C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Science & Lifesciences**
Course: **Bachelor of Science(Microbiology)**
Semester**: II**
Subject Code**:**MIM204-1C
Subject Name: **Biochemistry -I**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								
									Theory				Tutorial / Practical				Total
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
				Th	Tu	Pr			Marks		Marks	Duration	Marks	Duration	Marks	Duration	
3	MAJOR	MIM 204-1C	**Biochemistry-I**	3	-	2	5	4	10 10 05	Assignment Quiz Attendance	50	2	50	2	50	2	100

AIM :

- Acquaint the basic concept of structure of Cell ,
- Basic concepts of organelles and their function.
- Gain a knowledge about bacterial growth and reproduction.

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	**Carbohydrates:** • Families Of Monosaccharides: Aldoses And Ketoses, Trioses, Tetroses, Pentoses, And Hexoses, Stereo Isomerism Of Monosaccharides, Epimers, Mutarotation And Anomers Of Glucose. Furanose And Pyranose Forms of Glucose And Fructose, Haworth Projection Formulae For Glucose; Chair And Boat Forms Of Glucose, Sugar Derivatives, Glucosamine, Galactosamine, Muramic Acid, N-Acetyl Neuraminic Acid, Disaccharides; Concept Of Reducing And Non-Reducing Sugars, Occurrence And Haworth Projections Of Maltose, Lactose, And Sucrose, Polysaccharides, Storage Polysaccharides, Starch And Glycogen. Structural Polysaccharides, Cellulose, Peptide Glycan and Chitin	**15**
II	**Lipids:** • Definition And Major Classes of Storage and Structural Lipids. Storage Lipids. Fatty Acids Structure and Functions. Essential Fatty Acids. Triacyl Glycerol Structure, Functions and Properties. Saponification Structural Lipids. Phospho Glycerides: Building Blocks, General Structure, Functions and Properties. Structure Of Phosphatidyl Ethanol Amine and Phosphatidyl Choline, Sphingo Lipids: Building Blocks, Structure of Sphingosine, Ceramide. Special Mention of Sphingomyelins, Cerebrosides and Gangliosides	**15**

III	**Proteins:** • Functions Of Proteins, Primary Structures of Proteins: Amino Acids, The Building Blocks of Proteins. General Formula of Amino Acid and Concept of Zwitter Ion. Titration Curve of Amino Acid and Its Significance, Classification, Biochemical Structure and Notation of Standard Protein Amino Acids Ninhydrin Reaction. Natural Modifications of Amino Acids In Protein Shydrolysine, Cystine And Hydroxyproline, Non-Protein Amino Acids: Gramicidin, Beta-Alanine, D-Alanine And D-Glutamic Acid Oligopeptides: Structure And Functions Of Naturally Occurring Glutathione And Insulin And Synthetic Aspartame, Secondary Structure Of Proteins: Peptide Unit And Its Salient Features. The Alpha Helix, The Beta Pleated Sheet and Their Occurrence In Proteins, Tertiary And Quaternary Structures Of Proteins. Force Sholding The Polypeptide Together. Human Hemoglobin Structure, Quaternary Structures of Proteins.	**15**

Course Outline for Practical

SR. NO	COURSE CONTENT	HOURS
1	Properties Of Water, Concept of Ph and Buffers, Preparation of Buffers and Numerical Problems to Explain The Concepts	**30**
2	Numerical Problems on Calculations of Standard Free Energy Change and Equilibrium Constant	
3	Standard Free Energy Change of Coupled Reactions	
4	Qualitative/Quantitative Tests for Carbohydrates, Reducing Sugars, Non-Reducing Sugars	
5	Qualitative/Quantitative Tests for Lipids and Proteins	
6	Study Of Protein Secondary and Tertiary Structures with The Help of Models	
7	Study Of Enzyme Kinetics– Calculation of V_{max}, Km, Kcat Values	
8	Study Effect of Temperature on Enzyme Activity	
9	Study Effect of Ph on Enzyme Activity	
10	Estimation Of Any One Vitamin	

TEACHING METHODOLOGY:

- Conventional Method (Classroom Blackboard Teaching)
- ICT Techniques
- Teaching Through the Classroom, Laboratory Work
- Variety Of Learning Styles and Tools (Powerpoint Presentations, Audio-Visual Resources, E-Resources, Seminars, Workshops, Models)
- Teaching Through Laboratory Work

LEARNING OUTCOME:

- At The End of This Course the Students Would Have Sufficient Knowledge of Cell And Its Function.
- Obtain The Knowledge About Cell Organelles.
- Understanding The Mechanism of Protein Sorting and Transport.
- To Gain a Knowledge About Cell Signaling.

- Learn structure of organelles and its function.

Arrangement of lectures duration and practical session as per defined credit numbers:

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory+ Practical	Theory+ Practical
Unit – 1	15	30	3	1	45+30	4
Unit – 2	15					
Unit – 3	15					
TOTAL	**45**	**30**	**3**	**1**	**75**	**4**

Evaluation:

Theory Marks	Practical Marks	Total Marks
75	**25**	**100**

REFERNCE BOOKS:

1. **Campbell, MK** (2012) Biochemistry,7thed., Published by CengageLearning
2. **Campbell, PN and SmithAD** (2011) Biochemistry Illustrated, 4thed., Published by Church ill Livingstone
3. **T ymoczko JL, Berg JM and StryerL** (2012) Biochemistry: Ashortcourse, 2nded., W.H.Freeman
4. **Berg JM, T ymoczko JL and StryerL** (2011) Biochemistry, W.H. Freeman and Company
5. **Nelson DL and CoxMM** (2008) Lehninger Principles of Biochemistry, 5thEdition., W.H.Freeman and Company
6. **WilleyMJ,Sherwood,LM&WoolvertonCJ**(2013)Prescott,HarleyandKlein'sMicrobiology by.9thEd.,McGrawHill
7. **Voet,D.andVoetJ.G**(2004)Biochemistry3rd edition,JohnWileyandSons,