# MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by **NAAC** with '**A**' Grade Recognized by **UGC** under Section 2(f) & 12 (B)



www.muthayammal.in

# **DEGREE OF BACHELOR OF SCIENCE**

Learning Outcomes - Based Curriculum Framework - Choice Based Credit System



(For Candidates admitted from the academic year 2021 - 2022 and onwards)

# MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

## RASIPURAM - 637408

#### VISION

To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, thereby nurturing a generation of committed, Knowledgeable and socially responsible citizens.

#### MISSION

- To Ensure State of the world learning experience
- To espouse value based Education
- To empower rural education
- ✤ To instill the sprite of entrepreneurship and enterprise
- To create a resource pool of socially responsible world citizens

# **QUALITY POLICY**

To seek – To strive – To achieve greater heights in Arts & Science, Engineering, Technological and Management Education without compromising on the quality of education.

# **DEPARTMENT OF BIOCHEMISTRY**

## VISION

To ensure state of the world learning experience in science

#### MISSION

◆ To expose the scientific education to empower science in rural peoples Vision

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO):**

PEO1: Graduates will be able to promote learning environment to meet the industry expectation.

PEO2: Graduates will be incorporated the critical thinking with good Communication and Leadership skills to become a self-employed.

PEO3: Graduates will be uphold the human values and environmental sustenance for the betterment of the society.

# **GRADUATE ATTRIBUTES**

The Graduate Attributes of B.Sc., Biochemistry are

GA1: Analytical Reasoning

GA2: Critical Thinking

GA3: Problem Solving Skills

GA4: Communication Skills

GA5: Leadership Quality

GA6: Team work

GA7: Lifelong Learning

#### **PROGRAMME OUTCOMES (POs):**

PO1: Graduates will acquire dynamic skills through proper perception of the course objectives that leads to scientific and analytical comprehension of the concepts;

PO2: Graduates will focus on sustainable goals that might bring about spherical developments

PO3: Graduates will infuse a spirit converging on bricking a team work, interpersonal and administrative skills to think critically and execute effectively.

PO4: Graduates will apply reasoning appropriately to scale the humps in learning and solute them to the core.

PO5: Graduates will engage the skills obtained in independent and collaborative learning a perennial process.

#### **PROGRAMME SPECIFIC OUTCOMES (PSOs):**

PSO1: Incorporate the concepts of biological components that are required for optimal cell and system functioning.

PSO2: Illustrate biological techniques for assembling and assessing experimental results.

PSO3: Understand how modifications in the structure and metabolism of biomolecules results in abnormalities.

PSO4: Perform fundamental biochemistry research, integrating medicinal and diagnostic applications.

PSO5: Build a team, establish it with the proper attitude, and perform efficiently in employment either in government sector or can become an entrepreneur.



MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (Autonomous) - Rasipuram - 637 408 Scheme of Examinations LOCE-CRCS Pattern Scheme of Examinations LOCF-CBCS Pattern COLLEGE OF ARTSdents Admitted from the Academic Year:2021-2022 Onwards) **Programme : B.Sc.BIOCHEMISTRY** Learn. Lead

(Autonomous) AUNITOF VANETRA GROUP

S No	PART	COURSE CODE	TITLE OF THE COURSE	Hrs./W		CREDIT	MAX.MARKS		
5.110.			Lect.	Lab.	POINTS	CIA	ESE	TOTAL	
			SEMESTER - I						
1	Ι	21M1UFTA01	TAMIL-I	5	-	3	25	75	100
2	II	21M1UCEN01	COMMUNICATIVE ENGLISH-I	5	-	3	25	75	100
3	III	21M1UBCC01	BASICS OF BIOCHEMISTRY	4		4	25	75	100
4	III	21M1UCHA01	ALLIED- CHEMISTRY I	4		4	25	75	100
5	III	21M2UBCP01	PRACTICAL : BIOCHEMICAL ANALYSIS	-	3				
6	IV	21M2UCHAP1	PRACTICAL : ALLIED CHEMISTRY	-	3				
7	IV	21M1UVED01	YOGA	2		2	100		
8	IV	21M1UPEL01	PROFESSIONAL ENGLISH FOR LIFE SCIENCE - I	4		2	25	75	100
			TOTAL	24	6	18	225	375	500
		•	SEMESTER - II		•				
1	Ι	21M2UFTA02	TAMIL-II	5	-	3	25	75	100
2	II	21M2UCEN02	COMMUNICATIVE ENGLISH - II	5	-	3	25	75	100
3	III	21M2UBCC02	TOOLS OF BIOCHEMISTRY	4	-	4	25	75	100
4	III	21M2UCHA02	ALLIED -CHEMISTRY II	4		4	25	75	100
5	III	21M2UBCP01	PRACTICAL : BIOCHEMICAL ANALYSIS		3	3	40	60	100
6	III	21M2UCHAP1	PRACTICAL : ALLIED CHEMISTRY		3	3	40	60	100
7	IV	21M2UEVS01	ENVIRONMENTAL STUDIES	2	-	2	100		
8	IV	21M2UPEL02	PROFESSIONAL ENGLISH FOR LIFE SCIENCE – II	4		2	25	75	100
			TOTAL	24	6	24	305	495	700
			SEMESTER - III						
1	Ι	21M3UFTA03	TAMIL-III	6	-	3	25	75	100
2	II	21M3UCEN03	COMMUNICATIVE ENGLISH - III	6	-	3	25	75	100
3	III	21M3UBCC03	ENZYMES	6	-	5	25	75	100
4	III	21M3USTA03	ALLIED -BIOSTATISTICS	4	-	4	25	75	100
3	III	21M4UBCP02	PRACTICAL : ENZYMES AND PHYTOCHEMISTRY	-	3				
6	III	21M3UBCS01	CELL BIOLOGY	3	-	2	25	75	100

7	IV	21M3UCHN01	NMEC - I	2	-	2	25	75	100
			TOTAL	27	3	19	150	450	600
			SEMESTER - IV						
1	Ι	21M4UFTA04	TAMIL-IV	5	-	3	25	75	100
2	II	21M4UCEN04	COMMUNICATIVE ENGLISH - IV	5	-	3	25	75	100
3	III	21M4UBCC04	BIOENERGETICS & INTERMEDIARY METABOLISM	6	-	5	25	75	100
4	III	21M4UCSA01	ALLIED - COMPUTER APPLICATIONS IN BIOLOGY	4	-	3	25	75	100
5	III	21M4UBCP02	PRACTICAL : ENZYMES AND PHYTOCHEMISTRY	-	3	3	40	60	100
6	III	21M4UCSAP1	PRACTICAL : ALLIED - OFFICE AUTOMATION	-	3	2	40	60	100
7	IV	21M4UBCS02	PLANT BIOCHEMISTRY	2		2	25	75	100
8	IV	21M4UCHN02	NMEC - II	2	-	2	25	75	100
			TOTAL	24	6	23	230	570	800
	SEMESTER - V								
1	III	21M5UBCC05	PATHOLOGY AND CLINICAL BIOCHEMISTRY	5	-	5	25	75	100
2	III	21M5UBCC06	HUMAN PHYSIOLOGY	5	-	5	25	75	100
3	III	21M5UBCC07	MOLECULAR BIOLOGY	5	-	5	25	75	100
4	III	21M6UBCP03	PRACTICAL : CLINICAL BIOCHEMISTRY AND PHYSIOLOGY	-	5				
5	III	21M5UBCE01	ELECTIVE - I	4	-	4	25	75	100
6	III	21M5UBCE02	ELECTIVE - II	4	-	4	25	75	100
7	IV	21M5UBCS03	NUTRITION AND DIETICS	2		2	25	75	100
			TOTAL	25	5	25	150	450	600
	I	I	SEMESTER - VI	I	I				
1	III	21M6UBCC08	PHARMACOLOGY AND TOXICOLOGY	5	-	5	25	75	100

2	III	21M6UBCC09	ENDOCRINOLOGY	5	-	5	25	75	100
3	III	21M6UBCE03	ELECTIVE - III	5	-	5	25	75	100
4	III	21M6UBCE04	ELECTIVE - IV	4	-	4	25	75	100
5	III	21M6UBCP03	PRACTICAL : CLINICAL BIOCHEMISTRY AND PHYSIOLOGY		5	3	40	60	100
6	III	21M6UBCPR1	PROJECT WORK	-	4	4	40	60	100
7	III	21M6UBCOE1	COMPETITIVE ONLINE EXAMINATION IN BIOCHEMISTRY	-	-	2	100		
8	IV	21M6UBCS04	INDUSTRIAL BIOCHEMISTRY	2		2	25	75	100
9	V	21M6UEXA01	EXTENSION ACTIVITY		-	1	100		
			TOTAL	21	9	31	405	495	700
			OVERALL TOTAL	145	35	140	1465	2835	3900
		21M6UBCEC1	MOOC Courses offered in SWAYAM / NPTEL	-	-	2	-	-	-

#### List of Allied Course for any Degree offered by the B.Sc.,Biochemistry SYLLABUS - LOCF-CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards

S.No.	Sem	COURSE_CODE	TITLE OF THE COURSE
1	Ι	21M1UBCA01	Allied Biochemistry- I
2	II	21M2UBCA02	Allied Biochemistry- II
3	II	21M2UBCAP1	Allied Biochemistry Practical- I

#### List of Elective Course (DSE) Details for B.Sc.,Biochemistry SYLLABUS - LOCF-CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards

S.No.	COURSE_CODE	TITLE OF THE COURSE
1	21M1UBCE01	Genetic Engineering
2	21MXUBCE02	Phytochemistry
3	21MXUBCE03	Food Preservation and Adulteration
4	21MXUBCE04	Biomedical Instrumentation
5	21MXUBCE05	Microbial Biochemistry
6	21MXUBCE06	Cancer Biology

#### List of Non Major Elective Course (NMEC) offered by the B.Sc.,Biochemistry SYLLABUS - LOCF-CBCS Pattern EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	III	21M3UBCN01	Fundamentals of Human physiology
2	IV	21M4UBCN02	Biochemistry in Nutrition
3	III	21M3UBCN01	Biochemistry and Health
4	IV	21M4UBCN02	Biochemistry in Diagnosis

#### **UG-REGULATION**

#### 1. InternalExamination Marks- Theory

Components	Marks
CIA I&II	15
Attendance	5
Assignment	5
Total	25

Attendance Percentage	Marks
96 % to 100%	5
91% to 95%	4
86% to 90%	3
81% to 85%	2
75% to 80%	1
Below 75%	0

#### 2. QUESTION PAPER PATTERN FOR CIA I, II AND ESE (3HOURS) MAXIMUM: 75Marks

#### SECTION-A (10 Marks) (Objective Type)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

#### SECTION-B(10 Marks)(Short Answer)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

# <u>SECTION-C (25 Marks)</u>(Either or Type)

Answer any **FIVE** questions

ALL Questions Carry EQUAL Marks

Either or Type.(5 x 5 = 25 marks)

#### SECTION-D (30 Marks)(Analytical Type)

Answer any **THREE** Questions out of **FIVE** questions

ALL Questions Carry EQUAL Marks

(3 x 10 = 30 marks)

(Syllabus for CIA-I 2.5 Unit, Syllabus for CIA-II All 5 Unit)

(10 x1=10 marks)

(10 x1=10 marks)

 $(5 \times 2 = 10 \text{ marks})$ 

#### 2a) Components for Practical CIA

Components	Marks
CIA –I	15
CIA - II	15
Observation Note	5
Attendance	5
Total	40

#### **2b)** Components for Practical ESE

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
Total	60

#### 3. Guidelines for Value Education Yoga and Environmental Studies (PartIV)

- The Course Value Education Yoga is to be treated as 100% CIA course which is offered in I Semester for I year UG students.
- The Course Environmental Studies is to be treated as 100% CIA course which is offered in II Semester for I year UG students.
- Total Marks for the Course=100

Components	Marks
Two Tests(2 x30)	60
Field visit and report(10+10)	20
Two assignments(2 x10)	20
Total	100

The passing minimum for this course is 40%

Incase, the candidate fails to secure 40%passing minimum, he/she may have to reappear for the same in the subsequent odd/even semesters.

#### 4. Guidelines for Extension Activity (PartV)

- Atleasttwoactivitiesshouldbeconductedwithinsemesterconsistingoftwodayseach.
- The activities may be Educating Rural Children, Unemployed Graduates, Self Help Group etc.

The marks may be awarded as follows

No of Activities	Marks
2 x50 ( Each Activity for two days)	100

#### 5. Internship/Industrial Training, Miniproject and Major Project Work

Internship/Industr	ial Training	Mini Project	Major Project V	Vork
Components	Marks	Marks	Components	Marks
CIA*2 Work Diary Report Viva-voce Examination Total	25 50 25 <b>100</b>	- 50 50 <b>100</b>	CIA a) Attendance b) Review /Work Diary*1 10 Marks 30 Marks	40
			ESE*2 a)Final Report 40Marks b)Viva-voce 20Marks Total	60 <b>100</b>

\*<sup>1</sup>Review is for Individual Project and Work Diary is for Group Projects(Group consisting of minimum3 and maximum 5)

\*<sup>2</sup>Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

#### 6. Guidelines for Competitive Exams- Online Mode(PartIII)- Online Exam 3 hours

Components	Marks
100 Objective Type Questions	100
100*1=100 Marks	

Objective type Questions from Question Bank.

- The passing minimum for this paper is40%
- In case, the candidate fails to secure 40% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

	<b>B.Sc-Biochemistry</b>	LOCF-CBCS with eff	ect fro	m 2021-2	:022	Onw	ards	
Course Code	Course Title	Course Type	Sem	Hours	L	т	P	С
21M1UBCC01	BASICS OF BIOCHEMISTRY	DSC THEORY - I	I	4	4			4
Objective	To understand the sin molecular formulae, o importance of biomol	mple and molecular str diagrams or models, pl lecules.	ucture hysicoc	of the d hemical	iffer proj	ent ty pertie	ypes of biomol es and biologic	ecules, al
Unit		Course Content		an a			Knowledge Levels	Sessions
I	Carbohydrates: Intr carbohydrates. Monosaccharides: Str monosaccharides: Isom interconversion Oligosaccharides: Diss functions of Polysaccharides: Cla properties and Homo-polysaccharides polysaccharides -Hya Heparin.	oduction and gene uctures, properties and erism-structural and of sugars, saccharides - structures, maltose, Lactose sisifications of poly biological s - starch, cellulose, glyc luronic acid, Chondroi	propert ster propert sacchar fur cogen, I tin sul	classificat gical fun- reo is muta ties and t and ides, S nctions pectin and phate, cl	tion ction omer- rota biolo Suc truct d He nitin	of rism, tion. gical rose. ures, of tero- and	K1, K2	10
П	Amino acids: Structure electrochemical proper aminoacids, Non-prote Peptides: Features of p Glutathione, enkaphali endorphins. Proteins: Classification structural organization quaternary structures, I	e, classification, physica ties, Non-standard in aminoacids. eptide bond, naturally o ns and n, physical and chemical of proteins - Primary, so Forces stabilizing each l	l, chem ccurrin proper econdat evel of	ical and g peptide ties of pr ry, tertiar structure	s — rotein y and	ns, d	K1,K2	10
Ш	Fatty acids: Definition saturated and unsaturat Lipids: Classification of occurrence, structure a phospholipids, glycolip Lipoproteins: Types an VLDL, LDL and HDL	, nomenclature, classific ted fatty acids. Essential of lipids- simple, conjug nd physical and chemica bids, sphingolipids and c id functions of lipoprote	ation o fatty a ated an al prope choleste ins – C	f fatty ac cids. d derived erties of erol. hylomicr	ids- l lipi ons,	ds,	K1,K2	8

÷۶

IV	Nitrogenous bases: - pur formation of phosphodie DNA: - Types of DNA, S helix model, physic-chem properties and functions palindromic sequence, cr RNA: - Types and basic and rRNA, properties and RNA. Nucleoproteins: st protamines.	ines and py ster bonds. Structure of nical of DNA. S ruciforms. structural f d functions ructure and	rimidines, 1 f DNA – W pecial base features of F of I functions of	nucleos atson a sequen NA – of Histo	sides, nucleot and Crick dou aces of DNA mRNA, tRN ones and	iides, ıble — A	K1,K2	10
v	Vitamins: Introduction to structures, sources, RDA deficiency diseases of fat	o vitamins, , functions t soluble ar	classificatio , nd water-sol	on of v uble vi	itamins - itamins.		K1, K2, K3	7
	CO1: To define the des	ign of the s	structures,	isome	rism and		K1	
	CO2: to classify the nat	ture of ami	ino acids ai	nd pro	teins with th	eir	К2	
Course	CO3: Classify about the	e lipids an	d lipoprote	ins alo	ng with thei	r	К2	
Outcome	CO4: Explain the struc Nucleoproteins.	К2						
	CO5: Describe about so	ource and i	importance	e of Vi	tamins.		К3	
		Learn	ing Resour	ces				
Text Books	1. Biochemistry (2013) U 2. Fundamentals of Bioc 3Biochemistry, 4th edi	J.Satyanara hemistry(2 tion (1988)	ayana and U 005)J.LJain ) Zubay G I	J. Chak , 6th E , W M	rapani, 4th e dition, S.Cha C Brown Pu	dition, and&C ablishe	Elsevier o Ltd., rs.	
Reference Books	<ol> <li>Lehninger's Principles Macmillan/worth, NY.</li> <li>Biochemistry, 3rd (19</li> <li>Principles of Biochem</li> </ol>	of Biocher 94) Lubert: istry (1994	mistry (200 stryer, W H ) Garrette&	0) Nels freema Grish	son, David 1. an and co, Sa am, Saunders	and Co Infrance S Colle	ox, M.M. isco. ge publishing.	
Website Link	1.https://www.phys.sinic NANO/Course/2010_Sp 2. https://nptel.ac.in/cour 3. https://onlinecourses.r	ca.edu.tw/T ring/Classr rses/104102 ptel.ac.in/1	TGP notes/AAC_ 3121 noc20_cy07	lehnin	ger4e_ch03%	620(Pr	otein).pdf	
	L-Lecture	T- Tutorial	P- Practical		C-Credit			

	B.Sc-Biochemistry Syllabus	LOCF-CBCS with effect	from 2021-2	022 Onwards				
Course Code	Course Title	Course Type	Sem	Hours	Ţ	F	a.	U
21M1UBCC01	BASICS OF BIOCHEMISTRY	DSC THEORY - I	-	4	4	97.		4

,

\$

CO Number	P01	P02	P03	P04	P05	PS01	PS02	PSO3	PSO4	PSO5
<u>co</u> 1		¥	¥	s	S		¥			¥
C02		¥	¥	S	s	S	-	S	¥	s
CO3	Ч	¥	s	W	s	S	W	¥	¥	s
C04		¥	W	S	s	S	W		S	×
CO5	_	٧	S	S	¥	S	W	¥	¥	s
Level of Correlation between CO and PO	R-LOW	M-ME	WNIC	S-STRONG						

Tutorial Schedule	
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assesment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

,		I
Approved By	J- p. 2 min	
Verified By	H. Shokane Byn	
Designed By	R. Hors	R. Ablemi

RASIPURAN R31 408 NWW

B.Sc	,-Biochemistry L	OCF-CBCS wit	th effe	ct from	202	1-20	22 Onwards	
Code	Course Title	Course Type	SEM	Hours	L	Т	Р	С
21M2UBCC02	TOOLS OF BIOCHEMISTRY	DSC THEORY - II	11	4	4			4
Objective	To understand th separation techn and to expertise separation of mix	ne basis and g iques specifi on the applic ctures with k	general ed in t cation nown o	method he cours of these composi	dolog se. tecl tions	gy of hniq s.	the molecu ues to the	lar
Unit		Course Cont	ent	in und		12.14	Knowledge Levels	Sessions
I	Definition and der human body. Cell Fractionation Organ and tissue a homogenization, disruption, extract Dialysis and Ultra semipermeable m equilibrium and b Basic principles o Maintenance and Microscopy: Simp	effinitions for termination o a Techniques: slice techniqu cell lysis - Me ction, salting filtration - Ar membranes, Do iological signi f cell sorting a preservation le, Light, Darl	Acids a f pH. B les, tis: thods c in and tificial pinnan r ificance and cou of cells k, Phas	and base uffer sys of cell salting o membran nembran e of osm unting. S. e Contra	ut. ut. ne osis.	Η: - ⊢of	<b>K1</b>	8
II	Chromatographic Principles, proced chromatography, chromatography - filtration chromat Gas Liquid Chrom Chromatography.	Techniques: lure and appl thin layer chr ion exchange ography, affi atography, Hi	ication omato e chron nity ch gh per	s of pape graphy, natograp romatog formanc	er colui hy, g raph e Liq	mn gel y. juid	K2	8
111	Centrifugation: Basic principles or sedimentation vel equilibrium. Type speed and ultrace swinging bucket, rotor. Types of ce centrifugation - d centrifugation wit centrifugation - m	f sedimentation locity and sed s of centrifuges entrifuges. Ty fixed angle, v entrifugation: ifferential an th application nolecular weig	on,Sveo limenta ges - de pes of rertical Prepar d densi s, Anal ght det	dberg's o Ition sk top, I Rotors - tube an ative ty gradi ytical erminat	consa nigh Id zo ent ion.	ant, nal	К2	8
IV	Electrophoretic T Principles, techni electrophoresis, g PAGE, Capillary e Factors affecting Spectroscopic Tec Laws of absorptio limiations. Princip applications of co	echniques: ques and app gel electrophoresis electrophoresis chniques: n -Beer - Lam oles, instrume lorimeter, sper and flame r	lication presis - s, isoel sis. bert's l entation ectroph	agarose ectric fo aw and as and notomet	er , SDS ocusii its er,	ng,	К3	10

v	Radioisotope Techniques: Radioactivity, stable and radioactive isotopes, Radioactive decay - rate of radioactive decay and units of radioactivity. Methods of detection of radioisotopes: - GM counter, Scintillation counter. Autoradiography and its applications. Advantages, disadvantages and safety aspects of radio isotopic techniques. Radioisotopes in Biology: Radioisotopes commonly used in biochemical studies - 14C, 32P, 35S, 3H, 131I.	K3	11
	CO1: Explain the cell fractionation techniques and clarify about the microscope handling.	K1	
	CO2: Relate the chromatographic techniques for the separation components	K2	
Course Outcome	CO3: Compare the principles of centrifugation techniques for the separation of components	К2	
	CO4: Value the basic principles behind electrophoretic and spectroscopic techniques	К3	
	CO5: Critique about the measurement and the applications of radioisotopes	К3	
	Learning Resources		
Text Books	<ol> <li>Biophysical chemistry Principles and Techniques - Av Nirmalendhe Nath, Himalaya Publishers.</li> <li>A Biologist Guide to Principles and Techniques of Bio Wilson and Kenneth Goulding, Edward Arnold publisher</li> </ol>	vinash Upadh ochemistry, k rs.	iyaye and Keith
	1. Cell biology, T. Devasena, 2012, Oxford University p	ress.	
Reference Books	<ol> <li>Principles and techniques of practical Biochemistry, John Walker, 1995. Cambridge University Press.</li> <li>An Introduction to Spectroscopy for Biochemist, Bro Press.</li> </ol>	Keith Wilsor wn. SB Acado	n and emic
Website Link	<ol> <li>1.https://link.springer.com/content/pdf/bfm%3A978- 2%2F1.pdf</li> <li>2. https://onlinecourses.nptel.ac.in/noc22_cy43</li> <li>3. https://nptel.ac.in/courses/104102009</li> </ol>	1-4419-9785-	
L-Lecture	T-Tutorial P-Practical C-Credit		

# B.Sc.,-Biochemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	SEM	Hour	L	т	Р	с
21M2UCSC 02	TOOLS OF BIOCHEMISTRY	DSC THEORY - II	11	4	4			4

CO Number	P01	P0 2	P0 3	P04	P0 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	L	м	Μ	S	S	L	M	L	L	Μ
CO2	L	Μ	Μ	S	S	S	L	S	M	S
CO3	M	м	S	м	S	S	M	м	м	S
CO4	L	Μ	Μ	S	S	S	Μ	L	S	Μ
CO5	M	M	S	S	M	S	M	M	M	S
Level of Correlatio n between CO and PO	L- LO W	A MEC	n- Dium	S- STRON G			1	1	1	J

Tutorial Schedule	<ul><li>1.Group discussion</li><li>2.Flash cards</li><li>3.Listening skills</li><li>4.Roll play</li></ul>
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assesment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

**Designed By** Verified By Approved By 1-6° AC Mary elopme utonomous Rasipuram

Course Code	Course Title	Course Type	SEM	Hours	L	Т	Р	С
21M2UBCP0 1	BIOCHEMICAL ANALYSIS	DSC PRACTICAL	11	3+3			3	3
Objective	To provide the stu and quantitative s identification of u	idents with ar kills, and to u nknown comp	n oppo Inderst Dounds	rtunity ( and the	to de bio	evelo cher	op their qua nical analysi	litative s and
S. No.	List of I	Experiments / F	Progran	nmes			Knowledge Levels	Sessions
1	1.Preparations a) Percentage solu b) Molar Solutions c) Normal Solution d) Simple problems	tions s s for preparati	ion of s	olutions			КЗ	6
2	2. Preparation of E	Buffers and de	termin	ation of	pH.		K3	6
3	3.Biochemical Prepa) Starch from pot b) Casein from mil c) Lecithin from eg	oarations ato. k. gg yolk.					КЗ	9
4	<ul> <li>4. Qualitative Anala)</li> <li>a) Monosaccharide</li> <li>Polysaccharides.</li> <li>b) Amino acids.</li> <li>c) Lipids.</li> </ul>	ysis 's, Disacchario	des and	1			K4	38
5	5. Quantitative An a) Determination of - Titrimetric Analy b) Estimation of G c) Determination of d) Determination of f) Estimation of Ca	alysis of reducing sug vsis. lycine- Formal of Acid numbe of Saponificati of Ascorbic aci alcium-Titrime	gar- Be I Titrat r. on nun id - DC etric m	nedict's ion. nber. PIP meth ethod.	met nod.	hod	К4	21
	CO1:Facilitate the	e learners to priments	prepar	e soluti	ons	for	К3	
	CO2:Make the stu and to know the	idents to prep	are bu f pH so	Iffer sol	utio	n	К3	-
Course Outcome	CO3:Prepare cruc casein etc	le macromole	cules	ike star	ch,		K3	
	CO4:Facilitate the carbohydrates, a	e learners to mino acids an	correc d lipid	tly iden s	tify	the	K4	
	CO5: Quantify the	e bio molecul	es				K4	

Text Books	<ol> <li>Practical clinical biochemistry, volume I and II- Harold Varley, et al., 1980. Fifth Edition. CBS publishers.</li> <li>Biochemical Methods. II Edition. Sadasivam. S and Manickam, A New Age International private Ltd Publishers.</li> <li>A Text book of practical biochemistry. David Plummer</li> </ol>
Reference Books	<ol> <li>Laboratory Manual in Biochemistry, 1981. J.Jayaraman, New Age International publishers, New Delhi.</li> <li>Plant Biochemistry - Practical. C.C. Giri &amp; Archana Giri.</li> </ol>
Website Link	<ol> <li>https://ncert.nic.in/pdf/publication/science laboratory manuals/</li> <li>https://nptel.ac.in/courses/102103016</li> </ol>

B.Sc.,-I	Biochemistry Syllabus LOC	F-CBCS with	effect	t from 2	021-2022 Onwards           L         T         P         C           3         3         3			
Course Code	Course Title	Course Type	SEM	Hour s	L	т	Ρ	с
21M2UBCP 01	BIOCHEMICAL ANALYSIS	DSC PRACTICA L - I	11	3+3			3	3

CO Number	P01	P0 2	P0 3	P04	P0 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	L	S	S	S	S	S	S	S	Μ
CO2	M	S	S	S	M	S	M	S	M	S
CO3	S	S	L	M	S	S	S	M	S	S
CO4	S	S	S	S	Μ	S	M	S	S	Μ
CO5	S	M	S	M	S	S	S	S	M	S
Level of Correlatio n between CO and PO	L- LO W	A MED	n- Dium	S- STRON G			•			

Tutorial Schedule	Problem solving and group discussion
Teaching and Learning Methods	Explanation of Practical procedure and Demonstration of experiments
Assesment Methods	Observation, Performance, Attendance

Designed By	Verified By	Approved By	
S. Anlite	WERF	A- h-500	~
	opmen		



B.Sc-I	Biochemistry Syl	labus LOCF-CBCS	s with ef	fect from	2021	-202	2 Onwards	
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	С
21M3UBCC03	ENZYMES	DSC THEORY - III	ш	6	6			5
Objective	To provide a d role in control the current ap	eeper insight into t of metabolism and plications and futur	he funda industri re poten	mentals o al applica tial of enz	of en ation zyme:	zymo of ei s	e kinetics and nzymes and t	d their to learn
Unit	ng na ng manini na na Ng mang ng mang Ng mang ng mang	Course Cont	ent				Knowledg e Levels	Sessio s
I	Introduction to nomenclature, of enzyme acti metalloenzyme enzymes, oligo activators and coenzymes. Er	Enzymes: History and IUB classificativity. Holoenzyme es, metal activated omeric enzymes, ri inhibitors. Structu nzyme turnover.	and ten ation of es, Apoe enzyme bozyme re and fi	minology enzymes. enzyme, es, monor es, cofacto unctions o	y, Uni neric ors, of	ts :	K1	12
Ш	Active Site: St characteristics induced fit, an Enzyme Catal catalysis, Meta Mechanism of	ructure of active s , theories of ES co d substrate strain t ysis: Acid-base cat al ion catalysis, Ele Action of Specific	ite and i mplex - heory. N alysis, c ectrostat Enzym	ts Lock and Nature of covalent ic catalys ne: - lysoz	l key sis. zyme	,	K1 ,K2	12
Ш	Enzyme Kinet velocity and st significance, L Equation; - Lin Hanes Plot. Fa of pH, tempera concentration, activators. Enzyme Inhibi inhibition - Co Uncompetitive Feedback inhil Allosteric inhi	ics: Michaelis-Men eady-state approad inear transformation neweaver-Burk Plo actors Affecting Er ature, enzyme cond and the presence of ition: Types of inhom petitive, Non-co inhibition. Irreven bition, Regulation bition, covalent m	nten Equ ch, Vma on of M ot, Eadie zyme A centratic of inhibi ibition - mpetitiv rsible in of Enzy odificati	ation: - I x, Km an ichaelis-l c-Hofstee ctivity: - on, substra- tors and Reversit ve and hibition, me Activ on.	initia d the Ment Plot Effe ate	il eir en ect	K1 ,K2, K3	12
IV	Coenzymes: T coenzymes in pyrophosphate nucleotides, C Isoenzymes: D with examples creatine kinase Allosteric Enz with an examp Multienzymes	he structure and fu enzyme-catalyzed e, nicotinamide nuc oenzyme A, Lipoa Definition, features - Lactate dehydro e (CK). ymes: Definition, ole - Aspartate tran Complex – Pyruv	inction of reaction cleotides te, Fola and clin ogenase structure scarbox ate dehy	of the foll as – Thiar s, Flavin te and bio nical sign (LDH) ar e, and pro ylase. vdrogenas	lowin nine otin. ifica nd opert	nce ies	K1 ,K2, K3	12

• •

V	Immobilized E applications of Purification of purification of sources, determ Applications of industries and	nzymes: l immobili Enzymes enzymes nination o f enzymes role of en	Principles zed enzyr : Methods from micr f purity o s- in food, zymes in	, metho nes. Iso s of isol robial, p f isolate textile, medicir	ds, and blation and ation and blant and ed enzym , and leath ne.	d anim es. her	nal	K1- K4	12
	CO1: To list the enzymes	e basic fea	tures and	classifi	cation of			K1	
	CO2: Describe of enzyme catal	the chara lysis	cteristics (	of active	e site and	natu	re	K2	
Course Outcome	CO3: Explain t enzyme regulat	he enzym ion with r	e kinetics, elevant ex	enzym amples	e inhibitio	on an	d	K2	
	CO4: Demonstr multienzyme co	rate the co omplex	enzymes,	alloster	ic enzym	es an	d	K4	
	applications of immobilized enzymes. Isolation and Purifications of Enzymes: Methods of isolation and purification of Enzymes: from microbial, plant and animal sources, determination of purity of isolated enzymes. Applications of enzymes- in food, textile, and leather industries and role of enzymes in medicine.       K.         CO1: To list the basic features and classification of enzymes       Enzymes       K.         CO2: Describe the characteristics of active site and nature of enzyme catalysis       Enzyme inhibition and enzyme regulation with relevant examples         CO4: Demonstrate the coenzymes, allosteric enzymes and multienzyme complex       Enzymes and CO5: Diffentiate the various immobilization techniques and application of enzymes in different fields         Learning Resources       1. Enzymes - Dixon, E.C Webb, CJR Thorne and K.F. Tipton, Longr 2. Fundamentals of Enzymology 2 ed., (1998) - Nicholas C.Price, Le Oxford University Press, First Edition (1990).         3. Devasena, T. 2010. Enzymology 2 ed., (1998) - Nicholas C.Price, Le Oxford University Press, First Edition (1990).         3. Devasena, T. 2010. Enzymology. Oxford University Press, New D M. and Chauhan, D. 2009. Fundamentals of Enzymology. [First Edit Publishers, Jaipur.         1. Protein Biotechnology, Gary Walsh and Denis Headon, John Wile 1994.         2. Protein Biochemistry and Biotechnology, Gary Walsh and John W Ltd. 2002.         3. Understanding Enzymes, Trevor Palmer, Ellis Horwood Limited, " (1991).         1. https://nptel.ac.in/courses/102102033         2. https://archive.nptel.ac.in/courses/104/105/102105034         3. https://ar	K4							
		Le	arning Re	sources					
Text Books	<ol> <li>Enzymes - Di</li> <li>Fundamentals</li> <li>Oxford Universi</li> <li>Devasena, T.</li> <li>M. and Chauhan</li> <li>Publishers, Jaipu</li> </ol>	xon, E.C.V s of Enzym ity Press, F 2010. Enz a, D. 2009. ur.	Webb, CJR hology 2 ec First Editio ymology. ( Fundamen	. Thorne I., (1998 n (1990) Oxford I ntals of ]	and K.F. ) - Nichol ). University Enzymolo	Tipto as C. Pres gy. []	on, L Price s, Ne First	ongmans, Lo e, Lewis Stev ew Delhi.4. N Edition]. Aa	ndon. rans, 1eena, vishkar
Reference Books	<ol> <li>Protein Bioted</li> <li>1994.</li> <li>Protein Bioch</li> <li>Ltd. 2002.</li> <li>Understanding</li> <li>(1991).</li> </ol>	chnology, nemistry a g Enzymes	Gary Wals nd Biotech s, Trevor P	h and D nology, almer, F	enis Head Gary Wal Ellis Horw	lon, J Ish ar rood I	ohn nd Jo Limi	Wiley and So hn Wiley and ted, Third Ed	ons, 1 Sons lition
Website Link	1. https://nptel.a 2. https://archive 3. https://archive	c.in/course e.nptel.ac.i e.nptel.ac.i	es/1021020 n/courses/ n/content/	)33 104/105 storage2	/10210503 /courses/1	34 0410	)307	1/pdf/mod13	pdf
	L-Lecture	T- Tutorial	P- Practica 1		C- Credit				

Ilabus LOCF-CBCS with effect	t from 2021-20	22 Onwards				
Course Type	Sem	Hours	-	F	٩	υ
DSC THEORY - III	H	9				'n
04 P05 P501	PS02	PSO3	PS04	PSO5		
S M S	S	٤	×	s		
s x	٤	s	s	-		
s N	s	¥	¥	s		
x x	s	s	S	z		
s s	¥	¥	s	s		
DNC						
Chalk and talk method	I, PPT Classes,	Smart classro	om			
Assignment, Class test	, Unit test, Inte	ernal exams,	Seminars,	Attendance	a	
Designed By		Verified By			Approved By	
Nixed	M.	rebane	Regu	, t	M. 8.	Ş
- C1. 12218/2000	- Internet		>			
KRAWY LITT	RASIPURAM 637 408 13mil Nadu 52					
Designed By	M. C. S.		Verified By	Verified By Labara Regn	Verified By Krebane Regn A.	Verified By Approved By Kebane Ragn A. M. & C

<b>D</b> .5C-1			y with ei	I I I I I I I I I I I I I I I I I I I		1		r
Course Code	Course Title	Course Type	Sem	Hours	L	T	Р	C
21M3UBCS01	CELL BIOLOGY	SEC - I	ш	3	3			2
Objective	To understand the cellular con molecules and a	the structure and aponents and energy applying the know	function gy utiliz ledge in	s of prok ation pro cell biolo	aryo cess i gy.	tes a in th	nd Eukaryot e cell and the	ic cells, e cellula
Unit		Course Cont	tent				Knowledg e Levels	Session s
I	Biogenesis the Cell size and sl organization. S and animal cell	ory of origin of lif hape; Prokaryotic tructural comparis	fe. Cell a & eukar son of n	as a Basic ryotic cel nicrobial,	: uni l plan	t; nt	K1- K3	6
Ш	Cell wall and n plasma membr proteins and th membrane- sel adhesion; Cell wall.	nembrane: Plasma ane; fluidity of mo eir functions; Tran ective permeabilit junctions; Compo	n membrane embrane nsport ac y of me sition of	rane-Mod es; Memb cross the mbrane; ( f bacteria	el of rane Cell 1 cel	1	K1- K2	8
Ш	Structure and f Chloroplast, En lysosomes, Rib Centrioles and	unction of cell org ndoplasmic reticul posomes, Peroxiso Cytosols.	ganelle; lum, Go mes, Va	Mitochor lgi comp icuoles,	ndria lex,	,	K1- K4	6
IV	Cell cycle and Meiosis. Cell s membrane traf	cell signaling: Cel ignaling- types- C fic. Cellular Senes	ll Cycle, cell rece scence a	, Mitosis, ptors, Ce nd Apopt	ll osis		K1- K4	8
v	Specialized cel flagellar mover conduction, Mu	ls: Motile cells (a ments), Nerve cell uscle cells and mu	moeboid s and ne scle cor	l, ciliary, erve impu atraction.	ılse		K1- K4	7
	CO1: Label the	plant cell.					K1	
	CO2: Describe photorespiratio	the process of pho on.	otosynth	esis and			K2	
Course Outcome	CO3:Demonstr	ate nitrogen fixati	on in pla	ints.			K3	
	CO4:Illustrate germination an	about the plant gr d seed dormancy.	owth th	rough see	d		К3	]
	CO5: Explain h	normones and seco	ndary m	etabolite	s of		K2	

.

-

-

		Le	arning Re	sources						
Text Books	1. Cell Biology 2. The Cell, a r press, Washing 3. Cell and Mo	y by T. Dev nolecular a gton. lecular Bio	asena, 2012 pproach by logy by Ge	2, Oxfor Geoffro rald Ca	rd Univers ey M Coo rp, 3rdEdi	sity p per, 5 tion,	ress. 5 th 1 2002	Edition, 2, John	2009, wileya	, ASM & sons.
Reference Books	1. VK Agarwa 4/e S Chand & 2. Cell and Mo 3. Plant Bioche Biochemistry:	l and PS Va Company, decular Bio emistry: De K.N. P. Sir	arma Cytole New Delh logy by Pra y P. M. Ha ngh, Agrote	ogy (Ce i. akash S rbone J. ch Press	ll Biology Lohar, 20 B., 1st Eo s, 2014	or and 07, N d. 199	Mol 1JP j 97. 4	ecular E publishe . Advar	liolog ers. Ices Ir	y), 2000 n Plant
Website Link	1. https://onlin 2.https://nptel. 3. https://nptel	ecourses.np ac.in/course .ac.in/cours	otel.ac.in/nc es/1021030 ees/1021080	bc22_bt 12 )86	18/					
	L-Lecture	T- Tutorial	P- Practical		C- Credit					

•

~ ~

		5.20	Blochem	stry syllabus	LUCT-LBCS	with effect	1200 2021-1	2022 Unward	S			
Course Code	Course Titl	ð			Course	e Type	Sem	Hours	-	H	đ	U
21M3UBCS01	CELL BIOLO	GY			SEC	<del>.</del>	H	£	ε			2
CO-PO Mapping												
CO Number	P01	P02	P03	P04	PO5	PS01	PS02	PSO3	PSO4	PSO5		
60	s	s	s	S	S	s	¥	S	s	s		
C02	s	_	¥	W	¥	s	S	L .	¥	W		
CO3	s	S	s	¥	¥	S		۲	s	s		
C04	s		¥	s	s	S	s	S	¥	v		
COS	s	s	s	S	×	s	S	s	S	s		
Level of Correlation between CO and PO	R-LOW	M-ME	MUId	S-STRONG								
Tutorial Schadula												
Teaching and Learnin	ig Methods				Chalk and t	alk method,	PPT Classes,	. Smart classr	moo.			
Assesment Methods					Assignment	, Class test,	Unit test, In	ternal exams	, Seminars,	Attendanc	e	
					Designed By			Verified By			Approved E	Ā
				Silent	k		N. C.	abana	Re.	, A	9. V	Š
				0-0	mbi l'u				ml-			

.



B.Se	c-Biochemistry Syllabus	LOCF-CBCS wit	th effect	from 20	21-2	2022	Onwards		
Course Code	Course Title	Course Type	Sem	Hours	L	Т	<b>P</b>	С	
21M3UBCN01	FUNDAMENTALS OF HUMAN PHYSIOLOGY	NMEC - I	m	2	2			2	
Objective	To educate non-biosc of physiology of huma	ience students abo an anatomy and to	out hum o provi	an syster de know	n, ei ledg	nph e on	asize fundan neuronal ne	nentals twork.	
Unit		Course Content					Knowledge Levels	Sessions	
I	Digestive System: O process of digestion, carbohydrates, protei	verview of the dia absorption of ins and fats.	gestive	system,			K1- K2	4	
Ш	Respiratory System: transport and exchan	Overview of the ge of gases.	respirato	ory syste	m,		K1-K2	4	
Ш	Cardiovascular Syste structure and functio	em: overview of c n of heart.	ardiova	scular sy	vster	n,	K1- K2	4	
IV	Renal System: Kidne glomerular filtration, reabsorption and sec	of	K1- K2	4					
V	Nervous System: Cla of neuron, Action po transmission at synaj	Nervous System: Classification of nervous system, Structure of neuron, Action potential, signal transmission at synapse, neurotransmitters.							
	CO1: Describe about biomolecules	digestion and abs	orption	process	of		К2		
	CO2:Illustrate the re- exchange of gaseous	spiratory system a	nd mec	hanism o	f		K2		
Course Outcome	CO3:Implement the a structure and functio	wareness on card ning of heart	iovascu	lar systei	n,		К3		
	CO4:Outline the urin kidney.	e formation and e	xcretion	throug	1		K4		
	CO5:Obtain an immi	nent knowledge a	bout nei	rvous sys	tem		K2		

• 45

<u> </u>		Learni	ng Resour	ces					
Text Books	<ol> <li>Essentials of Medi</li> <li>Edition, 2012</li> <li>Human Physiology</li> </ol>	cal Physiol	ogy by K. S e C. 11th ec	Sembulin lition M	ngam an edical ag	d Prem gency a	aSembu Illied, Ca	lingam alcutta.	, 6th
Reference Books	<ol> <li>Principles of Anata &amp;Sons, Inc.</li> <li>Text book of medi</li> <li>Human body, Atla</li> <li>Review of medical book.</li> </ol>	omy and Ph cal physiol s, Publicati l physiolog	ogy, A.C. C on Garden o y, William.	y Tortor Guyton 1 cheers. F. Ganc	a and Gr Oth editi ong, 14th	abows on. editio	ki, 2003 n, A Lar	, John V nge Me	Wiley dical
Website Link	1. https://nptel.ac.in/o 2. https://onlinecours 3.https://www.digima	courses/102 es.nptel.ac. at.in/nptel/o	2104058 in/noc20_b courses/med	t42/prev lical/phy	view /siology/	⁄PY11.	html		
	L-Lecture	T- Tutorial	P- Practical		C- Credit				

		B.Sc	-Biochem	istry Syllabu	5 LOCF-CBCS	with effect	from 2021-2	2022 Onward	s	2		
Course Code	Course Titl	9			Cours	e Type	Sem	Hours		۴	•	υ
21M3UBCN01	FUNDAMEN	TALS OF HI	UMAN PHY	SIOLOGY	W		E	8	2		÷	Ч
CO-PO Mapping												
CO Number	P01	P02	PO3	P04	PO5	PS01	PS02	PS03	PSO4	PSO5		
C01	s	٤	٤	s	٤	¥	S	S	s	s		
C02	s	s	٤	×	×	s	¥	۶	¥	٤		
CO3	s	٤	s	¥	s	×	¥	٤	۶	٤		
C04	s	٤	Σ	×	٤	۶	٤	٤	×	٤		
CO5	s	٤	٤	z	٤	٤	×	٤	٤	٤		
Level of Correlation between CO and PO	R-LOW	M-ME	EDIUM	S-STRONG								
<b>Tutorial Schedule</b>												
Teaching and Learnin	g Methods				Chalk and t	talk method,	PPT Classes,	, Smart class	_oom			
<b>Assesment Methods</b>					Assignment	:, Class test,	Unit test, In	ternal exams	, Seminars,	Attendance	Ð	
					Designed By			Verified By			Approved By	
				2.5 2.5	HARAJ	5 AN	N.S	hchene	Regin	Y'	۹. ۲.	<u>s</u>

.



B.Sc.,-Bi	iochemistry Syllal	ous LOCF-CBCS	with ef	fect fro	m 2	2021	-2022 Onwa	ards
Course Code	Course Title	Course Type	SEM	Hours	L	т	Р	С
21M4UBCC04	BIOENERGETICS AND INTERMEDIARY METABOLISM	DSC THEORY - IV	IV	6	6			5
Objective	To understand th oxidative pathwa to gain knowledg Phosphorylation	ne principles of c ays of carbohydra ge on mitochond	cellular ates, L rial Ele	energy ipids, Pr ctron tra	me ote ans	tabo ins { port	lism, schema t Nucleic aci chain and O	atize the ds and xidative
Unit		Course Conter	nt				Knowledge Levels	Sessions
I	Introduction to r reactions. Bioen thermodynamics free energy, oxic potential, High e	netabolism: Type ergetics- Princip , concepts of fre dation-reduction energy phosphate	es of m les of ee ener reacti e comp	etabolic gy, stan ons, red ounds.	: daro ox	d	K1-K2	15
II	Biological oxidat Transport Chain: production, inhil phosphorylation: chemiosmotic th phosphorylation shuttle system.	ion: Mitochondri electron carrier bitors of ETC, Ox -the structure of eory, inhibitors and uncouplers,	al Elec rs, site tidative of ATPa of oxid Mitoch	tron s of ATP e se comp ative nondrial	olex	,	KI-K2	12
111	Carbohydrates M Glycolysis, Glyco acid cycle, and C pathways: HMP p acid pathway.	nic	KI-K3	13				
IV	Lipid Metabolism Oxidation of fatt oxidation, and o acids with the or Ketogenesis. Bio unsaturated fatt of triacylglycero degradation of c	n cy acids - Beta ox mega oxidation. dd number of ca synthesis of satu y acids. Biosynth l and phospholip holesterol	kidation Oxidat rbon at Irated 1 nesis ar rids. Bio	n, alpha tion of fa toms. fatty aci nd degra psynthes	atty ds a dat is a	and ion nd	K1-K4	15
V	Protein Metaboli Oxidative, Non-o decarboxylation Creatinine forma Nucleic acid Met of purine and py	ism, Degradation oxidative, deami of amino acids, ation. abolism Biosynth rimidine nucleot	i of pro nation Urea C nesis ai tides	teins, and ycle and nd degra	l dat	ion	КІ-К4	15
	CO1:Understand pathways	d the basic prine	ciples o	of metal	ooli	с	K1	
Course Outcome	CO2:Compreher	nd carbohydrate	e metal	oolism a	nd	its	K2	]
	CO3:Relate the oxidation proce	big picture abo	ut the	biologic	al		K3	

	CO4:Value the concepts of lipid metabolism and amino acid metabolism and urea cycle	K4	
	CO5:Defend the concepts of nucleic acid metabolism	K4	
	Learning Resources		
Text Books	<ol> <li>Fundamentals of Biochemistry, J.L. Jain, S. Chand p</li> <li>Biochemistry, Lubert Stryer, 4th edition, W.H. Freer</li> <li>Fundamentals of Biochemistry (1999) - Donald Voet, Charlotte W Pratt, John Wiley &amp; Sons, NY.</li> </ol>	ublications, nan & Co, 19 Judith G.Vo	2004. 195. et and
Reference Books	<ol> <li>Lehninger's Principles of Biochemistry (2000) - Nelso M.M. Macmillan / Worth,NY.</li> <li>Harper's Biochemistry Robert K. Murray, Daryl K. Gra Mayes, Victor W. Rodwell, 24th edition, Prentice Hall I</li> <li>Principles of Biochemistry, Geoffrey L. Zubay, 3rd e Parson, Dennis E. Vance, W.C. Brown Publishers, 1995.</li> <li>Principles of Biochemistry, David L. Nelson, Michael 4th edition, W.H. Freeman and company.</li> </ol>	n, David I. an anner, Peter nternational dition Williar 26 M.Cox, Lehn	nd Cox, A. . Inc. m W. ninger,
Website Link	1. www.biosciencenotes.com 2. https://microbenotes.com/		
L-Lecture	T-Tutorial P-Practical C-Credit		

×

B.Sc.,-I	Biochemistry Syllabus LC	CF-CBCS with	effect	from 2	021-20	22 Onv	vards	
Course Code	Course Title	Course Type	SEM	Hour s	L	Т	Р	С
21M4UBCC 04	BIOENERGETICS AND INTERMEDIARY METABOLISM	DSC THEORY - ·IV	IV	6	6			5

CO Number	P01	P0 2	P0 3	P04	P0 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	M	S	M	S	M	S	M	S	M
CO2	S	Μ	M	M	S	M	S	M	M	M
CO3	S	Μ	S	S.	M	S	S	M	S	M
CO4	S	M	M	M	S	M	S	M	M	M
CO5	S	M	S	M	S	M	S	M	S	M
Level of Correlation between CO and PO	L- LO W	۸ Med	۸- DIUM	S- STRON G						1

Tutorial Schedule	<ul><li>1.Group discussion</li><li>2.Flash cards</li><li>3.Listening skills</li><li>4.Roll play</li></ul>
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assessment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

Designed By	Verified By	Approved By
M. Dei	MAP	A. r. Dar



Code	Course Title	Course Type	SEM	Hours	L	Т	Р	C
21M4UBCS02	PLANT BIOCHEMISTRY	SEC - II	IV	2	2			2
Objective	To understand all compartmen biosynthetic pa metabolites and	plant cell structu ts of the plant c thways in plants d their role in m	ell, the and to edicine	l specific e mecha gain kn e.	c bi nisi Iow	ioch n o ledi	emical func f photosynth ge about sec	tions to lesis and condary
Unit		Course Conte	nt				Knowledge Levels	Session
I	Physiology of Pla Plant cell wall, Ascent of sap. T Mechanism and	ants: Mechanism of wa ranspiration-type factors affecting	iter abs es, Stor transp	orption, natal ope iration.	enir	ng,	K1- K2	5
II	Photosynthesis: Photosynthetic a reactions - cycli Calvin cycle, Ph Glyoxylate cycle	a, Photosynthetic c and non-cyclic otorespiration, C e.	c pigme Phosph 4 plant	ents, Ligh Iorylation Is, CAM p	nt n, olan	ts.	КІ-К2	5
III	Nitrogen Metabo Nitrogen in soil, fixation: - No bi fixation, bioche nitrogen fixation phosphorus cycl	blism and Nitroge nitrate reductio ological and biolo mistry of symbio n, nitrogen cycle e.	en Cycle n in pla ogical r tic and , sulpho	e: ants, Nitr nitrogen non sym ur cycle,	oge bio	en tic	К1-К3	5
IV	Plant Hormones Chemistry, bios of action and pl Gibberellins, Cy	Plant Hormones: Chemistry, biosynthesis, storage, distribution, mode of action and physiological effects of Auxins, Gibberellins, Cytokinins, ABA and Ethylene.					K3- K4	5
V	Medicinal plants Medicinal value and secondary r identify them. S Phenols, flavone their roles in al Amla, Stevia, A	s and secondary r of different part netabolites. and Secondary metab olds and nitrogen ternative medicir swagandha and T	netabo s of pla Basic n olites: ous con ne. Mec urmeri	lites: ants. Prir nethods Terpene: npounds licinal va c.	nar to s, and	y d e of	KI-K5	5
	CO1: Understa	nd the plant cell	physic	logy.			K1	
	CO2: Demonstr and photorespi	ate the process ration.	of pho	tosynthe	esis		K2	
Course Outcome	CO3: Demonstr	ate nitrogen fixa	ation ir	n plants.			К3	
	CO4: Select the germination an	e plant growth th d seed dormanc	nrough y.	seed			K4	
	CO5: Construct metabolites of	hormones and s plants.	second	ary			K4	

	Learning Resources
Text Books	<ol> <li>Textbook Of Plant Physiology, Biochemistry And Biotechnology, Dr. S. K. Verma &amp; Mohit Verma,, S Chand &amp; Co Ltd</li> <li>Pandey, S. N. and Sinha, B. K. 1999. Plant Physiology. [Third Edition]. Vikas Publishing House Pvt. Ltd., Pune.</li> <li>Chawla, H. S. 2002. Introduction to Plant Biotechnology. [Second Edition]. Science Publishers, USA.</li> </ol>
Reference Books	<ol> <li>Plant Biochemistry: Hans-Walter Heldt &amp; Heldt, 4th Ed. 2010.</li> <li>Biochemistry &amp; Molecular Biology of Plant: Bob B. Buchanan, Wilhelm Gruissem, Russell L. Jones, 2nd Ed. 2015.</li> <li>Plant Biochemistry: Dey P. M. Harbone J. B., 1st Ed. 1997. 4. Advances In Plant Biochemistry: K.N. P. Singh, Agrotech Press, 2014</li> </ol>
Website Link	<ol> <li>https://nptel.ac.in/courses/102105058</li> <li>https://pravara.in/wp- content/themes/twentyseventeen/essentials/pdf/elearn/Principles-of- Plant-Biotechnology.pdf</li> </ol>
L-Lecture	T-Tutorial P-Practical C-Credit

B.Sc.,-	Biochemistry Syllabus LOO	CF-CBCS with	effect	from 2	021-20	22 Onv	vards	
Course Code	Course Title	Course Type	SEM	Hour	L	т	Ρ	С
21M4UBCS 02	PLANT BIOCHEMISTRY	SEC - II	IV	2	2			2

CO Number	P01	P0 2	P0 3	P04	P0 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
C01	S	S	S	S	S	S	Μ	S	Μ	S
CO2	м	L	м	Μ	Μ	S	S	L	Μ	м
CO3	S	Μ	S	Μ	Μ	S	L	M	S	S
CO4	M	L	M	S	S	Μ	S	S	M	Μ
CO5	S	S	Μ	S	Μ	S	M	S	M	S
Level of Correlation between CO and PO	L- LO W	۸ MED	n- Dium	S- STRON G				•		

Tutorial Schedule	1.Group discussion 2.Flash cards 3.Listening skills 4.Roll play
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assessment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

Designed By	Verified By	Approved By
J. Amthat.	WERP	Ar h. 5 m



B.Sc.,-Bi	ochemistry Syllabus	LOCF-CBCS	with e	ffect fro	m 2	2021	-2022 Onwa	ards		
Course Code	Course Title	Course Type	SEM	Hours	L	Т	Р	с		
21M4UBCP02	ENZYMES AND PHYTOCHEMISTRY	DSC PRACTICAL - II	IV	3+3			3	3		
Objective	To practice calorim separation technique components.	etric determ ues and to pr	inatio actice	ns, enzy extract	/me ion	ass anc	ays and mol l estimation	ecular of plant		
S. No.	List of Ex	List of Experiments / Programmes Knowledge Levels Session								
1	1. Isolation and puri (saliva/potato/whea	fication of Ar at)	nylase				KI-K2	7		
2	<ol> <li>Determination of</li> <li>Determination of</li> <li>Determination of</li> <li>substrate concentra</li> </ol>	optimum pH Km and Vma optimum ten tion of saliva	of sali x of sa nperat ry amy	vary am livary ar ure and lase	ylas nyla	e ise	KI-K2	15		
3	5. Isolation of sub-c	ellular organe	elles.				KI-K3	8		
4	6. Study of various s preparation of Onio	stages of mito n root tips	osis usi	ng cytol	ogic	al	K1-K4	15		
5	<ol> <li>7. Estimation of chl</li> <li>8. Extraction of Pec</li> <li>9. Extraction of Caf</li> </ol>	orophyll in le tin from oran feine from te	aves Ige pee a	el			KI-K5	15		
	CO1:Know about an separation and pur	nalytical tech ification of e	nnique nzyme	s of es			K1			
	CO2:Analyse the er	nzymes by co	olorime	eter			К2			
Course Outcome	CO3:Know about co	K3								
	CO4:Extraction of	olant materia	als				K4			
	CO5:To analyse the quantitatively	e secondary r	netabo	olites			K5			
		Learning Re	source	es						
Text Books	<ol> <li>Practical clinical</li> <li>1980. Fifth Edition.</li> <li>Biochemical Meth International privat</li> <li>A Text book of privat</li> <li>Plant Biochemist</li> <li>Biochemical meth Eastern Limited, Netherical</li> </ol>	biochemistry CBS publishe nods. II Editio e Ltd Publishe ractical bioch ry - Practical hods, S. Sada w Delhi.	, volur rs. n. Sad ers. emistr . C.C. sivam	ne I and asivam. y. David Giri & Ar and A. <i>N</i>	II- S ar Plu rcha Iani	Hard Ind M Imm Ina ( ckar	old Varley, et anickam, A I er Giri. n 1992. Wille	t al., New Age Py		

Reference Books	<ol> <li>Laboratory techniques in Biochemistry and Molecular biology, Copyright 2017. Ed. T.S. Work and E.Work., 1969. Vol I &amp; II, Elsevier.</li> <li>A Biologist's guide to principles and Techniques of Practical Biochemistry, Modern Experimental Biochemistry Boyer, R III Edition, Benjamin Cummings Publishers.</li> <li>Enzymes Structure and Mechanism, AlnFessht 1997.</li> </ol>
Website Link	<ol> <li>https://ncert.nic.in/pdf/publication/science laboratory manuals/</li> <li>https://srjcstaff.santarosa.edu/~jfassler/chem60/</li> </ol>

B.Sc.,-I	Biochemistry Syllabus LOC	F-CBCS with	effect	from 2	021-20	)22 Or	nwards	
Course Code	Course Title	Course Type	SEM	Hour s	L	т	Р	С
21M4UBCP 02	ENZYMES AND PHYTOCHEMISTRY	DSC PRACTICA L - II	IV	3+3			3	3

CO Number	P01	P0 2	P0 3	P04	P0 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	L	S	м	S	M	M	S	Μ	Μ
CO2	M	S	Μ	S	Μ	S	M	S	M	S
CO3	S	м	L	м	S	Μ	S	. W	S	S
CO4	M	S	Μ	S	Μ	S	м	S	м	Μ
CO5	S	M	м	M	S	M	м	S	M	S
Level of Correlation between CO and PO	L- LO W	A MED	n- Dium	S- STRON G						

Tutorial Schedule	Problem solving and group discussion
Teaching and Learning Methods	Explanation of Practical procedure and Demonstration of experiments
Assesment Methods	Observation, Performance, Attendance

Designed By	Verified By	Approved By
of Rub	Wer	y. r. par



B.Sc	-Biochemistry Syll	abus LOCF-CBCS	with ef	fect from	202	1-202	2 Onwards				
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Р	0			
21M1UBCA0 1	ALLIED BIOCHEMISTR Y I	GEC THEORY - I	I	4	4			4			
Objective	To understand t biomolecules, en properties and b	he simple and mole zymes and vitamins piological importance	cular st s and to ce of bio	ructure o gain kno molecule	of the owlee s.	e diff Ige tl	erent types o he physicoch	of emic			
Unit		Course Content									
I	Carbohydrates: Monosaccharide structural isome Oligosaccharide and importance Polysaccharides homopolysaccharides	Carbohydrates: Classification of carbohydrates, Aonosaccharides: - Structures, Stereoisomers and tructural isomers, mutarotation, and chemical properties. Oligosaccharides: - Dissaccharides-structure nd importance of sucrose, Lactose, maltose, Polysaccharides: - Structure and significance of omopolysaccharides and heteropolysaccharides.									
П	Amino Acids: S acids, Essential properties of am Protein: Classifi involved in prot organization: - p structures with o	Amino Acids: Structures and Classifications of amino acids, Essential and Non-essential amino acids, properties of amino acids. Protein: Classification and functions of proteins, bonds nvolved in protein structure, structural levels of organization: - primary, secondary, tertiary and quaternary									
ш	<ul> <li>Enzymes: Holoenzyme, Apoenzyme, coenzymes, cofactors/prosthetic groups, IUB classification of enzymes with example. Active site: - characteristic features and theories of ES compex, enzyme units, Enzyme kinetics: - MM equation and LB plot, factors affecting enzyme activity.</li> <li>Lipids:Classificationsoflipids, physical and chemical properties offats,structure and functions of saturated and unsaturated fatty acids.</li> <li>Nucleic Acids: Nitrogenous bases, structures of Ribonucleotides and deoxyribonucleotides, structure and functions of DNA and RNA.</li> </ul>						K1- K2				
IV							K1- K2				
V	Vitamins: Sourc deficiency disor Vitamins. Minerals: Sourc Phosphorus, Ca	Vitamins: Sources, RDA, biochemical functions, deficiency disorders of fat soluble and water-soluble Vitamins. Minerals: Sources, Biological importance and disorders of Phosphorus, Calcium, Magnesium and Iron.						1			
Course	CO1:Describe st	ructures, propertie	s and fu	inctions o	of		K2				
Outcome	CO2:Explain the	K2	1								

,

ę. \*

	CO3:Illustrate th enzymes and fact	ne nomeno tors affect	clature and ting their a	d identi action v	fy the cla vith kinet	isses ics	of	K	3	
	CO4:Demonstration lipids and Nuclei	te about t c acids wi	he structu ith their in	re and nportai	propertie 1ce	es of		К3		
	CO5:Describe about source, importance and deficiency disorders of vitamins and minerals								2	
		Lea	rning Res	ources						
Text Books	1. Lehninger's Pri M.M.Macmillan/ 2. Fundamentals ( W Pratt, John Wil 3. Biochemistry (2)	nciples of worth,NY. Df Biocher ey&Sons, 2013) by U	Biochemist mistry (199 NY. J.Satyanara	try(2000 99) by E ayana ar	)) byNelse Donald Vo nd U. Cha	on,Da oet, Ju ukrapa	avid udith ani, 4	I. andC G.Voe th edit	cox, et and ion, I	Charlotte Elsevier
Reference Books	1. Biochemistry4t 2. Principles of B 3. Text book of bi publication, New	<ol> <li>Biochemistry4th edition (1988) byZubayGL, WMCBrown Publishers.</li> <li>Principles of Biochemistry (1994) Garrette&amp; Grisham, Saunders college publishing.</li> <li>Text book of biochemistry (1997) 4th edition Thomas M devlin, A John Wiley, Inc publication, New York.</li> </ol>								
Website Link	1.http://en.bookfi. 2. 1.https://www.j NANO/Course/20 3. https://nptel.ac. 4. https://onlineco	net/ phys.sinica 10_Spring in/courses purses.npte	a.edu.tw/T g/Classnote s/10410312 el.ac.in/noc	IGP cs/AAC 21 20_cy0	_lehninge 7	er4e_	ch03	%20(P	roteir	ı).pdf
	L-Lecture	T- Tutorial	P- Practical		C- Credit					

~

× •

		0.35		כחתוםוולכ ל ווכו		אורוו כווברר ו		0 17 01 Mai 0	٥			
Course Code	Course Titl	•			Course	Type	Sem	Hours	, T	F	a	υ
21M1UBCA01	ALLIED BIO(	CHEMISTRY	_		GEC TH	EORY - I	1	4	4			4
CO-PO Mapping												
CO Number	P01	P02	P03	P04	PO5	PS01	PSO2	PSO3	PSO4	PSO5		
C01	s	S	s	٤	¥	٤	٤	٤	×	×		
C02	s	٤	z	٤	¥	s	z	s	٤	۶		
CO3	s	٤	s	٤	s	z	s	¥	s	s		
C04	s	٤	z	۶	¥	z	٤	¥	٤	۶		
CO5	s	٤	×	¥	¥	¥	¥	¥	٤	₹		
Level of Correlation between CO and PO	R-LOW	M-MĒ	MUID	S-STRONG								
<b>Tutorial Schedule</b>												
<b>Teaching and Learnin</b>	ig Methods				Chalk and t	alk method,	PPT Classes,	. Smart classr	moo			
<b>Assesment Methods</b>					Assignment	, Class test,	Unit test, In	ternal exams	, Seminars,	Attendanc	e	
					Designed By			Verified By			Approved I	By
				R. A.	jer.		2	. 10			, r	
				ן גע גע		, ,		Kana	re Been	Í T	5	t

د

.



B.Sc.,-Bi	ochemistry Sylla	bus LOCF-CBCS v	with ef	fect fro	m 2	2021	I-2022 Onwa	ards	
Course	Course Title	Course Type	SEM	Hours	L	Т	Р	С	
21M2UBCA02	ALLIED BIOCHEMISTRY II	GEC THEORY - II	11	4	4	-	-	4	
Objective	To learn bioche energy product properties and	emical technique ion and to gain k biological import	s, met nowle tance (	abolism dge the of horm	of ph one	bio ysic s.	molecules a ochemical	nd	
Unit		Course Conter	nt				Knowledge Levels	Sessions	
I	pH and Buffers: Definition and c Hasselbalch equ Biochemical Tec of paper and th	Definitions for Ad letermination of p lation, Buffer syst chniques: Principl in layer.	cids an oH, He cems of es and	d bases, nderson f human Applica	pH - bod tior	:- y. ns	K1- K2	9	
11	Carbohydrate M cycle, gluconeo HMP shunt.	etabolism: Glycol genesis, glycogen	lysis, C metal	itric aci oolism a	d nd		K1- K2	9	
III	Bioenergetics: F chain, Oxidative uncouplers of o compounds.	Bioenergetics: Redox potential, Electron transport chain, Oxidative phosphorylation, inhibitors of ETC, uncouplers of oxidative phosphoryation, High energy compounds.K1- K39							
IV	Lipid Metabolisi Biosynthesis of Interrelationshi between carbol metabolism. Protein Metabo non-oxidative d	Lipid Metabolism: Beta and omega oxidation, Biosynthesis of Saturated fatty acids. Interrelationship between carbohydrates, proteins and fat metabolism. Protein Metabolism: Transamination, oxidative and							
v	Introduction to and Biological s mechanism of h Second Messens and Ca2+	Hormones: Defini ignificance of hor ormone action. gers: - Role of cAM	MP, cG	MP, IP3,	atio	on G	K1- K4	9	
	CO1: Understa of human body in handing vari	nd the basics of a and gain and de ous chromatogra	acid - I velop phic t	base bal compete echniqu	anc enc es.	e e	K1		
	CO2: Describe knowledge abo	carbohydrate me out Diabetes mell	etaboli itus.	sm and	gai	n	K2		
Course	CO3: Learn bas mechanisms of	sic concepts of B oxidative phosp	ioener horyla	getics, tion.			К3		
outcome	CO4: Describe amino acid me	the concepts of l tabolism.	lipid m	netaboli	sm	and	K4		
	CO5:Gain know classification a and to demons	vledge about the nd mechanism o trate various typ	basic f actio	termino n of hor	log mo	ies, nes	K4		

	1. Biochemistry (2013) by U.Satyanarayana and U. Chakrapani, 4th edition,
	Elsevier
Text	2. Principles and techniques of practical Biochemistry, Keith Wilson and
Books	John Walker, 1995.Cambridge UniversityPress
	3. Biophysical chemistry Principles and Techniques- Avinash Upadhyaye and
	Nirmalendhe Nath, Himalaya Publishers.
	1. Fundamentals of Biochemistry (1999) by Donald Voet, Judith G.Voet and
	Charlotte W Pratt, John Wiley&Sons, NY.
Peference	2. Outlines of Biochemistry (1987) by Eric E. Conn, P.K. Stumpf, G. Brueins and
Books	RayH.Doi, JohnWiley& Sons, NY.
DOOKS	3. Biochemistry3rd (1994) byLubertstryer,WH freeman and co, Sanfrancisco.
	4. Text book of biochemistry (1997) 4th edition, Thomas M
	devlin,AJohnWiley,In
	1. www.biosciencenotes.com
Website	2. https://microbenotes.com/
Link	3. http://en.bookfi.net/
L-Lecture	T-Tutorial P-Practical C-Credit

B.Sc.,-	Biochemistry Syllabus LOC	F-CBCS with	effect	from 2	021-2	022 On	wards	
Course Code	Course Title	Course Type	SEM	Hour s	L	Т	Р	С
21M2UBCA 02	ALLIED BIOCHEMISTRY II	GEC THEORY - II	11	4	4	-	-	4

CO Number	P01	P0 2	P0 3	P04	P0 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
C01	S	Μ	M	м	L	M	S	M	Μ	M
CO2	M	Μ	M	M	Μ	S	Μ	M	S	M
CO3	S	S	M	S	Μ	M	м	S	Μ	Μ
C04	M	M	S	M	S	M	м	L	M	S
C05	S	м	M	M	S	M	L	M	M	м
Level of Correlation between CO and PO	L- LO W	۸ MED	n- Dium	S- STRON G						1

Tutorial Schedule	1.Group discussion 2.Flash cards 3.Listening skills 4.Roll play
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assessment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

Designed By	Verified By	Approved By
FR	MRP	A- h: sam



<b>B.Sc-Biochemis</b>	try Syllabus LOCF-CBCS	with effect from 2	2021-2	022 Onw	ard	S		
Course Code	Course Title	Course Type	Sem	Hours	L	Т	Р	С
21M2UBCAP01	ALLIED BIOCHEMISTRY PRACITCAL	GEC PRACTICAL - I	II	3+3			75	3
Objective	To have hands on expo and understand the se	erience on qualita eperation techniqu	tive an 1es.	alysis of	bio	mol	ecules and	d to learn
S.No.	List of Experiments / l	Programmes				Kn Le	owledge vels	Sessions
1	I. QualitativeAnalysis a. Analysis ofcarbohydr b. Analysis ofAmino acio	ates ds				K2		15
2	c. Test for proteins d. Test for lipids – chole	sterol				K2		15
3	II. Biochemical preparat a. Starch from Potato b. Casein from milk c. Lecithin from egg yoll	tion K				K2		15
4	III. QuantitativeAnalysis a. Reducing Sugar –Ben b. Amino acid – formal t c. Ascorbic acid – using method.	s edict'smethod itration 2, 6 Dichloro phenc	olIndop	henol		K2		15
5	IV. Techniques a. Separation of sugar & chromatography b. Separation of lipid by	amino acid by pap	er cograph	У		K2		15
Course	CO1:Analyse biomoleo	cules for qualitativ	ve stud	y		K2		
Outcome	CO2:Learn about biocl aminoacids.	hemical preparati	on of s	ugars an	d	K2		
	CO3: Qualitative analy	rses of proteins an	d lipid	s		K2		
	CO4: Quantify the bior	nolecules				K2		
	CO5: Experimententat	ion of chromatog	raphy	techniqu	es			
Learning Resou	irces							
Text Books	<ol> <li>Biochemical Methods</li> <li>Age International Publis</li> <li>Laboratory Manual in publishers, New Delhi.</li> </ol>	1992, by S.Sadasiv shers, New Delhi. 1 Biochemistry, 198	am and 1. J.Jaya	A. Manic araman, N	kan Iew	n, Se Age	cond Editio Internatio	on, New mal
Reference Books	1. Introductory practica Science International pu	l Biochemistry (20) Iblishers, 2ndEditio	05), by on.	S. K. Sawl	hney	y and	d Radhir si	ngh, Alpha
Website Link	1. https://ncert.nic.in/p 2. https://nptel.ac.in/co	odf/publication/scio ourses/102103016	ence lal	poratory	man	uals	;/	

B.Sc-Biochemi	stry Sy	llabu	s LOCI	F-CBCS wit	h effe	ct from	2021-20	)22 Onw	ards				
Course Code	Cour	se Titl	le		Cour Type	rse e	Sem	Hour s	L	Т	Р	C	
21M2UBCAP0 1	ALLII PRAC	ED BIC CITCAL	CHEM	ISTRY	GEC PRA L - I	CTICA	II	3					
CO-PO Mappin	g												
CO Number	P01	P0 2	P0 3	P04	P0 5	PS0 1	PSO2	PSO3	PSO 4	PSO 5			
C01	S	L	S	S	S	S	S	S	S	М			
CO2	М	S	S	S	М	S	М	S	М	S			
CO3	S	S	L	М	S	S	S	М	S	S			
CO4	S	S	S	S	М	S	М	S	S	М			
CO5	S	М	S	М	S	S	S	S	М	S			
Level of Correlation between CO and PO	L- LO W	M- MED	DIUM	S- STRON G									
Tutorial Sched	lule	1	1		Problem solving and group discussion								
Teaching and	Learni	ng Me	ethods	5	Expl expe	Explanation of Practical procedure and Demonstration of experiments							
Assessment Me	thods				Obse	ervation	, Perform	ance, Att	tendanc	e			
				Designe	d By		Verifie	d By		Appro	oved By		

	B.Sc-Biochemistr	y Syllabus I	OCF-CBCS wit	h effect	from 2021	-2022	Onw	ards	
Course Code	Course Title	Coι	ırse Type	Sem	Hours	L	Т	Р	С
21M3UBCN0 1	FUNDAMENTALS ( HUMAN PHYSIOLOGY	)F N	IMEC - I	III	2	2			2
Objective	To educate non-bi physiology of hun	oscience stu an anatomy	idents about l and to prov	ide kno	system, em wledge on 1	phasizo neuror	e fun Ial n	damentals o etwork.	of
Unit		Co	ourse Content					Knowledg e Levels	Session s
I	Digestive System: C absorption of carbo	verview of t hydrates, pr	he digestive sy oteins and fats	stem, pr	ocess of dig	estion,		K1- K2	4
II	Respiratory System exchange of gases.	: Overview o	of the respirato	ry syste	m, transport	t and		K1- K2	4
III	Cardiovascular Sys function of heart.	em: overvie	w of cardiovas	cular sys	stem, structı	ire and		K1- K2	4
IV	Renal System: Kidn filtration, tubular re	ey and neph eabsorption	ron structure, 1 and secretion.	nechani	sm of glome	erular		K1- K2	4
v	Nervous System: Cl Action potential, sig	assification o gnal transmis	of nervous syst ssion at synaps	em, Stru e, neurc	otture of neu otransmitter	ıron, s.		K1- K2	4
	CO1: Describe about digestion and absorption process of K1- K2								
	CO2:Grasp the res	piratory sys	stem and mec	hanism	of exchange	e of		K1- K2	
Course Outcome	CO3:Gain awarene functioning of hea	ess on cardio rt	ovascular syst	em, str	ucture and			K1- K2	
	CO4:Understand t	he urine for	mation and ex	cretion	n through k	idney.		K1- K2	
	CO5:Obtain an im	ninent knov	wledge about	nervou	s system			K1- K2	
	I		Learning Reso	urces					
Text Books	1. Essentials of Mec 2. Human Physiolog	lical Physiolo gy, Chatterjeo	ogy by K. Semb e C. 11th editio	ulingam n Medic	and Prema al agency all	Sembul ied, Cal	linga cutta	m, 6th Editio a.	n, 2012
Reference Books	<ol> <li>Principles of Ana</li> <li>Text book of med</li> <li>Human body, Atl</li> <li>Review of medica</li> </ol>	tomy and Ph lical physiolo as, Publicatio al physiology	ysiology by To ogy, A.C. Guyton on Garden chee r, William. F. Ga	rtora an 1 10th e rs. nong, 1	d Grabowsk dition. 4th edition, <i>i</i>	i, 2003 A Lange	, Johi e Me	n Wiley &Son dical book.	s, Inc.
Website Link	1. https://nptel.ac.i 2. https://onlineco 3.https://www.dig	n/courses/1 urses.nptel.a mat.in/npte	02104058 c.in/noc20_bt4 l/courses/med	2/previ ical/ph	iew ysiology/PY	11.htm	l		
	L-Lecture	T-Tutorial	P-Practical		C-Credit				

B.Sc-Biochen	nistry S	yllab	us LO	CF-CBCS wi	ith e	effect f	from 202	21-2022 Or	nwards			
Course Code	Course	e Title	e		Ϲჿι Τッլ	irse De	Sem	Hours	L	т	Р	С
21M3UBCN01	FUNDA PHYSI(	AMEN OLOG	TALS ( Y	OF HUMAN	NM	EC - I	III	2	20			2
CO-PO Mappi	ing											
CO Number	P01	P02	P03	P04	P0:	5 PSO1	PSO2	PSO3	PSO4	PSO5		
C01	S	М	М	S	М	М	S	S	S	S		
CO2	S	S	М	М	М	S	М	М	М	М		
CO3	S	М	S	М	S	М	М	М	М	М		
CO4	S	М	М	М	М	М	М	М	М	М		
CO5	S	М	М	М	М	М	М	М	М	М		
Level of Correlation between CO and PO	L-LOW	M-M	EDIUM	S-STRONG	ſ							

Tutorial Schedule	1.Group discussion 2.Role play 3.Listening skills 4.Flash cards
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assesment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

Designed By	Verified By	Approved By

	B.Sc-Biochemisti	y Syllabus L	OCF-CBCS wit	h effect	from 2021	-202	2 On	wards				
Course Code	Course Title	Cour	rse Type	Sem	Hours	L	Т	Р	С			
21M4UBCN0 2	BIOCHEMISTRY IN NUTRITION	NM	1EC - II	III	2	2 0			2			
Objective	To create awaren significance of nu physiological char	ess on vario trients in me nges and in s	us nutrient co etabolic proce sports	ontent in ess and t	n food/food to study the	l regu e imp	ilatio ortai	n act / food sa nce of nutrien	afety, the ts during			
Unit		Со	ourse Content					Knowledg e Levels	Session s			
I	Nutritional Profile seeds, animal foods spices. Role of dieta fats, fiber and antic	of Foods: - Ce , milk and m ary carbohyd xidants	ereals, pulses, v ilk products, eg rates, proteins	vegetabl gg, fish, 1 ,	es, fruits, nu meat, drinks	ts, oil and		K1- K2	4			
П	Determination of ca Measurement of en specific dynamic ac influencing BMR. R obese.	Determination of calorific value of foods by Bomb calorimeter. Measurement of energy expenditure, respiratory quotients of food stuffs, specific dynamic action. BMR: - Measurement of BMR and factors influencing BMR. RDA for patients: - Anemic, Diabetic, Blood pressure and obese.										
III	Recommended die pregnant, lactating		K1- K2	4								
IV	Drug - nutrient Inte alcohol, tobacco, te Introduction and cl		K1- K2	4								
v	Nutritional therapy nutrition in the pre peptic ulcer, jaundi	cus,	K1- K2	4								
	CO1: Describe the biomolecules, fibe	nutritional er and antiox	profile of vari kidants	ous foo	ds and the	role o	of	K1- K2				
	CO2: Describe the BMR; RDA for var	techniques ious disorde	to measure ei ers.	nergy ex	xpenditure	and		K1- K2				
Course Outcome	CO3: Understand age group people	the recomm	ended dietary	' allowa	nces for di	fferei	nt	K1- K2				
	CO4: Gain awaren importance of nut	ess on drug raceticals.	– nutrient int	eractio	ns, food alle	ergy a	Ind	K1- K2				
	CO5: Obtain an im various metabolic	pending kno disorder	owledge abou	t nutrit	ional thera	py fo	r	K1- K2				
	1	]	Learning Reso	ources								
Text Books	1. Human nutrition 2. Human nutrition	by B. Srilaks and dietetics	hmi, New age l s, S. Davidson a	nternat nd J.R. F	ional Pvt Lto Passmore.	1, 200	9					
Reference Books	<ol> <li>Human nutrition</li> <li>Mechanism and t</li> <li>Modern nutrition</li> </ol>	and dietetics heory in food in health an	s, IS Garraw, W l chemistry, D d diseases, Wh	PT Jame NS Won ol and C	es, 10th edit g, CBS New Good hart.	ion. Delhi	, 199	5.				
Website Link	1. https://nptel.ac. 2. http://www.nitt 3. https://ciet.nic.in	n/courses/1 trc.edu.in/np n/swayam_Fl	26104004 tel/courses/vi NHL_module07	deo/12 7.php	6104004/L3	31.htr	nl					
	L-Lecture	T-Tutorial	P-Practical		C-Credit							

B.Sc-Biochen	nistry	Syllab	us LO	CF-CBCS w	vith e	effect f	rom 202	21-2022 Or	nwards			
Course Code	Course Title		Course Type		Sem	Hours	L	т	Р	С		
21M4UBCN02	BIOCH	HEMIS ITION	ΓRY IN	1	NM	EC - II	III	2	20			2
CO-PO Mappi	ing											
CO Number	P01	P02	P03	P04	P05	5 PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	S	М	S	М	М	S	S	М	М	М		
CO2	S	М	М	S	S	М	М	М	S	М		
CO3	S	М	М	М	М	М	М	S	М	M		
CO4	S	S	М	М	М	М	М	М	М	S		
CO5	S	М	М	М	М	М	S	М	М	М		
Level of Correlation between CO and PO	L- LOW	M- MED	IUM	S- STRONG								

Tutorial Schedule	1.Group discussion 2.Role play 3.Listening skills 4.Flash cards
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assesment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

Designed By	Verified By	Approved By	

	B.Sc-Biochen	nistry Syllabu	IS LOCF-CBCS	with ef	fect from 20	021-2	2022	Onwards				
Course Code	Course Title	Cours	е Туре	Sem	Hours	L	Т	Р	С			
21M3UBCN0 1	BIOCHEMISTRY AND HEALTH	NM	EC - I	IV	2	2 0			2			
Objective	To understand the different types of biomolecules, the common disorders of nutritional deficiency and to gain knowledge on the biological importance of micro nutrients.											
Unit		Co	ourse Content					Knowledg e Levels	Sessions			
I	Carbohydrate – So living organisms, N complications in h	Carbohydrate – Source of carbohydrates, Importance of carbohydrates in living organisms, Normal level of sugar in humans, Diabetes mellitus and its complications in human. Control and prevention of Diabetes mellitus.										
Ш	Proteins –Sources living organisms. M disease-Kwashiorl	roteins –Sources of proteins and amino acids. Importance of proteins in ving organisms. Normal level of proteins in human. Protein deficiency K1- K2 4 isease-Kwashiorkor and Marasmus, Protein quality.										
ш	Lipids - Source of fats and importance of fats and lipids in living organism and. Role of lipoproteins in human body. Normal levels of cholesterol hypercholesterolemia and role of cholesterol in Blood pressure. K1- K2 4 Atherosclerosis and myocardial infarctions. Prevention and control of heart related diseases.											
IV	Vitamins –Source of water soluble and fat soluble vitamins. Deficiency /disorders of Vitamins and importance of vitamins in humansK1- K24											
v	Minerals - Source and deficiency disorders of calcium, magnesium, sodium, potassium, phosphorus, Iron, Iodine in humans.											
	CO1:Summarize t awareness about	he sources, i Diabetes me	mportance of llitus.	carboh	ydrates and	d gaiı	1	K1- K2				
6	CO2:Understand their deficiency d	the importan lisorders.	ice of proteins	s in livi	ng organisn	n wit	h	K1- K2				
Outcome	CO3:Describe the disorders of lipid	sources and metabolism	importance o	of lipids	along with	the		K1- K2				
	CO4:Explain the s vitamins.	sources, RDA,	, importance a	and def	iciency disc	order	s of	K1- K2				
	CO5:Describe abo	out sources a	nd biological i	importa	ance of min	erals		K1- K2				
				, source								
Text Books	<ol> <li>Deb.A.C., Fundar</li> <li>Essentials of Bic</li> <li>Biochemistry by</li> </ol>	nentals of Bio ochemistry Sat y Ambika Shan	chemistry, Boc hyanarayanan mugam.	oks and .U. Bool	allied (p) Lt s and allied	d, 20( . (p) L	)2. td, 20	02.				
Reference Books	<ol> <li>Text book of Me</li> <li>Human Physiolo</li> <li>Food facts and p</li> </ol>	dical Physiolo gy by Chatter rinciples, Sha	gy – Guyton.A. jee. kuntala Manay	С.								
Website Link	1. https://onlineco 2. https://www.di 3. https://nptel.ac	ourses.swayan gimat.in/npte .in/courses/1	n2.ac.in/cec20 l/courses/mec 04105076	_ag01/p lical/bio	oreview ochemistry/	BC22	.html					
	L-Lecture	T-Tutorial	P-Practical		C-Credit							

I	B.Sc-Biochemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards												
Course Code	Cours	Course Title			Co T	urse ype	Sem	Hours	L	Т	Р	С	
21M3UBCN 01	BIOCH HEAL	IEMIS ГН	TRY A	AND	NMI	EC - III	IV	2	2	20		2	
СО-РО Марр	oing												
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5			
C01	S	М	S	М	М	М	М	М	М	М			
CO2	S	М	М	М	S	М	М	S	S	S			
CO3	S	М	М	S	М	М	S	М	М	М			
CO4	S	S	М	М	М	S	М	М	М	S			
C05	S	М	М	М	М	М	М	М	S	М			
Level of Correlation between CO and PO	L- LOW	MED	1- DIUM	S- STRONG									

Tutorial Schedule	1.Group discussion 2.Role play 3.Listening skills 4.Flash cards
Teaching and Learning Methods	Chalk and talk method, PPT Classes, Smart classroom
Assesment Methods	Assignment, Class test, Unit test, Internal exams, Seminars, Attendance

Designed By	Verified By	Approved By	

Course CodeCourse TitleCourse TypeSemHoursLTPCCourse CodeBIOCHEMISTRY IN DIAGNOSISNMEC - IIIV22222ObjectiveTo understand the different types of diagnostic tests in biochemistry, common techniques to collect, preserve and processing the biological samples and to gain knowledge on the enzyme asays.2UnitCourse Course ContentKnowledge LevelsSessio nsIApproaches to Clinical Biochemistry: Collection of clinical specimens, preservatives for blood and urine, transport of biological samples. Quality Control: Concepts of accuracy, precision, sensitivity and reproducibilityK1- K24IIHematology: Composition and functions of blood, Haemoglobin, PCV, ESR, RBC, WEG: and Platelet court. ESR and PCV.K1- K24IIIPhysical Examination of Urine: Volume, colour, appearance, specific gravity and pH. Chemical examination of urine: Qualitative tests for Reducing sugar, protein, kotone bodies, Bile pigment, bile sat, Urobilinogen, and mucin. Microscopic Examination or urine.K1- K24IVStool Examination: Collection of fecal specimens, preservation, physical examination: - volume, colour, adour and appearance. Chemical examination: - reducing sugar, protein, kotone bodies, Dire acid and Creatinine. Determination of Enzyme Activity. ST, ALT, ALP and LDH.K1- K24Course OutcomeCO1: Summarize the use of standard precedutos applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.K1- K24CO3: Become skilled		B.Sc-Biochen	nistry Syllabu	IS LOCF-CBCS	with eff	fect from 20	21-2	2022 (	Onward	s			
21M4UBC NO2         BIOCHEMISTRY IN DIAGNOSIS         NMEC - II         IV         2 <th2< th=""></th2<>	Course Code	Course Title	Cours	е Туре	Sem	Hours		L	Т	Р	С		
ObjectiveTo understand the different types of diagnostic tests in biochemistry, common techniques to collect, preserve and processing the biological samples and to gain knowledge on the enzyme assays.UnitCourse ContentKnowledge levelsIApproaches to Clinical Biochemistry: Collection of clinical specimens, preservatives for blood and urine, transport of biological samples. Quality Control: Concepts of accuracy, precision, sensitivity and reproducibilityK1- K24IIHematology: Composition and functions of blood, Haemoglobin, PCV, ESR, RBC, WBC and Platelet count. ESR and PCV.K1- K24IIIPhysical Examination of Urine: Volume, colour, appearance, specific gravity and pli. Chemical examination of urine. Qualitative tests for Reducing sugar, protein, ketone bodies, Bile pigment, bile salt, Urobilinogen, and mucin. Microscopic Examination of urine.K1- K24IVStool Examination: Collection of fecal specimens, preservation, physical examination: - volume, colour, dour and appearance. Chemical examination: - reducing sugar, occut blood test, detection of steatorrhea. Microscopic examination of stool.K1- K24VEstimation of Biochemical Components in serum: Glucose, GTT, Glycosylated hemoglobin, Protein, cholesterol, Urea, Uric acid and Creatinine. Determination of K1- K24CourseCO2:Gain knowledge of the normal composition of blood and their analysis along with their significance in maintaining good health.K1- K2CourseCO3:Become skilled at performing clinical urine tests for diagnostic purposes and leftify abnormal constituents of urineK1- K2CO4:Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard precedures <td< th=""><th>21M4UBC N02</th><th>BIOCHEMISTRY IN DIAGNOSIS</th><th>NMI</th><th>EC - II</th><th>IV</th><th>2</th><th></th><th>2</th><th></th><th></th><th>2</th></td<>	21M4UBC N02	BIOCHEMISTRY IN DIAGNOSIS	NMI	EC - II	IV	2		2			2		
UnitCourse ContentKnowledge LevelsSessio nsIApproaches to Clinical Biochemistry: Collection of clinical specimens, preservatives for blood and urine, transport of biological samples. Quality Control: Concepts of accuracy, precision, sensitivity and reproducibilityK1- K24IIHematology: Composition and functions of blood, Haemoglobin, PCV, ESR, RBC, WBC and Platelet count. ESR and PCV.K1- K24IIIPhysical Examination of Urine: Volume, colour, odour, appearance, specific gravity and pH. Chemical examination of urine: Qualitative tests for Reducing sugar, protein, ketone bodies, Bile pigment, bile salt, Urobilinogen, and mucin. Microscopic Examination of urine: Qualitative tests for Reducing sugar, protein, ketone bodies, Bile pigment, Bile salt, Urobilinogen, and mucin. Microscopic Examination: - volume, colour, odour and appearance. Chemical examination: - reducing sugar, occult blood test, detection of steatorrhea. Microscopic examination of stool.K1- K24VStool Examination: collection of fecal specimens, preservation and transportation of test, detection of steatorrhea. Microscopic examination of stool.K1- K24VStool Examination: - volume, colour, processing, preservation and transportation of biological specimens for analysis.K1- K24CourseeC02:Gain knowledge of the normal composition of blood and their analysis along with their significance in maintaining good health.K1- K2K1- K2CourseeC04:Describe physical, chemical and microscopic examination of stool and 	Objective	To understand the operation of the preserve and proce	different type ssing the bio	es of diagnost logical sample	ic tests es and t	in biochem o gain knov	istry vledg	, com ge on	mon teo the enz	hniques ( yme assay	o collect, /s.		
IApproaches to Clinical Biochemistry: Collection of clinical specimens, preservatives for blood and urine, transport of blological samples. Quality Control: Concepts of accuracy, precision, sensitivity and reproducibilityK1- K24IIHematology: Composition and functions of blood, Haemoglobin, PCV, ESR, RBC, WBC and Platelet count. ESR and PCV.K1- K24IIIPhysical Examination of Urine: Volume, colour, odour, appearance, specific gravity and pH. Chemical examination of urine.K1- K24IIIPhysical Examination of Urine: Volume, colour, odour, appearance, specific gravity and pH. Chemical examination of urine.K1- K24IVStool Examination: Collection of fecal specimens, preservation, physical examination: - volume, colour, odour and appearance. Chemical examination: - reducing sugar, occult blood test, detection of steatorrhea. Microscopic examination of stool.K1- K24VStool Examination: Collection of fecal specimens, preservation, physical examination: - volume, colour, odour and appearance. Chemical examination: - reducing sugar, occult blood test, detection of steatorrhea. Microscopic examination of stool.K1- K24VStool Examination: Collection, processing, preservation and transportation of biological specimens for analysis.K1- K24Course OutcomeCO1: Summarize the use of standard precautions applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.K1- K2K2Course OutcomeCO3:Become skilled at performing clinical urine tests for diagnostic purposes and Identify abnormal constituents of urineK1- K	Unit		Co	urse Content					Kı	iowledge Levels	Sessio ns		
IIHematology: Composition and functions of blood, Haemoglobin, PCV, ESR, RBC, WBC and Platelet count. ESR and PCV.K1- K24IIIPhysical Examination of Urine: Volume, colour, odour, appearance, specific gravity and pH. Chemical examination of urine: Qualitative tests for Reducing sugar, protein, ketone bodies, Bile pigment, bile salt, Urobilinogen, and mucin. Microscopic Examination: Collection of fecal specimens, preservation, physical examination: - volume, colour, odour and appearance. Chemical examination: - reducing sugar, occult blood 	I	Approaches to Clinic preservatives for blo Control: Concepts of	al Biochemist od and urine, accuracy, pree	ry: Collection o transport of bi cision, sensitivi	f clinica ological ity and 1	l specimens, samples. Q eproducibil	uality ity	7		K1- K2	4		
IIIPhysical Examination of Urine: Volume, colour, adour, appearance, specific gravity and pH. Chemical examination of urine: Qualitative tests for Reducing sugar, protein, ketone bodies, Bile pigment, bile salt, Urobilinogen, and mucin. Microscopic Examination of urine.K1- K24IVStool Examination: Collection of fecal specimens, preservation, physical examination: -volume, colour, odour and appearance. Chemical examination: - reducing sugar, occult blood test, detection of steatorrhea. Microscopic examination of stool.K1- K24VEstimation of Biochemical Components in serum: Glucose, GTT, Glycosylated hemoglobin, Protein, cholesterol, Urea, Uric acid and Creatinine. Determination of Enzyme Activity: AST, ALT, ALP and LDH.K1- K24C01: Summarize the use of standard precautions applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.K1- K24C02:Gain knowledge of the normal composition of blood and their analysis along with their significance in maintaining good health.K1- K2K1- K2C03:Become skilled at performing clinical urine tests for diagnostic purposes and Identify abnormal constituents of urineK1- K2K1- K2C04:Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard proceduresK1- K2K1- K2C05: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.K1- K2Text Books1. Practical Clinical Biochemistry by MN Chatterriee, Rana Shinde, 8th editi	II	Hematology: Compos WBC and Platelet cou	sition and fund ant. ESR and P	ctions of blood CV.	, Haemo	globin, PCV,	ESR,	RBC,		K1- K2	4		
IVStool Examination: Collection of fecal specimens, preservation, physical examination: - volume, colour, odour and appearance. Chemical examination: - reducing sugar, occult blood test, detection of steatorrhea. Microscopic examination of stool.K1- K24VEstimation of Biochemical Components in serum: Glucose, GTT, Glycosylated hemoglobin, Protein, cholesterol, Urea, Uric acid and Creatinine. Determination of Enzyme Activity: AST, ALT, ALP and LDH.K1- K24Course OutcomeC01: Summarize the use of standard precautions applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.K1- K24Coursee OutcomeC02:Gain knowledge of the normal composition of blood and their analysis 	III	Physical Examination gravity and pH. Cher sugar, protein, keton Microscopic Examina	n of Urine: Vol nical examina e bodies, Bile ation of urine.	ume, colour, oo tion of urine: ( pigment, bile s	dour, ap Jualitati alt, Urol	pearance, sp ve tests for I pilinogen, an	ecifio Reduo d mu	c cing icin.		K1- K2	4		
VEstimation of Biochemical Components in serum: Glucose, GTT, Glycosylated hemoglobin, Protein, cholesterol, Urea, Uric acid and Creatinine. Determination of Enzyme Activity: AST, ALT, ALP and LDH.K1- K24C01: Summarize the use of standard precautions applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.K1- K24C02: Gain knowledge of the normal composition of blood and their analysis along with their significance in maintaining good health.K1- K24C03: Become skilled at performing clinical urine tests for diagnostic purposes and Identify abnormal constituents of urineK1- K2K1- K2C04: Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard proceduresK1- K2K1- K2C05: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.K1- K2Text Books1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi.Nedical Biochemistry by MN Chatterjee, Rana Shinde, 8th edition, 2013, Jaypee publications.	IV	Stool Examination: C examination: - volum reducing sugar, occui test, detection of stea	tool Examination: Collection of fecal specimens, preservation, physical xamination: - volume, colour, odour and appearance. Chemical examination: - educing sugar, occult blood est, detection of steatorrhea. Microscopic examination of stool.										
Course OutcomeCO1: Summarize the use of standard precautions applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.K1- K2Course OutcomeCO2:Gain knowledge of the normal composition of blood and their analysis along with their significance in maintaining good health.K1- K2C03:Become skilled at performing clinical urine tests for diagnostic purposes and Identify abnormal constituents of urineK1- K2C04:Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard proceduresK1- K2C05: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.K1- K2Text Books1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi.	V	Estimation of Biochemical Components in serum: Glucose, GTT, Glycosylated hemoglobin, Protein, cholesterol, Urea, Uric acid and Creatinine. Determination K1- K2 4 of Enzyme Activity: AST, ALT, ALP and LDH.											
Course OutcomeCO2:Gain knowledge of the normal composition of blood and their analysis along with their significance in maintaining good health.K1- K2CO3:Become skilled at performing clinical urine tests for diagnostic purposes and Identify abnormal constituents of urineK1- K2CO4:Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard proceduresK1- K2CO5: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.K1- K2Learning ResourcesText 		CO1: Summarize the use of standard precautions applied in clinical laboratory and during the collection, processing, preservation and transportation of biological specimens for analysis.											
Course OutcomeCO3:Become skilled at performing clinical urine tests for diagnostic purposes and Identify abnormal constituents of urineK1- K2CO4:Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard proceduresK1- K2CO5: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.K1- K2Text Books1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi. 2. Medical Biochemistry by MN Chatterjee, Rana Shinde, 8th edition, 2013, Jaypee publications.		CO2:Gain knowledge along with their sign	of the normal ificance in ma	composition c intaining good	of blood health.	and their an	alysi	S		K1- K2			
C04:Describe physical, chemical and microscopic examination of stool and analysis of its constituents using standard procedures       K1- K2         C05: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.       K1- K2         Learning Resources         Text         Books       1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi.         2. Medical Biochemistry by MN Chatterjee, Rana Shinde, 8th edition, 2013, Jaypee publications.       V	Course Outcome	CO3:Become skilled a and Identify abnorma	at performing al constituent	clinical urine t s of urine	ests for	diagnostic p	urpo	ses		K1- K2			
CO5: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.       K1- K2         Learning Resources         Text         Books       1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi.         2. Medical Biochemistry by MN Chatterjee, Rana Shinde, 8th edition, 2013, Jaypee publications.       VIIII (VIIII)		CO4:Describe physical analysis of its constit	al, chemical an wents using st	nd microscopic andard proced	examin lures	ation of stoo	ol and	l		K1- K2			
Learning Resources           Text         1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi.           2. Medical Biochemistry by MN Chatterjee, Rana Shinde, 8th edition, 2013, Jaypee publications.		CO5: Become aware with the variations in the levels of biochemical components of blood and their relationship with various diseases and also get acquainted with the role of enzymes in diagnosis of a variety of diseases.											
Text Books1. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi. 2. Medical Biochemistry by MN Chatterjee, Rana Shinde, 8th edition, 2013, Jaypee publications.				Learning R	esource	es							
3. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors, New Delhi.	Text Books	<ol> <li>Practical Clinica</li> <li>Medical Biocher</li> <li>Practical Clinica</li> </ol>	l Biochemistr nistry by MN ( l Biochemistr	y, Harold Varle Chatterjee, Ran y, Harold Varle	y, 4th eo a Shind y, 4th eo	lition, CBS P e, 8th edition lition, CBS P	ublic 1, 201 ublic	ation 13, Jay ation	and Dist pee pub and Dist	ributors, l olications. ributors, l	New Delhi. New Delhi.		
Reference Books1. Sabitri Sanyal, Clinical pathology, B. I. Churchill Livingstone (P) Ltd, New Delhi.2000.2. Text book of Biochemistry with clinical correlation, Thomas M. Devlin, 3rd edition, A. John Wiley- Liss Inc. Publication. 3. Tietz Fundamentals of Clinical Chemistry- (5th edition) C.A. Burtis, E.R. Ashwood (eds) Saunders WB Co.	Reference Books	1. Sabitri Sanyal, C 2. Text book of Bio Inc. Publication. 3. Tietz Fundamen	linical patholo ochemistry wit stals of Clinica	ogy, B. I. Church ch clinical corre l Chemistry- (5	nill Livir elation, ' oth editi	ngstone (P) I Thomas M. I on) C.A. Burt	.td, N )evlir tis, E.I	ew De n, 3rd R. Ash	elhi.2000 edition, wood (e	). A. John Wi eds) Saunc	ley- Liss lers WB Co.		
Website Link1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6279435/ 2. https://www.digimat.in/nptel/courses/medical/biochemistry/BC45.html. 3. https://onlinecourses.swayam2.ac.in/cec20_bt19/preview	Website Link	1. https://www.nd 2. https://www.di 3. https://onlineco	cbi.nlm.nih.gov gimat.in/npte ourses.swayar	v/pmc/articles l/courses/mec n2.ac.in/cec20	/PMC62 lical/bio _bt19/p	279435/ ochemistry/ review	BC45	.html.					
L-Lecture T-Tutorial P-Practical C-Credit		L-Lecture	T-Tutorial	P-Practical		C-Credit							

B.Sc-Biochen	nistry Sy	llabus	LOCF-	CBCS with e	effect f	rom 20	21-2022	Onward	S				
Course Code	Course	e Title			Course Type		Sem	Hour s	L	T	Р	C	
21M4UBCN 02	BIOCH	EMIST	RY IN E	DIAGNOSIS	NME	EC - IV	IV	2	2	20		2	
CO-PO Mappi	ing												
CO Number	P01	P0 2	P0 3	P04	P0 5	PS0 1	PSO2	PSO3	PSO 4	PSO 5			
C01	S	М	М	М	М	М	М	S	М	М			
CO2	S	S	М	М	S	М	М	М	М	М			
CO3	S	М	М	М	М	М	S	М	М	S			
CO4	S	М	S	М	М	М	М	М	S	М			
CO5	S	М	М	М	М	S	М	М	М	М			
Level of Correlation between CO and PO	L- M- S- LOW MEDIUM STRONG												
Tutorial Schedule				1.Group discussion 2.Role play 3.Listening skills 4.Flash cards									
Teaching and	l Learni	ng Me	thods		Chalk and talk method, PPT Classes, Smart classroom								
Assesment M	ethods				Assig Atter	gnment, ndance	Class tes	t, Unit te	st, Inter	nal exam	ns, Seminars,		
				Designed	By	•	Verifie	Verified By			Approved By		