B.Sc.Biochemistry(R2023)

SEMESTER–I										
S.No	Course Code	Course Title	Category	Periods L	T	P	Credits	Max.Marks 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	A23BCT101D	Fundamentals of Biochemistry	DSC	4	0	0	4	25	75	100
4	A23BCT102D	Essential Cell biology	DSC	4	0	0	4	25	75	100
5	A23CHD101D	Chemistry – I	IDC	4	0	0	4	25	75	100
Practical										
6	A23BCL101D	Fundamentals of Biochemistry and Essential Cell biology Practical	DSC	0	0	4	2	50	50	100
7	A23CHI101D	Chemistry – I 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	A23BCC101D	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 L	T	P	Credits	Max.Marks 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	A23BCT203D	Human Physiology	DSC	4	0	0	4	25	75	100
4	A23BCT204D	Intermediary Metabolism	DSC	4	0	0	4	25	75	100
5	A23CHD203D	Chemistry –II	IDC	4	0	0	4	25	75	100
Practical										
6	A23BCL202D	Human Physiology and Intermediary Metabolism Practical	DSC	0	0	4	2	50	50	100
7	A23CHI203D	Chemistry-II Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23ENSA01C	Communication Skills	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	A23BCC202D	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	A23BCT305D	Analytical Biochemistry	DSC	4	0	0	4	25	75	100
3	A23BCD301D	Basic Microbiology	IDC	4	0	0	4	25	75	100
4	A23BCE3XXD	DSE-I	DSE	3	0	0	3	25	75	100
5	A23XXO3XXC	Open Elective–I	OE	2	0	0	2	25	75	100
Prtical										
6	A23BCL303D	Molecular Biology and Analytical Biochemistry Practical	DSC	0	0	4	2	50	50	100
7	A23BCI301D	Basic Microbiology Practical	IDC	0	0	4	2	50	50	100
Skill Enhancement Course										
8	A23MASA01C	Quantitative Aptitude and Logical Reasonings	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	A23BCC303D	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	A23BCE4XXD	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										
9	A23BCN401D	Internship	DSC	0	0	6	3	40	60	100
Skill Enhancement Course										
9	A23BCS401D	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	A23BCC404D	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	A23BCT506D	Endocrinology	DSC	4	0	0	4	25	75	100
2	A23BTT510D	Bioinformatics	DSC	4	0	0	4	25	75	100
3	A23BCT507D	Analytical Biochemistry	DSC	4	0	0	4	25	75	100
4	A23BCE5XXD	DSE-III	DSE	3	0	0	3	25	75	100
Practical										
5	A23BCL504D	Endocrinology and Bioinformatics Practical	DSC	0	0	4	2	50	50	100
6	A23BCL505D	Analytical Biochemistry Practical	DSC	0	0	4	2	50	50	100
Skill Enhancement Course										
7	A23BCS502D	Research Methodology	SEC	0	0	4	2	100	0	100
8	A23BCM501D	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	A23BCT608D	Pharmacology	DSC	4	0	0	4	25	75	100
2	A23BCT609D	Basic Biotechnology	DSC	4	0	0	4	25	75	100
3	A23BTT614D	Biosafety, Bio-ethics and IPRs	DSC	4	0	0	4	25	75	100
4	A23BCE6XXD	DSE- IV	DSE	3	0	0	3	25	75	100
Practical										
5	A23BCL606D	Pharmacology and Basic Biotechnology Practical	DSC	0	0	4	2	50	50	100
Project										
6	A23BCP601D	Project	DSC	0	0	10	5	40	60	100
Skill Enhancement Course										
7	A23BCS603D	R & D and Bio entrepreneurship	SEC	4	0	0	2	100	0	100
							24	**290**	**410**	**700**

DISCIPLINESPECIFICELECTIVES										
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	A23BCE301D	Bioscience I	DSE	3	0	0	3	25	75	100
2	A23BCE302D	Plant Biochemistry	DSE	3	0	0	3	25	75	100
3	A23BCE303D	Environmental Biochemistry	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - II) - offered in Fourth Semester										
1	A23BCE404D	Bioscience II	DSE	3	0	0	3	25	75	100
2	A23BCE405D	Developmental Biology	DSE	3	0	0	3	25	75	100
3	A23BCE406D	Computer application in Biology	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - III) - offered in Fifth Semester										
1	A23BCE507D	Enzymology	DSE	3	0	0	3	25	75	100
2	A23BCE508D	Nutrition Biochemistry	DSE	3	0	0	3	25	75	100
3	A23BCE509D	Genetic Disorders	DSE	3	0	0	3	25	75	100
Discipline Specific Electives (DSE - IV) - offered in Sixth Semester										
1	A23BCE610D	Stem Cell and Cancer Biology	DSE	3	0	0	3	25	75	100
2	A23BCE611D	Food safety and sanitation	DSE	3	0	0	3	25	75	100
3	A23BCE612D	Clinical Biochemistry	DSE	3	0	0	3	25	75	100

Department	**Bioscience**	Programme: **B.Sc. Biochemistry**						
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,**		
	nrt;tpyf;fpa jd;ik nfhz;l jkpo;nkhopapd; rpwg;gpid vLj;Jiug;gjhf ,g;ghlj;jpl;lk; mikf;fg;gl;Ls;sJ.		
	,uz;lhapuk; Mz;Lfhyj; jkpopd; njhd;ikiaAk; tuyhw;iwAk; mjd; tpOkpaq;fisAk; gz;ghl;ilAk; vLj;Jiug;gjhf ,g;ghlj;jpl;lk; mikf;fg;gl;Ls;sJ.		
	jkpo; ,yf;fpak; cs;slf;fj;jpYk;> tbtj;jpYk; ngw;wkhw;wq;fs;> mjd; rpe;jidfs;> milahsq;fs; Mfpatw;iwf; fhye;NjhWk; vOjg;gl;l ,f;fpaq;fspd; topahff; $Wtjw;F ,g;ghlj;jpl;lk; mikf;fg;gl;Ls;sJ		
	tho;tpay; rpe;jidfs;> xOf;ftpay; Nfhl;ghLfs;> rkj;Jtk;> #oypay; vdg; gy $Wfis khztHfSf;F vLj;Jiuf;Fk; tpjj;jpy; ,g;ghlj;jpl;lk; cUthf;fg;gl;Ls;sJ.		
	rpe;jid Mw;wiyg; ngUf;Ftjw;Fj; jha;nkhopapd; gq;fspg;gpid czHj;j ,g;ghlj;jpl;lk; mikf;fg;gl;Ls;sJ		
Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	,yf;fpaq;fs; czHj;Jk; tho;tpay; newpKiwfisg; Ngzpelj;jy;.	**K3**
	CO2	ekJ vz;zj;ij ntspg;gLj;Jk; fUtpahfj; jha;nkhopiag; gad;gLj;Jjy;.	**K3**
	CO3	jfty; njlHGf;Fj; jha;nkhopapd; Kf;fpaj;Jtj;ij czHjy;.	**K3**
	CO4	jha;nkhopapd; rpwg;ig mwpjy	**K3**
	CO5	,yf;fpa ,d;gq;fis EfUk; jpwd;fis tsHj;jy;.	**K3**

UNIT-I	**myF-1 ,f;fhy ,yf;fpak;**	**Periods: 09**	
kuGf;ftpijfs; ghujpahH - nts;spg; gdpkiyapd; kPJyhTNthk;… (13 ghly;fs;) ghujpjhrd; - Gul;rpf;ftp (Ngud;Gf; nfhz;ltNu…Kjy; - ftpQDf;Fk; fhjypf;Fk; kPl;rpje;jhH tiu) jq;fg;gh - gdpg;ghiw Edpfs; - tho;f;if Xtpak; **GJf;ftpijfs;** mg;Jy; uFkhd; - tlY}Uk; thHjhTk; Afp - capHg;G (,aw;ifapd; vYk;G Kwpg;G) **rpWfij** MH.#lhkzp - rhk;gYf;Fs;			**CO1**
UNIT-II	**myF-2 ehlfk**	**Periods: 09**	
ehlfk; gpugQ;rd; - Kl;il **ciueil** ,uh.Ntq;flhrygjp - me;jf; fhyj;jpy; fhg;gp ,y;iy **ehty;** ,uh.KUfNts; - kpspHfy;			**CO2**
UNIT-III	**myF:3 gf;jp ,yf;fpak**	**Periods: 09**	
irtk; jpUQhdrk;ge;jH - Kjy; jpUKiw - NjhLilanrtpad;…ghly; kl;Lk; jpUehTf;furH - ehd;fhk; jpUKiw - $w;whapdthW…ghly; kl;Lk; Re;juH - Vohk; jpUKiw - gpj;jhgpiw#B…ghly; kl;Lk; khzpf;fthrfH - jpUthrfk; - Gy;yha; GOtha;...ghly; kl;Lk; jpU%yH - jpUke;jpuk; - MHf;Fk; ,Lkpd;…ghly; kl;Lk; fhiuf;fhyk;ikahH-jpUtpul;il kzpkhiy - md;ghy; miltnjt;thW…ghly; kl;Lk; **itztk;** ngha;ifaho;thH - itak; jfspaha;…ghly; kl;Lk; G+jj;jho;thH - md;Ng jfspaha;…ghly; kl;Lk; Ngaho;thH - jpUf;fz;Nld; nghd;Nkdp…ghly; kl;Lk; ek;kho;thH - jpUtha;nkhop - csd; vdpd;…ghly; kl;Lk; nghpaho;thH - nghpaho;thH jpUnkhop - thf;Fj; J}a;ik…ghly; kl;Lk; Mz;lhs ; - ehr;rpahH jpUnkhop– vd;G cUfp ,dNty;…ghly; kl;Lk; **fpwpj;Jtk;** ,ul;rz;a kNdhfuk; - Mtpf;FWnte;JaH…Kjy; ciday;yJ gw;WNjh tiu **,];yhk;** Fzq;Fb k];jhd; rhfpG– uFkhd; fz;zp -milj;j kdf;Nfhl;il…Kjy; vd;fz; tiu			**CO3**

UNIT-IV	**myF 4 - rpw;wpyf;fpak;**	**Periods: 09**

Kj;njhs;shapuk;
1.NtuWifgk;gpr; Riuaha;…
2.khiy tpiygfHthH…
3.vd;id ciuay; …vdj; njhlq;Fk; ghly;fs; kl;Lk;
cyh
FNyhj;Jq;fNrhod; cyh - jhis mutpe;jr; rhjp…Kjy; epyntd;whs; tiu
fyk;gfk;
jpUtuq;ff;fyk;gfk; - cUkhwpg; gygpwg;Gk;…Kjy; MBH thry; tiu
gs;S
Kf;$lw;gs;S - ehl;Ltsk; - fiwgl;Ls;sJ…vdj;njhlq;Fk; ghly; kl;Lk;
J}J
mofH fps;istpL J}J - ,d;nrhy;iy…..Kjy; cgNjrkhf ciug;gha; tiu
,ilf;fhyg; GytHfs;
,uhkypq;f mbfs; - k`hNjtkhiy–gbj;Njd;…Kjy; ngha; cyfpay; tiu
tPukhKdptH - jpUf;fhtY}Hf; fyk;gfk; - jio–Nghjtpo;g;…vdj;njhlq;Fk; ghly; kl;Lk;
K.K`k;kJj`h - /nfsJK`pa;apj;jPd; gps;isj; jkpo; - tapWGilf;f cz;fpd;wPH…ghly; kl;Lk;

CO4

UNIT-V	**myF– 5 nkhopg;gapw;rp**	**Periods: 09**

1.typkpFk; ,lq;fs; >typkpfh ,lq;fs;.
2.mfuthpirg;gLj;Jjy;
3.NeHfhzy;
,yf;fpa tuyhW
,f;fhy ,yf;fpak;> gf;jp ,yf;fpak;> rpw;wpyf;fpak; Fwpj;j ghlg;gFjpia xl;baJ.

CO5

Lecture Periods: 35	**Tutorial Periods: 10**	**Practical Periods: -**	**Total Periods: 45**

Text Books

1. ghujpahH – ghujpahH ftpijfs;> Fkud; gjpg;gfk;> nrd;id.2011.
2. rptFkhH. v];.> - nfhq;FNjH tho;f;if> ghly; njhFg;G E}y; - njhFjp -1 Aidnll; iul;lH];> nrd;id -86. Kjw;gjpg;G 2003.
3. #lhkzp.MH. - jdpikj; jspH> NjHe;njLj;j rpWfijfs;> fhyr;RtL gjpg;gfk;> Kjy; gjpg;G: nrg;lk;gH 2013.
4. gpugQ;rd; - [Ptejp (ehlfq;fs;) – ftpjh gg;spNf\d;> 8> khrpyhkzp njU> ghz;bg[hH> jp.efH> nrd;id -600 017 KUfNts;. ,uh.> - kpspHfy;> lk;nghopy; gjpg;gfk;> jpUg;G+H> ,uz;lhk; gjpg;G> 2014

Reference Books

1. rpw;gpghyRg;gpukzpak; kw;Wk; ePygj;kehgd; (g.Mrp.) – Gjpa jkpo; ,yf;fpa tuyhW> njhFjp-1>2>3> rhfpj;jpa mfhnjkp> GJnly;yp> 2013.
2. ghf;fpaNkhp> tifik Nehf;fpy; jkpo; ,yf;fpa tuyhW (nrk;ik kw;Wk; tphpTg; gjpg;G)> ghhpepiyak;. nrd;id>
3. Mde;jd;> KidtH.R.> - jkpo; ,yf;fpa tuyhW> fz;kzp gjpg;gfk;> jpUr;rp-2. ,Ugj;jp %d;whk; gjpg;G– 2015.
4. gue;jhkdhH> m.fp.> - ey;y jkpo; vOj Ntz;Lkh> ghhp epiyak;> nrd;id> 1998.
5. ty;ypf;fz;zd;> GJf;ftpijapd; Njhw;wKk; tsh;r;rpAk;> md;dk;> rptfq;if. 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. Biochemistry**						
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		
	To introduce them French and Francophone countries and their cultures		
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 Giradeau, *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. Biochemistry**						
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
	To enable them understanding the intrinsic nuances of writing in English language

Course Outcome	**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 – *IF* 2. William Wordsworth – *Daffodils* 3. Percy Bysshe Shelley – *Ozymandias* 4. William Ernest Henley – *Invictus* 5. Rabindranath Tagore – *On the Nature of Love*			**CO1**
UNIT-II	**Prose**	**Periods: 09**	
1. Bertrand Russell – *The Road to Happiness* 2. Charles Lamb – *A Dissertation upon Roast Pig*			**CO2**
UNIT-III	**Short stories**	**Periods: 09**	
1. Oscar Wilde – *The Devoted Friend* 2. R. K. Narayan – *God and the Cobbler*			**CO3**
UNIT-IV	**Drama**	**Periods: 09**	
1. H H Munro – *The Death Trap* 2. J.M. Synge – *Riders to the Sea*			**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, *Malgudi days*, Indian Thought Publication, 2019
2. Synge John Millington, *Riders to the Sea*, Sahitya Sarowar Publisher, 2022
3. P. C. Wren, H. Martin, *High School Wren and Martin English Grammar and Composition*, S. Chand & Company Pvt. Ltd, 2022.
4. J.M. Synge, S.C. Narula. *Riders to the Sea*. Surjeet Publication. 2018.
5. S.C.Gupta. *A Handbook for Letter Writing*. 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-windermeres-fan/study-guide/summary-act-i

* 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	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. Biochemistry**						
Semester	**I**	Course Category Code: **DSC**			*End Semester Exam Type: **TE**			
Course Code	**A23BCT101D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Fundamentals of Biochemistry**	**4**	**0**	**0**	**4**	**25**	**75**	**100**

Prerequisite	Basic knowledge of Biochemistry
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

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.

Reference Books

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, Gruissem W, and Jones R. (2015). Biochemistry and Molecular Biology of Plants. 2nd edition. American Society of Plant Biologists.

Web References

1. https://www.toppr.com/guides/chemistry/biomolecule/carbohydrates/
2. https://www.tutorialspoint.com.cach3.com/class_11th_proteins/protein_amino_acids.asp.ht ml
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	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. Biochemistry**						
Semester	**I**	Course Category Code: **DSC**			*End Semester Exam Type: **TE**			
Course Code	**A23BCT102D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Essential of Cell Biology**	**4**	**0**	**0**	**4**	**25**	**75**	**100**

Prerequisite	Basic knowledge of cell biology
Course Objectives	**The main objectives of the course are,**
	To understand the Fundamentals of Cells and its types.
	To study the cell structure and cellular organization.
	To understand the structure and Functions of cell organelles.
	To understand the Structure and organization of nucleus.
	To study about Cell division

Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	Understand the cells are the basic unit of life and various types of cells.	**K2**
	CO2	Know the basic cell structure and basement membrane in cells.	**K6**
	CO3	Understand the structure and functions of cellular organelles.	**K2**
	CO4	Understand the structure and functions of nucleus.	**K2**
	CO5	Understand the basic mechanisms cell division.	**K2**

UNIT-I	**Introduction to cell biology**	**Periods: 12**	
History of cell Biology, cell as basic unit of life, Discovery of the cell, Cell theory, Protoplasm theory, Organismal theory, development of cell theory, Classification & characterization of cell types - Prokaryotes & Eukaryotes cell organization.			**CO1**
UNIT-II	**Structure & Functions of cell organelles**	**Periods: 10**	
Cytosol, Endoplasmic Reticulum (SER & RER), golgi apparatus, lysosomes, microbodies (peroxisomes and glyoxysomes), ribosomes and its types, centrioles, basal bodies, mitochondria, chloroplast, nucleus and chromosomes			**CO2**
UNIT-III	**Cytoskeleton and cell movement**	**Periods: 14**	
Plasma membrane – fluid mosaic model, membrane fluidity, Transport across membranes - Symport, antiport, uniport, active and passive transport, Intra cellular communication, Endocytosis, Differentiation of cell surface: Basement membrane, tight junction, gap junctions, Desmosomes, hemidesmosomes. Cytoskeletal structures – microtubules, microfilaments (actin, myosin), Intermediate filament.			**CO3**
UNIT-IV	**Cell division**	**Periods: 12**	
Cell cycle, mitosis and meiosis, regulations of cell cycle and check points and enzymes involved in cell cycle check points. Basics in cell signaling- signaling molecules and receptors, G protein coupled receptors, receptor protein tyrosin kinases, cell – cell interaction.			**CO4**
UNIT-V	**Cell differentiation and death**	**Periods: 12**	
Fertilization, initial divisions, seed formation, germination, primordial layer formation, organogenesis. (only sources of organs from each layer). Stem cells: occurrence, concept, types and applications. Cell death and abnormalities: Cancer biology- Types, causes, diagnosis, characteristics and treatment. Genes responsible for aging. Cell death, apoptosis and necrosis.			**CO5**

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

Text Books

1. E.D. P. De Robertis and E.M.F. De Robertis, Jr. 2012 Cell and Molecular Biology (Eighth edition). B.I. Waverly Pvt.Ltd. New Delhi.
2. Harvey Lodish, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore and James Dernell, 2009. Molecular Cell Biology (Fourth Edition). Media Connected — W.H.Freeman and Company.
3. P.S. Verma and V.K. Agarwal, 2012, Concepts of Cell Biology. S.Chand & Company Ltd., New Delhi.

Reference Books

1. D.E Sadava, 1993. Cell Biology - Organelle Structure and Function. Jones and BartlettPublishers
2. B Alberts, 2009 Essential Cell Biology (Third Edition), Garland Science; publishers
3. Alberts Bruce, 2008 Molecular Biology of the Cell (Fifth Edition), Garland Science;publishers

Web References (Minimum 5)

1. https://www.toppr.com/guides/biology/cell-structure-and-function/introduction-to-cell/
2. https://byjus.com/biology/cells/
3. https://bio.libretexts.org/Bookshelves/Cell_and_Molecular_Biology/Book%3A_Basic_Cell_and_Molecular_Biology_(Bergtrom)/18%3A_The_Cytoskeleton_and_Cell_Motility
4. https://askabiologist.asu.edu/cell-division
5. https://www.biologyonline.com/dictionary/cell-death

* 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. Biotechnology**						
Semester	**I**	Course Category Code: **IDC**			*End Semester Exam Type: **TE**			
Course Code	**A23CHD101D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Chemistry- I**	**4**	**0**	**0**	**4**	**25**	**75**	**100**
	(Common to B.Sc._ Branches)							
Prerequisite	Basic knowledge of Chemistry							
Course Objectives	**The main objectives of the course are,**							
	To study about Atomic Structure and Chemical Bonding.							
	To know about Chemical Thermodynamics, Energetics & Kinetics.							
	To learn about Chemical Equilibrium and Redox Reactions.							
	To learn about various types of solutions and preparations.							
	To study about the classification of solvents.							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Acquire the knowledge about Atomic Structure and Chemical Bonding.	**K6**
	CO2 Understand about Chemical Thermodynamics, Energetics & Kinetics.	**K2**
	CO3 Understand the use of Integrals and able to apply it.	**K2**
	CO4 Acquire the knowledge prepare various types of solutions.	**K6**
	CO5 Understand about various types of solvents.	**K2**

UNIT-I	**Atomic Structure and Chemical Bonding**	**Periods: 10**	
Atoms, elements, compounds and molecules. Electronic configuration of atom, Quantum mechanical model. Chemical bonding: classification, ionic bonding, covalent bonding, co-ordinate — covalent bonding, VSEPR, bond theory, shape of molecules, atomic orbital's, σ, π bonds, hybridization, resonance, bond properties, molecular orbital theory, metallic bonding, Intermolecular forces. Hydrogen bonds, Van der Waals forces.			**CO1**

UNIT-II	**Chemical Thermodynamics, Energetics & Kinetics**	**Periods: 15**	
Basic concepts of thermodynamics, I law of thermodynamics, heat capacity & specific heat capacity, Enthalpy changes, bond enthalpies, Entropy and II law of thermodynamics, Entropy changes, Gibbs energy & its changes. Rate of chemical reaction, rate constant & order of reaction — zero order, 1^{st} order, pseudo 1^{st} order, determination of order of reaction, theories of chemical kinetics, mechanism of reaction.			**CO2**

UNIT-III	**Chemical Equilibrium and Redox Reactions**	**Periods: 10**	
Equilibrium in chemical and physical processes, dynamic equilibrium & equilibrium constant homogeneous & heterogeneous, equilibria, Equilibrium constant units & application, factors affecting equilibrium. Redox reactions: rate of electrons in redox reactions, oxidation number balancing chemical equation, stoichiometry of redox reactions.			**CO3**

UNIT-IV	**Solutions- I**	**Periods: 15**	
Types of solutions, concentration of solutions, colligative properties, acids & bases, Bronsted-Lowry concept of acid and bases, ionization, acid-base titration, strong and weak electrolytes, degree of dissociation, hydrolysis, pH, pH scale, pH electrode, ionic strength. Equivalent & molecular mass, mole concepts, expressing concentration of solutions – mole fraction, molarity, molality, normality, molar volume, mass of substance, Mass – moleconversion, percent compositions, empirical & molecular formula, chemical stoichiometry.			**CO4**

UNIT-V	**Solutions- II**	**Periods: 10**	
Solvation energy, Polar and non-polar solvents, properties of water, Polarity of solvents, factors affecting solubility, dielectric constant of solvents, classification of solvents, dilution factor, serial dilution, solvent — solvent interaction, solute — solvent interaction in solutions. Colloids – types, properties, emulsions, coagulation. Distillation and its application.			**CO5**

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

Text Books

1. B.R Puri., L.R Sharma and K. C Kalia. 31st edition *Advanced Inorganic Chemistry.*
2. Delhi:Shoban Lal Nagin Chand and Sons, 2011.
3. B.R Puri., L.R Sharma and Pathania. 46th edition *Principles of Physical Chemistry.* VishalPublishingCompany, 2012.

Reference Books

5. R. M. Verma *Analytical Chemistry- Theory and Practice*, 3rd edition CBS Publishers and Distributors Pvt. Ltd., 2007
6. Skoog, West, Holler and Crouch, *Fundamentals of analytical chemistry*, 8th edition, Thomson Asia Pvt. Ltd,2004.

Web References

1. https://www.tutorialspoint.com/semiconductor_devices/semiconductor_devices_atomic_combinations. htm
2. https://www.learner.org/series/chemistry-challenges-and-solutions/the-energy-in-chemical-reactions-thermodynamics-and-enthalpy/
3. https://www.google.com/search?q=Chemical+Equilibrium++tutorial+point&sxsrf=ALeKk03suQ-Ly4aZT_KWsMRitMAyk6lNLA%3A162710397
4. https://www.toppr.com/guides/chemistry/solutions/types-of-solutions/
5. https://flexbooks.ck12.org/cbook/ck-12-middle-school-physical-science-flexbook-2.0/section/7.2/primary/lesson/solut and-solven

* 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. Biochemistry**						
Semester	**I**	Course Category Code: **DSC**			*End Semester Exam Type: **LE**			
Course Code	**A23BCL101D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Fundamentals of Biochemistry Practical**	**0**	**0**	**4**	**2**	**25**	**75**	**100**

Prerequisite	Basic knowledge of Biochemistry 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.		
	To Understand Good laboratory practices in a laboratory.		
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

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

1. Berg JM, Tymoczko JL, and Stryer L. (2011). Biochemistry. 7th edition. Newyork: W.H. Freeman & Company.
2. Buchanan B, Gruissem W, and Jones R. (2015). Biochemistry and Molecular Biology of Plants. 2nd edition. American Society of Plant Biologists.

Reference Books

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

1. https://practicalbiology.org/bio-molecules
2. https://byjus.com/biology/biomolecules/
3. https://uomus.edu.iq/img/lectures21/MUCLecture_2022_1032325.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. Biochemistry**						
Semester	**I**	Course Category Code: **DSC**			*End Semester Exam Type: **LE**			
Course Code	**A23BCL101D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Essential of Cell Biology Practical**	**0**	**0**	**4**	**2**	**25**	**75**	**100**

Prerequisite	Basic knowledge of Cell Biology practical	
Course Objectives	**The main objectives of the course are,**	
	To gain the practical skills about cell Biology by experimenting microscope, micrometer, mitosis, meiosis, cell counting and dicot leaf section.	
	To learn the basics of prokaryotic and eukaryotic cells	
	To develop practical biological skills such as staining, sterilization, dialysis etc.	
	To understand the physiology of organisms such as cell division, enzyme activity etc.	
	To learn the fundamental aspects of microtomy technique	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Understand the unique features of plant and animal cells.	**K2**
	CO2 Gain the practical skills on tissue mounting techniques to visualize the cell morphology.	**K6**
	CO3 Differentiate the cells of various living organisms and get awareness of physiological processes of cell.	**K4**
	CO4 Observe and correctly identify different cell types, cellular structures using different microscopic techniques.	**K3**
	CO5 Handle the equipment available and identify the suitable and appropriate experiments for their experiments.	**K6**

Practicals

1. Study of Prokaryotic and Eukaryotic cell structure.
2. Cell size measurement by using Micrometer
3. Demonstration and performance of dialysis
4. Study of plasmolysis and de-plasmolysis.
5. Microtomy: Fixation, block making, section cutting, double staining of animal tissues like liver, pancreas, kidney
6. Mitosis in onion root tip cells
7. Meiosis in grasshopper testis
8. Cell counting and viability

Lecture Periods: 0	**Tutorial Periods: 0**	**Practical Periods: 60**	**Total Periods: 60**

Text Books

1. Becker WM, Kleinsmith LJ, Hardin J. and Bertoni GP. (2015). The World of the Cell. 8th edition. San Francisco: Pearson Benjamin Cummings Publishing.
2. Cooper GM, and Hausman, RE. (2013). the Cell: A Molecular Approach. 6th edition. ASM Press & Sunderland, D.C., Sinauer Associates. Washington, USA.
3. De Robertis EDP, and De Robertis E.M.F. (2017). Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia

Reference Books

1. Practical laboratory manual- CELL BIOLOGY (Gupta Amit), Publisher: LAP Lambert Academic Publishing.
2. Karp G. (2013). Cell and Molecular Biology: Concepts and Experiments. 7th edition. Hoboken, US: John Wiley & Sons. Inc.

Web References

1. 1.https://vulms.vu.edu.pk/Courses/BIO201/Downloads/paractical%20manual%20of%20cell%20bio%20201%202 5-4-17.pdf
2. http://www.ihcworld.com/_protocols/lab_protocols/cell-biology-lab-manual-heidcamp.htm

* 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	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. Biochemistry**						
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
	To train the students to work with team environment and Creative thinking

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

1. Sabina Pillai, Agna Fernandez, *Soft Skills and Employability Skills*, Cambridge University Press, 2017.
2. Jeff Butterfield, *Soft Skills for Everyone*, Cengage India Private Limited, 2nd Edition, 2020.
3. Alex K, *Soft Skills*, 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.

Web References

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

* 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

Department	**Bioscience**	Programme: **B.Sc. Biochemistry**						
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 UnionTerritories 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

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, 3rdEdition, 2012.

3. RumkiBasu, “Public Administration: Concept and Theories”, Sterling, 1st Edition, 2013.

Reference Books

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 andDeepPublications, 2002.

Web References

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

Department	**BIOSCIENCE**	Programme: **B.Sc. Biochemistry**						
Semester	**II**	Course Category Code: **MIL**			*End Semester Exam Type: **TE**			
Course Code	**A23TAT202C**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**TAMIL – II**	**3**	**0**	**0**	**3**	**25**	**75**	**100**
(Common to **B.A, B.Sc., BBA., B.COM., BCA., B.COM CS.,**)								
Prerequisite	பன்னிரெண்டாம் tFg;gpy; jkpio xU ghlமாகப் பயின்றிருக்க Ntz;Lk;.							
Course Objectives	• 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 மாணவடகளுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது. • சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணடத்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.							
Course Outcome	**On completion of the course, the students will be able to**					BT Mapping (Highest Level)		
	CO1	இலக்கியங்கள் உணடத்தும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.				**K3**		
	CO2	நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.				**K3**		
	CO3	தகவல் தொடடுக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணடதல்.				**K2**		
	CO4	தாய்மொழியின் சிறப்பை அறிதல்.				**K3**		
	CO5	இலக்கிய இன்பங்களை நுகரும் திறன்களை வளடத்தல்.				**K3**		
UNIT-I	காப்பியம்				**Periods: 09**			
சிலப்பதிகாரம் – வழக்குரைகாதை—காவியுகுநீரும். . . முதல் தோற்றான் உயிடவரை (8 வரிகள்) மணிமேகலை – பசிக்கறை புக்ககாதை—மதுமலடக் கூந்தல். . . முதல் புறமறிப் பரராப் வரை (186–121வரிகள்) பெரியபுராணம் – இளையான்குடிமாறநாயனாடபுராணம் – உள்ளம் அன்புகொண்டு. . . (17ஆவது பாடல்மட்டும்) கம்பராமாயணம் – கும்பகடணவதைப்படலம் – உறங்குகின்ற கும்பகள்ள. . . (45ஆவதுபாடல் மட்டும்) தேம்பாவணி – பாலமாட்சிப்படலம் – ஊட்டினாடஅருள். . . (229 பாடல் மட்டும்) சீறாப்புராணம் – மழையழைப்பித்தப் படலம் – வேமினை முறித்து எனத் தொடங்கும் (15ஆவது பாடல் மட்டும்)								**CO1**
UNIT-II	பதினெண் கீழ்க்கணக்கு நூல்கள்				**Periods: 09**			
திருக்குறள் – வலியறிதல் (48).நெஞ்சொடுகிளத்தல் (125) நாலடியாட – அரும்பெறல். . . (பாடல் எண்:34) சிறுபஞ்சமூலம் – பூவாது காய்க்கும். . . (பாடல் எண்:22) ஐந்திணைஐம்பது – சுனைவாய்ச் சிறுநீரை. . . (பாடல் எண்:38) காடநார்பது – கருவிளை கண்மலடபோல் பூத்தன. . . (பாடல் எண்:34) களவழிநாற்பது – ஞாட்பினுளெஞ்சிய (பாடல் எண்:?)								**CO2**
UNIT-III	சங்க இலக்கியம் – எட்டுத்தொகை				**Periods: 09**			
ஐங்குறுநூறு – பாடல் எண்:44 – தோழி கூற்று குறுந்தொகை – பாடல் எண்:224 – தலைவி கூற்று நற்றிணை – பாடல் எண்:284 – தலைவன் கூற்று அகநானூறு – பாடல் எண்:145 – செவிலி கூற்று முநானூறு – பாடல் எண்:182 – ஔவையாட பரிபாடல் – பாடல் எண்:3 – திருமால் வாழ்த்து (1–11வரிகள்)								**CO3**
UNIT-IV	பத்துப்பாட்டு				**Periods: 09**			
பொருநராற்றுப்படை – வரியும் வடத்தும். . . முதல் பெருந்தகு பாடினி வரை (25–47) சிறுபாணாற்றுப்படை – பைந்தளை அவரை. . . முதல் வென்றிவேலாட எய்தின் வரை (164–179) பெரும்பாணாற்றுப்படை–பாடவையாத்த. . . முதல் மதம் மிகப் பருகுவீட வரை (95–105) குறிஞ்சிப்பாட்டு – அண்ணல் நெடுங்கோடு. . . முதல் சிவந்தகண்ணோம் வரை(54–61)								**CO4**

மதுரைக்காஞ்சி – மைபடுபெருந்தோள்...முதல் பெரும்பெயஉ மதுரை வரை (687–699) நெடுநல்வாடை – குளிஉகாலக்காட்சி– கல்லென் துவலைத்...முதல் பண்ணுமுறை நிறுப்ப வரை (64–70)			
UNIT-V	மொழிப்பயிற்சி, இலக்கியவரலாறு	**Periods: 09**	
1.முதல், கரு, உரிப்பொருள் அறிதல் 2.அலகிட்டு வாய்ப்பாடு 3.அணிகள் அறிதல் இலக்கிய வரலாறு காப்பியம், அறஇலக்கியம், சங்க இலக்கியம் குறித்துப் பாடப்பகுதியை ஒட்டிய இலக்கிய வரலாறு.			**CO5**
Lecture Periods: 45	**Tutorial Periods:-**	**Practical Periods:-**	**TotalPeriods:45**

Text Books

1. சிவகுமாஉ,எஸ்., –கொங்குதேஉவாழ்க்கை, பாடல் தொகுப்பு நூல் – தொகுதி –1, யுனைடெட் ரைட்டஉஸ்,சென்னை –86. முதற்பதிப்பு.2003.
2. சாமிநாதையஉ டாக்டஉ உ.வே. குறுந்தொகை மூலமும் உரையும், டாக்டஉ உ.வே.சாமிநாதையஉ நூல் நிலையம், வெளியீட்டெண்: 277,பெசன்ட் நகஉ, சென்னை— 600 090.எட்டாம் பதிப்பு— 2020.
3. வேங்கடராமன், வித்துவான்.ஹெச். (பதி.) – நற்றிணை மூலமும் உரையும்.டாக்டஉ உ.வே.சாமிநாதையஉ நூல் நிலையம், வெளியீட்டெண்: 277,பெசன்ட் நகஉ,சென்னை— 600 090. எட்டாம் பதிப்பு— 2020.
4. திருவள்ளுவஉ– சேயோன் டாக்டஉ – திருக்குறள்,மயிலைத் திருவள்ளுவஉதமிழ்ச் சங்கம்,184,ரெட்வே,சென்னை 600 108
5. வேங்கடசாமிநாட்டாஉ,ந.மு., – காஉநாற்பது,களவழிநாற்பது—சாரதாபதிப்பகம்,சாந்திஅடுக்ககம், ஸ்ரீகிருஷ்ணபுரம் தெரு, இராயப்பேட்டை,சென்னை –14. முதற்பதிப்பு: 2005.

Reference Books

1. சிற்பிபாலசுப்பிரமணியம் மற்றும் நீலபத்மநாபன் (ப.ஆசி.) —புதியதமிழ் இலக்கியவரலாறு, தொகுதி–1,2,3, சாகித்திய அகாதெமி, புதுடெல்லி, 2013.
2. பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு (செம்மை மற்றும் விரிவுப் பதிப்பு), பாரிநிலையம், சென்னை,
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3. ஙவவி:ஃஃறறற.வயஅடைமழனயட.உழஅ
4. றறற.எவழசந.வயஅடைடநஒஉயெ.உழஅ
5. றறற.மயடய.வயஅடைகழசர.டிடழபளிழவ.உழஅ
6. றறற.ழெழடயபயஅ.உழஅ

* TE – Theory Exam, LE – Lab Exa

COs/POs/PSOs Mapping

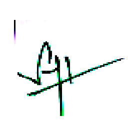
Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3
3	3	2	3	3	2	3	3	3
4	2	3	2	3	2	2	3	2
5	3	2	3	2	3	3	3	3

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	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		
		L	T	P	C	CAM	ESE	TM
Course Name	**French - II**	**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**

1.Prescribed Text book : *FESTIVAL 1* - Méthode de FrançaisAuthors :
2.Sylvie POISSON-QUINTON
3.Michèle MAHEO-LE COADICAnne VERGNE-SIRIEYS, Edition : CLE
4.International, Nouvelle Édition révisée : 2009.

Reference Books

Festival 1

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

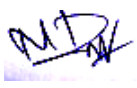
COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	2	-	-	2	2	2	3	-	1	2
2	-	-	-	-	-	2	-	-	2	1	2	2	-	1	2
3	-	-	-	-	-	1	-	-	3	3	3	3	-	2	2
4	-	-	-	-	-	1	-	-	2	2	3	2	-	2	2
5	-	-	-	-	-	2	-	-	2	2	2	1	-	1	2

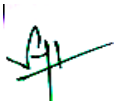
Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

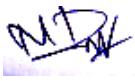
Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

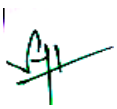
***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus





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 - *Minority Poem* 2. Sarojini Naidu – *Indian Weaver* 3. Walt Whitman – *O Captain My Captain* 4. William Blake – *Tyger* 5. Rabindranath Tagore – *Paper Boat*								**CO1**		
UNIT-II	PROSE						**Periods: 09**			
3. Jawaharlal Nehru – *A Tryst With Destiny* 4. Martin Luther King – *I have a dream* 5. Swami Vivekananda – *Speech at world Parliament of Religion Chicago*								**CO2**		
UNIT-III	SHORT STORIES						**Periods: 09**			
4. Arthur Canon Doyle – *A Scandal in Bohemia* 5. Stephen Crane – *The Open Boat*								**CO3**		
UNIT-IV	DRAMA						**Periods: 09**			
1. Cedric Mount Short – *The Never Never Nest* 2. Fritz Karinthy – *Refund*								**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**		
Lecture Periods: 45	**Tutorial Periods: 0**			**Practical Periods: -**			**Total Periods: 45**			





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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.

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1. Anjli 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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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	3	3
2	2	3	3	3	2	2	2	2
3	3	2	2	3	1	3	2	3
4	2	3	3	2	1	2	3	2
5	3	3	3	3	3	2	2	3

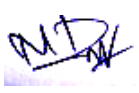
Correlation Level

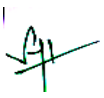
High	Moderate	Low
3	2	1

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





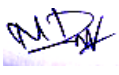
Department	**Bioscience**	Programme: **B.Sc. Biochemistry**						
Semester	**II**	Course Category Code: **DSC**			*End Semester Exam Type: **TE**			
Course Code	**A23BCT203D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**HUMAN PHYSIOLOGY**	**4**	**0**	**0**	**4**	**25**	**75**	**100**

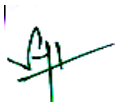
Prerequisite	Basic knowledge of Biochemistry
Course Objectives	**The main objectives of the course are,**
	Know about the Structure and Functions of General Anatomy.
	Learn about the Blood – Composition and Functions.
	To Understand the basic knowledge of Respiratory System
	To Know about the Endocrine System
	To Learn the about Nervous System

Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	Know about the Structure and Functions of General Anatomy	**K2**
	CO2	Learn about the Blood – Composition and Functions	**K2**
	CO3	Know the in-depth knowledge of Respiratory System	**K4**
	CO4	Know about Endocrine System	**K3**
	CO5	Get acquainted about the Nervous System.	**K2**

UNIT-I	**Digestive System**	**Periods: 10**
General Anatomy; Digestion in the mouth, stomach and intestines. Secretions involved in digestion; Role of Liver and Pancreas – Structure and Functions, Gall bladder. Movements of the small and large intestine. Gastrointestinal hormones. Absorption of various compounds.		**CO1**
UNIT-II	**Blood and Circulatory System**	**Periods: 15**
Blood – Composition and Functions; White Blood Cells – Types and function; Red Blood Cells – Structure and functions; Hemoglobin – erythropoiesis, Blood coagulation, Reticulo-Endothelial System –Definition and functions; Blood grouping-ABO, Rh factor. **Heart and Circulation** – Structure of heart and blood vessels; Properties cardiac muscle; cardiac cycle; origin and conduction of heart beat; measurement of arterial blood pressure.		**CO2**
UNIT-III	**Respiratory and Excretory System**	**Periods: 15**
Respiratory System – Structure of Respiratory organs; Sub – divisions of lung air; Chemistry of respiration. **Excretory system** – Physiology of the Urinary System- Structure of kidney and nephron; Formation of urine, micturition. **Skin** – Structure and functions, Regulations of body temperature		**CO3**
UNIT-IV	**Endocrine and Reproductive system**	**Periods: 10**
Endocrine System – Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of Langerhans of pancreas. **Reproductive System** – anatomy of the male and female reproductive organs menstrual cycle; mammary glands; Fertilization; Development of Embryo; Pregnancy and parturition.		**CO4**
UNIT-V	**Nervous System**	**Periods: 10**
General classification of nervous system; Structure of nerve cell and Spinal cord; Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata **Sense Organs** – Structure and function of eye and ear; taste, smell and cutaneous sensations.		**CO5**

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





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2. Chatterjee C.C (2004), Human Physiology Volume II, Medical Allied Agency, Kolkata.
3. Sembulingam, K. and Sembulingam, P. (2019). ***Essentials of Medical Physiology***, 8th Edition, J.P. Medical Publishers (P) Ltd, New Delhi.

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1. Bestand Taylor, (1992) The Physiological Basis for Medical Practice,Saunders Company.
2. Chaudhri, K. (1993) Concise Medical Physiology,New Central Book Agency (Parentral) Ltd., Calcutta.
3. Fox, S. (2011). *Human Physiology*, Twelfth Edition, WCB McGraw- Hill Publications, New York.

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2. https://kidshealth.org/en/teens/heart.html
3. https://www.tutorialspoint.com/excretory_system/index.asp
4. https://www.endocrine.org/topics/edc/what-edcs-are/common-edcs/reproduction
5. https://www.tutorialspoint.com/what-is-the-function-of-nervous-system

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

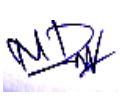
COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	1	2	2	3	2	2
2	3	3	2	2	2	3	3	2
3	3	3	3	3	2	3	3	3
4	3	3	2	2	3	3	3	2
5	3	3	2	2	2	3	3	3

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

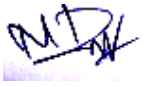


Department	**Bioscience**	Programme: **B.Sc. Biochemistry**						
Semester	**II**	Course Category Code: **DSC**			*End Semester Exam Type: **TE**			
Course Code	**A23BCT204D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**INTERMEDIARY METABOLISM**	**4**	**0**	**0**	**4**	**25**	**75**	**100**

Prerequisite	Basic knowledge of Biochemistry		
Course Objectives	**The main objectives of the course are,**		
	To understand the Fundamentals of Bioenergetics.		
	To study about Carbohydrate Metabolism.		
	To understand the General aspects of amino acid metabolism.		
	To understand the concepts of Lipid Metabolism		
	To understand about Nucleic Acid Metabolism.		
Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	Know the law of thermodynamics, electrons and high energy compounds.	**K2**
	CO2	Understand carbohydrate metabolism through various pathways like glycolysis and citric acid cycle	**K6**
	CO3	Develop the knowledge on biosynthesis of amino acids, regulation and amino acid metabolism	**K2**
	CO4	Understand about different types of fatty acids and its biosynthesis, absorption and transport.	**K2**
	CO5	Understand the biosynthesis of nucleic acid, degradation and nucleotides as regulatory molecules.	**K2**

UNIT-I	**Bioenergetics**	**Periods: 10**	
Enzyme & its forms, laws of thermodynamics, free energy change, enthalpy, entropy, equilibrium constant, flow of electrons, electron carriers, redox potential, redox coupling & ATP bioenergetics, High energy compounds.			**CO1**
UNIT-II	**Carbohydrate Metabolism**	**Periods: 15**	
Glycolysis, Fermentation, Citric acid cycle, Oxidative Phosphorylation & Electron transport chain, Gluconeogenesis, Pentose phosphate pathway, Glyoxylate shunt, Glycogen metabolism (glycogenesis and glycogenolysis).			**CO2**
UNIT-III	**Amino Acids Metabolism**	**Periods: 15**	
General aspects of amino acid metabolism, Transamination, Transamination, Deamination, Uric acid biosynthesis, Nitrogen excretion - Urea cycle, Amino acid catabolism, Amino acid biosynthesis - Fixation of ammonia into amino acid, biosynthesis of amino acids (Tryptophan and Methionine), Regulation of amino acid biosynthesis.			**CO3**
UNIT-IV	**Lipid Metabolism**	**Periods: 10**	
Lipid Metabolism: Biosynthesis of fatty acids - long chain, unsaturated, Triacylglycerols, phospholipids, comparison of fatty acid synthesis and degradation; Oxidation of fatty acids — even chain saturated fatty acids, Unsaturated fatty acids, odd chain fatty acids (α, β, ω), ketone bodies, cholesterol metabolism, dietary absorption of lipids, Transport forms (VLDL, LDL, HDL, chylomicron).			**CO4**
UNIT-V	**Nucleic Acid Metabolism**	**Periods: 10**	
Biosynthesis of purines and pyrimidines, feedback inhibition of purine & pyrimidine biosynthesis, NMP conversion to NTP, Nucleotide degradation, salvage pathways, degradation of purine and pyrimidines to uric acid & urea, nucleotides as regulatory molecules, non-enzymatic transformation of nucleotides & nucleic acids.			**CO5**

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



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3. https://www.lecturio.com/magazine/metabolism-amino-acids/
4. https://opentextbc.ca/anatomyandphysiologyopenstax/chapter/lipid-metabolism/
5. https://chem.libretexts.org/Bookshelves/Environmental_Chemistry/Toxicology_MSDT/02%3A_Biochemistry_and_Molecular_Genetics/2

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

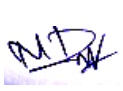
COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	2	3	2	3	2	3
2	3	1	1	2	2	3	2	2
3	3	2	2	2	3	3	3	2
4	3	2	2	1	2	3	3	2
5	3	3	3	2	2	3	3	2

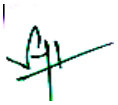
Correlation Level: 1 - Low, 2 - Medium, 3 – High

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.Sc. Biochemistry**						
Semester	**II**	Course Category Code: **IDC**			*End Semester Exam Type: **TE**			
Course Code	**A23CHD203D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Chemistry- II**	**4**	**0**	**0**	**4**	**25**	**75**	**100**
	(Common to B.Sc._ Branches)							

Prerequisite	Basic knowledge of Chemistry		
Course Objectives	**The main objectives of the course are,**		
	To understand the Fundamentals of Organic Chemistry		
	To understand stereochemistry of organic molecules		
	To gain knowledge about Electrochemistry		
	To understand the chemical analysis		
	To study about Bioinorganic Chemical analysis		
Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	Develop the basic knowledge about Organic Chemistry	**K6**
	CO2	Understand stereochemistry of organic molecules	**K2**
	CO3	Understand electrochemistry	**K2**
	CO4	Understand about chemical analysis	**K6**
	CO5	Understand the Bioinorganic Chemical analysis	**K2**

UNIT-I	**Fundamentals of Organic Chemistry**	**Periods: 12**	
Classification of organic compounds – Nomenclature, tetravalency of carbon,- Classification of reagents - electrophiles, nucleophiles and free radicals - Classification of reactions - addition, substitution, elimination, condensation and polymerisation **Polar Effects**-Inductive effect, resonance, hyper-conjugation, steric effect – Keto-enoltautomerism – electrophilic substitution mechanism in benzene (Nitration and Sulphonation).			**CO1**
UNIT-II	**Stereochemistry**	**Periods: 12**	
Classifications -Types of isomerism -structural isomerism – chain, position, functional, metamerism – tautomerism – stereo isomerism – Geometrical and optical isomerism. Enantiomerism, Diastereomerism and Meso compounds. D and L configuratrion; cis – trans nomenclature, R/ S (for only one chiral carbon atoms) and E / Z Nomenclature (for ethene). Chirality of organic compounds with special reference to amino acids and sugar.			**CO2**
UNIT-III	**Electrochemistry**	**Periods: 12**	
Electrochemistry-I: Strong and weak electrolytes, common ion effect, pH, buffer solutions, Henderson equation and buffer action in biological systems. **Electrochemistry-II:** Galvanic cells: EMF, standard electrode potentials, reference electrodes (NHE and Calomel).			**CO3**
UNIT-IV	**Chemical Analysis**	**Periods: 12**	
Gravimetric analysis – Introduction- Gravimetric analysis by precipitation, Optimum conditions for good precipitation, Physical nature of precipitate, Purity of precipitate: co-precipitation, post-precipitation, Organic precipitants and their applications. Volumetric analysis - principles of Volumetric analysis, Acid – base titration, redox and metal ion indicators.			**CO4**
UNIT-V	**Bio Inorganic Chemistry**	**Periods: 12**	
Essential & Trace element in Biological process, Metalloporphyrins and with special reference to Haemoglobin and Myoglobin, Biological role of alkali and alkali earth metals with special reference to Ca^{2+}			**CO5**

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

Text Books

1. Bhupinder Mehta, Manju Mehta,"Organic Chemistry", Prentice Hall of India Pvt Ltd. New Delhi.1st Edition, 2015.
2. B.S. Bahl and ArunBahl, "Advanced Organic Chemistry", S. Chand and Company Ltd, New Delhi.1st Edition, 1998.
3. B.B.L Srinivasata, Amarnath Mishra, "Fundamental of Analytical Chemistry", IP Innovative Publication Pvt. Ltd., 1st Edition, 2016.

Reference Books

1. I.L.Finar,"Organic chemistry Vol 1", Pearson Edition, Singapore, 6th Edition, 2005.
2. R.T. Morrision and R.N. Boyd,"Organic chemistry", Prentice Hall Private Limited, New Delhi, 6th Edition, 1997.
3. P.L. Soni, "Text Book of Organic Chemistry", Sultan Chand, New Delhi, 1st Edition, 2005.

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1. https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/nomen1.htm
2. https://www.toppr.com/guides/chemistry/organic-chemistry/isomerism/
3. https://www.chemguide.co.uk/organicprops/alkanes/background.html

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

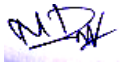
COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	2	2	3	2	3	2	2
2	3	3	2	2	3	2	2	3
3	2	3	2	2	2	3	2	2
4	3	1	2	2	3	3	1	2
5	3	2	2	2	3	2	2	3

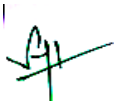
Correlation Level: 1 - Low, 2 - Medium, 3 – High

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: **DSC**			*End Semester Exam Type: **LE**			
Course Code	**A23BCL202D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**HUMAN PHYSIOLOGY PRACTICAL**	**0**	**0**	**4**	**2**	**50**	**50**	**100**

Prerequisite	Basic knowledge of Human Physiology practical		
Course Objectives	**The main objectives of the course are,**		
	To learn about the functioning of various physiological equipment's		
	To analyze the blood grouping techniques		
	To understand bleeding and clotting time		
	To determine the arterial blood pressure		
	To analyze glucose level		
Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	To know about the functioning of various physiological equipment's	**K2**
	CO2	To know the blood grouping techniques	**K6**
	CO3	To understand and know the bleeding and clotting time	**K4**
	CO4	To determine the arterial blood pressure	**K3**
	CO5	To know the glucose level	**K6**

Practicals

1. Microscopic Examination of Fresh Blood Mount, Blood Smear and Staining.
2. Estimation of Haemoglobin using Haemometer
3. Identification of Blood Groups, Rh factor
4. Determination of Bleeding and Coagulation time
5. Counting Blood cells using Haemocytometer (Demonstration of RBC, WBC)
6. Determination of Arterial Blood pressure using Sphygmomanometer
7. Recording of Pulse rate – Before and after exercise
8. Recording of Glucose Level using Glucometer.

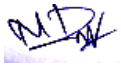
Lecture Periods: 0	**Tutorial Periods: 0**	**Practical Periods: 60**	**Total Periods: 60**

Text Books

1. Chatterjee C.C (2004), Human Physiology Volume I, Medical Allied Agency, Kolkata .
2. Chatterjee C.C (2004), Human Physiology Volume II, Medical Allied Agency, Kolkata.
3. Sembulingam, K. (2000) Essentials of Medical Physiology, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.

Reference Books

1. Bestand Taylor, (1992) The Physiological Basis for Medical Practice,Saunders Company.
2. Chaudhri, K. (1993) Concise Medical Physiology,New Central Book Agency (Parentral) Ltd., Calcutta.



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2. https://kidshealth.org/en/teens/heart.html
3. https://www.tutorialspoint.com/excretory_system/index.asp
4. https://www.endocrine.org/topics/edc/what-edcs-are/common-edcs/reproduction
5. https://www.tutorialspoint.com/what-is-the-function-of-nervous-system

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

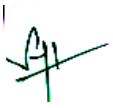
COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	3	3	2	3	3	3
2	3	3	3	3	2	3	2	3
3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	2	3
5	3	3	3	3	3	3	2	2

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

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)			End Semester Examination (ESE) Marks	Total Marks
	Model Practical Exam	Record*	Attendance		
Marks	30	10	10	50	100

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



Department	**Bioscience**	Programme: **B.Sc. Biochemistry**						
Semester	**II**	Course Category Code: **DSC**			*End Semester Exam Type: **LE**			
Course Code	**A23BCL202D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**INTERMEDIARY METABOLISM PRACTICAL**	**0**	**0**	**4**	**2**	**50**	**50**	**100**

Prerequisite	Basic knowledge of Intermediary metabolism practical		
Course Objectives	**The main objectives of the course are,**		
	To learn the techniques to estimate various type of Biomolecules such as carbohydrate, protein, amino acid DNA and RNA.		
	To understand good laboratory practices in a laboratory		
	To analyze common organic reagents and compounds based on their properties		
	To know the of primary biochemical markers		
	To understand threshold levels of HDL, LDL cholesterol.		
Course Outcome	**On completion of the course, the students will be able to**		BT Mapping (Highest Level)
	CO1	To perform the techniques to estimate various type of Biomolecules such as carbohydrate, protein, DNA and RNA.	**K2**
	CO2	To acquire handling skills to handle the biochemical methods	**K6**
	CO3	Develop skills to prepare reagents in laboratory.	**K4**
	CO4	To obtain skills on screening of markers in samples.	**K3**
	CO5	Learn the risk factors cholesterol level	**K6**

Practicals

1. Estimation of carbohydrates by Anthrone method
2. Estimation of proteins by Lowry method
3. Estimation of protein by Bradford method
4. Estimation of reducing sugars by DNS method
5. Estimation of total and HDL Cholesterol
6. Estimation of free amino acids by Ninhydrin method
7. Estimation of DNA by DPA method
8. Estimation of RNA by Orcinol method

Lecture Periods: 0	**Tutorial Periods: 0**	**Practical Periods: 60**	**Total Periods: 60**

Text Books

1. Manual of Practical Biochemistry (Mohammed Rafi), Publisher: Orient Blackswan Pvt Ltd
2. Biochemistry practical manual (Rajendiran Soundravally), Publisher: Elsevier
3. Practical Biochemistry (K Geetha Damodaran), Publisher: Jaypee Brothers Medical

Reference Books

1. Practical Manual of Biochemistry (Kaushik G.G.) Publisher: CBS Publishers & Distributors

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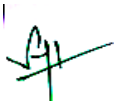
1. http://amrita.olabs.edu.in/?sub=79&brch=17&sim=205&cnt=2
2. https://www.onlinebiologynotes.com/ninhydrin-test-principle-requirements-procedure-and- result/
3. https://www.slideshare.net/jeevithaseyan/estimation-of-dna-by-diphenylamine-method

* TE – Theory Exam, LE – Lab Exam



COs/POs/PSOs Mapping

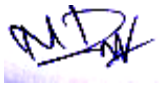
COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	3	3	2	3	3	3
2	3	3	3	3	2	3	2	3
3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	2	3
5	3	3	3	3	3	3	2	2

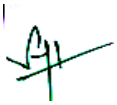
Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)			End Semester Examination (ESE) Marks	Total Marks
	Model Practical Exam	Record*	Attendance		
Marks	30	10	10	50	100

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





Department	**Bioscience**	Programme: **B.Sc. Biochemistry**						
Semester	**II**	Course Category Code: **IDC**			*End Semester Exam Type: **LE**			
Course Code	**A23CHI203D**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Chemistry – II Practical**	**0**	**0**	**4**	**2**	**50**	**50**	**100**
(Common to B. Sc., Branches)								
Prerequisite	Basic knowledge of Chemistry Practical							
Course Objectives	**The main objectives of the course are,**							
	To learn the Qualitative analysis of organic samples, Separation of organic compounds, Hardness of water.							
Course Outcome	**On completion of the course, the students will be able to**							BT Mapping (Highest Level)
	CO1	To perform the Qualitative analysis of organic samples, Separation of organic compounds, Hardness of water						**K3**

Practicals

1. Qualitative analysis of Alcohol
2. Qualitative analysis of Aldehydes
3. Qualitative analysis of Nitro Compounds
4. Qualitative analysis of Carboxylic acid (mono)
5. Qualitative analysis of Carbohydrates
6. Determination of Hardness of water.
7. Determination of acetic acid in commercial vinegar using NaOH
8. Determination of alkali content – Antacid tablet using HCl

Lecture Periods: -	**Tutorial Periods: -**	**Practical Periods: 30**	**Total Periods:30**

Text Books

1. Rageeb Md. Usman, Dr. Sunila T, "Practical Hand Book of Systematic Organic Qualitative Analysis", Unicorn Publication Pvt. Ltd, 1st Edition, 2015.
2. Israel Arthur Vogel , "Vogel's Textbook of Practical Organic Chemistry", Wiley Edition: 1st Edition,1989.
3. Arthur Israel Vogel, "Elementary Practical Organic Chemistry" Prentice Hall Press; 3rd Edition, 1980.

Reference Books

1. Venkateswaran. V, Veeraswmay. R, Kulandaivelu. A.R., "Basic Principles of Practical Chemistry", New Delhi, Sultan Chand and Sons.2nd Edition, 1997.
2. Mendham. J, Denney. R.C, Bames. J.D, and Thomas, M. "Vogel's Text book of QuantitativeAnalysis", Pearson Education,1st Edition,1989.
3. Gopalan.R, Subramaniam.P.S and Rengarajan.K, "Elements of Analytical Chemistry", Sultan Chand and Sons, 1st Edition, 2004.

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1. https://assets.cambridge.org/97805212/91125/frontmatter/9780521291125_frontmatter.pdf
2. https://www.csub.edu/chemistry/organic/manual/Lab14_QualitativeAnalysis.pdf
3. http://rushim.ru/books/praktikum/Mann.pdf

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

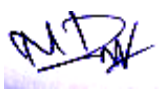
COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	3	3	2	3	3	3
2	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	--
4	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-

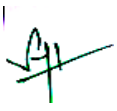
Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)			End Semester Examination (ESE) Marks	Total Marks
	Model Practical Exam	Record*	Attendance		
Marks	30	10	10	50	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	***On completion of the course, the students will be able to***	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 2. Process of effective Speech 3. Techniques for effectual Presentation		**CO1**
UNIT-II	SELF-MANAGEMENT SKILLS	**Periods: 06**
1. Time Management 2. Stress Management 3. Emotional Management		**CO2**
UNIT-III	COMMUNICATION SKILLS - READING	**Periods: 06**
1. Article analysis 2. Comprehension 3. Skimming and Scanning		**CO3**
UNIT-IV	SOCIAL SKILLS	**Periods: 06**
1. Leadership 2. Teamwork 3. Decision making		**CO4**
UNIT-V	PUBLIC SPEAKING AND PRESENTATION	**Periods: 06**
1. Rules and Techniques for Public Speaking 2. Practice session (both, Public Speaking and Presentation)		**CO5**

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.

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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.

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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

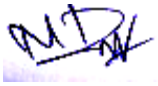
Correlation Level

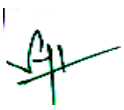
High	Moderate	Low
3	2	1

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		Periods / Week			Credit	Maximum Marks		
	A23AETA02C	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		
	To observe and discover the surrounding environment through field work.		
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 growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Womenand child welfare - Public awareness - Case studies		**CO4**
UNIT-V	**FIELD WORK**	**Periods: 06**
Visit to a local area / local polluted site / local simple ecosystem - Report submission		**CO5**

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods:30

Text Books

1. Bharucha Erach, "Textbook of Environmental Studies for Undergraduate Courses", Telangana, India:Orient Black Swan, 2rd Edition, 2013,
2. BasuMahua, 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", Bharathidasanuniversity pub, 1, trichy2004.
2. Rajamannar, "Environmental studies", EVR College PUB, Trichy2004
3. Kalavathy, S. (ED.) ,"Environmental Studies", Bishop Heber College PUB., Trichy

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

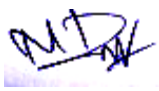
COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	3	-	-	3	3	2	3	2	2	3
2	-	-	-	-	-	3	-	-	2	3	3	2	3	2	3
3	-	-	-	-	-	2	-	-	3	3	3	3	2	2	3
4	-	-	-	-	-	2	-	-	3	2	3	2	3	2	3
5	-	-	-	-	-	2	-	-	2	2	2	1	2	1	3

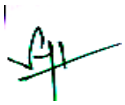
Correlation Level: 1 - Low, 2 - Medium, 3 – High

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 standard		
	ds 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, Genderissues, Government schemes for socialdevelopment 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 HallSingh, 2006.
5. Madhu, "Understanding Life Skills, background paper prepared for education for all: The leap toequality, 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 form thefield",RGNIYD publication,Sriperumbudur,2012.
8. National Service Scheme Manual (Revised), Government of India, Ministry of Youth Affairs andSports, New Delhi.
9. M. B. Dishad, "National Service Scheme in India: A Case study of Karnataka, trust Publications,2001.

Web References

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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