO3	enhance their strategies in analyzing articles and Newspaper							K3	
	CO4	the sense of social responsibility and accountability of the students							K3	
CO5	expertise in Managerial skills							K3		
UNIT-I	COMMUNICATION SKILLS - SPEAKING					Periods: 06				
1. Aspects of speaking									CO1	
2. Process of effective Speech										
3. Techniques for effectual Presentation										
UNIT-II	SELF-MANAGEMENT SKILLS					Periods: 06				
1. Time Management									CO2	
2. Stress Management										
3. Emotional Management										
UNIT-III	COMMUNICATION SKILLS - READING					Periods: 06				
1. Article analysis									CO3	
2. Comprehension										
3. Skimming and Scanning										
UNIT-IV	SOCIAL SKILLS					Periods: 06				
1. Leadership									CO4	
2. Teamwork										
3. Decision making										
UNIT-V	PUBLIC SPEAKING AND PRESENTATION					Periods: 06				
1. Rules and Techniques for Public Speaking									CO5	
2. Practice session (both, Public Speaking and Presentation)										
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30		Total Periods: 30		

Text Books

1. **Barun K. Mitra, Personality Development and Soft skills, Oxford University Press, 2nd Edition, 2016.**
2. Syamala, V, *Effective English Communication for you*, Chennai: Emerald Publisher, 1st Edition, 2002.
3. Sanjay Kumar & PusphLata. *Communication Skills*, Oxford University Press, 2nd Edition, 2015.

Reference Books

1. **Murphy, John J, Pulling Together: 10 Rules for High-Performance Teamwork, Simple Truth Publication, 1st Edition, 2010.**
2. Balasubramanian, T, *A Textbook of English Phonetics for Indian Students*, Trinity Press, 1st Ed, 1981.
3. Sardana, C.K, *The Challenge of Public Relations*, New Delhi: Harnand Publication, 1st Edition, 1995.
4. Sabina Pillai, Agna Fernandez, *Soft Skills and Employability Skills*, Cambridge University Press, 2017.
5. Jeff Butterfield, *Soft Skills for Everyone*, Cengage India Private Limited, 2nd Edition, 2020.

Web References

1. <https://blog.dce.harvard.edu/professional-development/10-tips-improving-your-public-speaking-skills>
2. <https://corporatefinanceinstitute.com/resources/careers/soft-skills/management-skills/>
3. <https://zety.com/blog/how-to-introduce-yourself>
4. https://www.butte.edu/departments/cas/tipsheets/readingstrategies/skimming_scanning.html
5. <https://www.mayoclinic.org/tests-procedures/stress-management/about/pac-20384898>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3
1	3	3	3	2	3	1	3	3
2	3	3	3	2	3	1	3	2
3	3	3	3	2	2	1	3	2
4	3	3	3	3	3	1	3	2
5	3	3	2	2	2	1	2	2

Correlation Level

High	Moderate	Low
3	2	1

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	80		-	10	10	-	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B.Sc. Biochemistry						
Semester	II		Course Category Code: SEC			*End Semester Exam Type: TE			
Course Code	A23AETA02C		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	ENVIRONMENTAL STUDIES		2	0	0	1	100	0	100
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)									
Prerequisite	Basic knowledge of soft skills								
Course Objectives	The main objectives of the course are,								
	To gain knowledge on the importance of natural resources and energy								
	To know the structure and function of an ecosystem								
	To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence								
	To know the causes of types of pollution and disaster management								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Understand about the various resources						K3	
	CO2	Learn about the biodiversity						K3	
	CO3	Learn the different types of pollution and to prevent the pollution						K6	
	CO4	Know about the pollution Act						K6	
	CO5	Observe various environmental issues in surroundings						K2	
UNIT-I	INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES					Periods: 06			
Environmental Sciences - Relevance - Significance - Public awareness - Forest resources - Water resources - Mineral resources - Food resources - conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.									CO1
UNIT-II	ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION					Periods: 06			
Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain -Food web -Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem. Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity –Insitu & Exsitu.									CO2
UNIT-III	MANAGEMENT ENVIRONMENTAL POLLUTION					Periods: 06			
Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earth quake, Cyclone and Landslides. Role of individuals in prevention of pollution - pollution case studies.									CO3
UNIT-IV	SOCIAL ISSUES - HUMAN POPULATION					Periods: 06			
Urban issues - Energy - water conservation - Environmental Ethics - Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental production Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population									CO4

growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness - Case studies

UNIT-V	FIELD WORK	Periods: 06
Visit to a local area / local polluted site / local simple ecosystem - Report submission		
Lecture Periods: -	Tutorial Periods: -30	Practical Periods: CO5
Total Periods:30		

Text Books

1. Bharucha Erach, "Textbook of Environmental Studies for Undergraduate Courses", Telangana, India: Orient Black Swan, 2nd Edition, 2013,
2. Basu Mahua, Savarimuthu Xavier, "SJ Fundamentals of Environmental Studies". Cambridge, United Kingdom: Cambridge University Press, 2017.

Reference Books

1. Kumarasam.K., A. Alagappa Moses AND M.Vasanthy, "Environmental studies", Bharathidasan university pub, 1, trichy 2004.
2. Rajamannar, "Environmental studies", EVR College PUB, Trichy 2004
3. Kalavathy, S. (ED.), "Environmental Studies", Bishop Heber College PUB., Trichy 2004.

Web References

1. <https://www.youtube.com/watch?v=78prsPYm98g>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2792934/>
3. <https://www.frontiersin.org/articles/505570>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	3	-	-	3	3	2	3	2	2	3
2	-	-	-	-	-	3	-	-	2	3	3	2	3	2	3
3	-	-	-	-	-	2	-	-	3	3	3	3	2	2	3
4	-	-	-	-	-	2	-	-	3	2	3	2	3	2	3
5	-	-	-	-	-	2	-	-	2	2	2	1	2	1	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Bioscience		Programme: B.Sc. Biochemistry						
Semester	II		Course Category Code: AECC* End Semester Exam Type: TE						
Course Code	A23EAS201C		Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CAM	ESE	TM
Course Name	NATIONAL SERVICE SCHEME		0	0	2	1	100	0	100
(Common to B.A., B.Sc., B.COM., B.B.A., & B.C.A Branches)									
Prerequisite	Basic knowledge of National Service Scheme								
Course Objectives	The main objectives of the course are,								
	To introduce about various activities carried out by national service scheme								
	To gain life skills through community service.								
	To gain awareness about various service activities performed in higher educational institutions.								
	To give exposure about the use of technology to uplift the living standards of rural community.								
Course Outcome	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Recognize the importance of national service in community development.						K2	
	CO2	Convert existing skills into socially relevant life skills						K1	
	CO3	Differentiate various schemes provided by the government for the social development						K2	
	CO4	Identify the relevant technology to solve the problems of rural community.						K6	
	CO5	Associate the importance harmony of nation with long term development						K5	
UNIT-I	INTRODUCTION TO NATIONAL SERVICE SCHEME					Periods: 06			
History and objectives, NSS symbol, Regular activities, Special camping activities, Village adaptation programme, Days of National and International Importance, Hierarchy of NSS unit in college. Social survey method and Data Analysis. NSS awards and recognition. Importance of Awareness about Environment, Health, Safety, Gender issues, Government schemes for social development and inclusion policy etc.,									CO1
UNIT-II	LIFE SKILLS AND SERVICE LEARNING OF VOLUNTEER					Periods: 06			
Communication and rapport building, problem solving, critical thinking, effective communication skills, decision making, creative thinking, interpersonal relationship skills, self-awareness building skills, empathy, coping with stress and coping with emotions. Understanding the concept and application of core skills in social work practice, Team work, Leadership, Event organizing, resource planning and management, time management, gender equality, understanding rural community and channelizing the power of youth.									CO2
UNIT-III	EXTENSION ACTIVITIES FOR HIGHER EDUCATIONAL INSTITUTIONS					Periods: 06			
Objective and functions of Red Ribbon Club, Swatchh Bharath Abhiyan, Unnat Bharat Abhiyan, Jal Shakthi Abhiyan, Road Safety Club, Environmental club and Electoral literacy club.									CO3
UNIT-IV	USE OF TECHNOLOGY IN SOLVING ISSUES OF RURAL INDIA					Periods: 06			
Understanding community issues, economic development through technological development. Selection of appropriate technology, Understanding issues in agriculture, fishing, artisans, domestic animals, health and environment									CO4
UNIT-V	NATIONAL INTEGRATION AND COMMUNAL HARMONY					Periods: 06			
The role of Youth organizations in national integration, NGOs, Diversity of Indian Nation, Importance of National integration communal harmony for the development of nation, Indian Constitution, Building Ethical human Relationships, Universal Human Values, Harmony of self and Harmony of nation.									
Lecture Periods: 30			Tutorial Periods: -			Practical Periods: -			Total Periods:30
Reference Books									

1. Joseph, Siby K and Mahodaya Bharat (Ed.), "Essays on Conflict Resolution", Institute of Gandhian Studies, Wardha, 2007.
2. Barman Prateeti and Goswami Triveni (Ed.), "Document on Peace Education", Akansha Publishing House, New Delhi, 2009
3. Sharma Anand and G. Davi, "Gandhian Way, Academic Foundation", New Delhi Myers Social Psychology. New Delhi: Tata Mc.Graw Hill, 2007.
4. Taylor E. Shelly et.al, "Social Psychology", 12th Edition New Delhi, Pearson Prentice Hall Singh, 2006.
5. Madhu, "Understanding Life Skills, background paper prepared for education for all: The leap to equality, Government of India report", New Delhi, 2003.
6. Sandhan "Life Skills Education, Training Module, Society for education and development", 2005.
7. Jaipur. Radakrishnan Nair and Sunitha Rajan, "Life Skill Education: Evidences from the field", RGNIDYD publication, Sriperumbudur, 2012.
8. National Service Scheme Manual (Revised), Government of India, Ministry of Youth Affairs and Sports, New Delhi.
9. M. B. Dishad, "National Service Scheme in India: A Case study of Karnataka, trust Publications, 2001.

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1. <http://www.thebetterindia.com/140/national-service-scheme-nss/>
2. <http://en.wikipedia.org/wiki/national-service-scheme> 19=<http://nss.nic.in/adminstruct>
3. <http://nss.nic.in/propexpan>
4. <http://nss.nic.in>
5. <http://socialworknss.org/about.html>

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1	-	-	-	-	-	2	2	3
2	-	-	-	-	-	2	2	3
3	-	-	-	-	-	2	2	3
4	-	-	-	-	-	2	1	3
5	-	-	-	-	-	2	1	3

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