

ORGANIC CHEMISTRY - II

Semester	Subject Code	Category	Lecture hours		Theory Hours		Practical Hours		Credits
			Per week	Per sem.	Per week	Per sem.	Per week	Per sem.	
VI	21CCH6B	Core paper-IX	6	90	6	90	-	-	5

COURSE OBJECTIVES:

The students will be able to

- Students gain knowledge about the importance of various natural products such as carbohydrates, amino acids, proteins, nucleic acids, terpenoids and alkaloids.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand about the classification, reactions and structural features of monosaccharides.	K4
CO2	Know about the structural features and uses of di and polysaccharides.	K4
CO3	Understand the classification, preparation and properties of amino acids.	K4
CO4	Understand about the structural features and importance of polypeptides, proteins and nucleic acids	K3
CO5	Learn the classification, structure and properties of Alkaloids and Terpenoids.	K4

*CO – Course Outcomes

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	S	S	S
CO2	S	S	S	S	S	S
CO3	S	S	S	S	S	S
CO4	S	S	S	S	S	S
CO5	S	S	S	S	S	S

(S – Strong; M – Medium; L – Low)

UNIT – I: Carbohydrates – I**18 Hours**

- 1.1 Carbohydrates – Definition – Classification – Reducing and non-reducing sugars – Reactions of glucose and fructose – Properties – Oxidation, reduction, acetylation, methylation, fermentation, action of alkali – Osazone formation – Epimerisation – Mutarotation and its mechanism – Reactions with Tollen's reagent, Fehling's solution, Barfoed's reagent and Molisch's reagent – Uses of glucose.
- 1.2 Structural elucidation of glucose and fructose – Open chain structure – Configuration – pyranose and furanose forms – Determination of ring size – Haworth's method – Haworth's projection formula – Conformations of glucose – Analytical tests of carbohydrates.

UNIT-II: Carbohydrates-II**18 Hours**

- 2.1 Chain lengthening of aldoses: Kiliani-Fischer synthesis – Chain shortening of aldoses: Wohl's method, Ruff's method and Weerman's reaction – Interconversion of aldose to ketose and ketose to aldose.
- 2.2 Disaccharides – Sucrose and maltose – Properties – structural elucidation of sucrose and maltose- polysaccharides – Properties of starch and cellulose – Structure of starch and cellulose (elementary treatment only) – Uses of starch – Applications of cellulose derivatives.

UNIT – III: Amino Acids**18 Hours**

- 3.1 Introduction - Classification and structure of amino acids: based on the position of amino group, nutritional requirement and the relative number of amino and carboxyl group – Nomenclature – Essential aminoacids - Preparation of alpha amino acids – Gabriel phthalimide synthesis, Strecker synthesis and Erlenmeyer azlactone synthesis.
- 3.2 Properties – General reactions due to amino and carboxyl groups – Zwitterion – isoelectric point – Action of heat on alpha, beta and gamma- amino acids – Ninhydrin test.

UNIT- IV: Polypeptides, Proteins and Nucleic acids**18 Hours**

- 4.1 Peptide synthesis by Bergmann method – Peptide linkage – Peptide synthesis – Structural determination of polypeptides – End group analysis – Classification of proteins based on physical properties, chemical properties and physiological functions – Primary and

secondary structure of proteins – alpha-helical and beta-sheet structures – Denaturation of proteins.

- 4.2 Nucleoside, nucleotide, degradation of nucleotide chain – Types of nucleic acids – structure of nucleic acids – Components of RNA and DNA – Differences between RNA and DNA – Double helical structure of DNA – Functions of nucleic acids – Transcription and translation – Elementary idea about protein synthesis.

UNIT – V: Terpenoidss and Alkaloids

18 Hours

- 5.1 Terpenoids – Classification – Isoprene rule – Isolation – Structural elucidation of menthol, limonene, alpha terpineol and geraniol.
- 5.2 Alkaloids – General isolation of alkaloids – Introduction – Classification – Structural elucidation of coniine, piperine, quinine and nicotine.

TEXT BOOKS:

S. No.	Authors	Title	Publishers	Year of publication
1.	P. L. Soni and H. M. Chawla	Textbook of Organic Chemistry	Sultan Chand and Sons	1994
2.	K. S. Tewari, N. K. Vishal and S. N. Mehrotra	A Textbook of Organic Chemistry	Vikas Publishing House	2006

REFERENCE BOOKS:

S. No.	Authors	Title	Publishers	Year of publication
1.	B. S. Bahl and Arun Bahl	Advanced Organic Chemistry	S. Chand and Company Ltd.	1987
2.	Gurdeep R. Chatwal	Chemistry of Natural Products	Himalaya Publishing House	2005
3.	I. L Finar	Organic Chemistry Volume I and II	Pearson Education	2002
4.	O. P. Agarwal	Chemistry of Organic Natural Products	Goel Publishing House	1993
5.	Ashutosh Kar	Medicinal Chemistry	New Age International Publishers	2010
6.	M. K. Jain and S. C. Sharma	Modern Organic Chemistry	Vishal Publishing Co.	2017

TEACHING METHODOLOGY:

- Chalk and Board
- Power Point Presentations
- Assignments
- Animated videos
- Seminars
- Models
- Quizzes

SYLLABUS DESIGNER:

- Dr. S. Santha Lakshmi, Assistant Professor of Chemistry