Semester IV

Advanced Chemistry

OBJECTIVES:

The course will enable students to:

1. Lay the foundation of biological chemistry.
2. Give insights about the chemical reactions that occur in biological systems.
3. Impart knowledge about the structures of the principle components present in biological systems.

	Course	Th	Pr	Total	Int	Ext	Total
	Advanced Chemistry	2	2	4	25	75	100

Advanced Chemistry Theory

Module No	Objectives	Content	Evaluation
1	This module will enable students to: **1)** Understand the fundamentals of carbohydrates and their importance in metabolism. **2)** Understand importance of lipids and their role in biological systems.	**Carbohydrates:** • General formula, Classification, Structure, properties and uses of monosaccharides (Glucose, Fructose), disaccharides (Lactose, Maltose and Sucrose), oligosaccharides, and polysaccharides (Starch, Glycogen). • Introduction to the structure of D & L forms. Optical and stereo isomers. Anomers. Cyclic forms of monosaccharides of glucose and fructose including structures. • Reactions of Monosaccharids- Oxidation and reduction reactions, esterification reaction, osazone formation **Lipids:** • Definition and Introduction, Structural formula and difference between saturated and unsaturated fatty acids, • Chemical Constants of fats-iodine value,	25 Marks Assignments Quiz

		saponification value, acid value and Richert- Miesel numbers. • Rancidity Sterols-Structure and function of cholesterol, 7 dehydro- cholesterol and ergosterol.	
2	**1)** Understand the fundamentals of proteins and nucleic acid chemistry. **2)** Know the role of enzymes and factors that affect enzyme actions.	**Proteins:** • Classification of amino acids with structure. • Zwitter ionic form. • Peptide bond. • Structure of proteins (primary, secondary, tertiary and quaternary structure. • Denaturation of proteins. • Salting out of proteins and isoelectric precipitation. **Nucleic Acid Structure:** **Enzymes:** • Definition, general properties, Nomenclature, classifications and specificity. • Mechanism of enzyme action. • Factors affecting enzyme activity. • Enzyme inhibition-competitive and non competitive. Coenzymes and isoenzymes and their role in metabolism.	25 Marks Assignments Quiz

References : 3, 4, 6, 7 & 9

Advanced Chemistry Practical

OBJECTIVES:

The course will enable students to:

1. Impart practical training in chemistry.
2. Develop understanding of the fundamentals of chemical reactions through hands on training.
3. Impart the necessary knowledge in identification of important compounds in biological systems.

Module No	Objectives	Content	Evaluation
1	This module will enable students to: Apply the basic knowledge of chemical reactions.	Preparations of basic solutions for titration: 1. Preparation of standard solution of NaOH and H_2SO_4 (Strength of 1N – 0.1N or 0.25N or 0.5N etc.), Calculations for normality, morality and g/l concentration. 2. Oxidation reduction titration- A) Ferrous ammonium sulphate with $K_2Cr_2O_7$ B) $KMnO_4$ with oxalic acid. Using a standard solution of $KMnO_4$and Na OH determine the strength of a mixture of H_2SO_4 and $H_2C_2O_4$. $2H_2O$.	25 Marks Practical test
2	This module will enable students to: Apply theoretical knowledge of carbohydrate, proteins and lipid chemistry**.**	1. Qualitative analysis of carbohydrates, Glucose, fructose, sucrose, lactose, maltose, starch. 2. Estimation of glucose by DNSA (colorimetric method) 3. Estimation of sucrose using Benedict's Quantitative method. 4. Qualitative tests for proteins (colour reactions and precipitation reactions) Qualitative tests for fats.	25 Marks Practical test

References : 1, 2 and 3

References:

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10) Vasudevan D.M. and Sreekumari S – (2007) "Textbook of Biochemistry for Medical Students". 5th Edition, Jaypee Brothers, Medical Publishers.
11) "Murray Harper's Illustrated Biochemistry" 29th Edition, (2012) Prentice Hall Int.
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16) Textbook of practical Chemistry Std. 11 Gujarat and Maharashtra secondary education Board.