

**SRM University Delhi-NCR, Sonapat**

**TEACHING, LEARNING & EVALUATION PLAN**

**Academic Session: 2023-24**

**Course Name: Natural Products & Protecting Agents**

**Course Code: 21CYMS402**

**Faculty Name: Naresh Kumar**

**Programme: M.Sc. Chemistry Sem- IV  
Year-II**

**TEACHING, LEARNING & EVALUATION PLAN**

S.No.	Topic & Coverage	Lecture sessions schedule	Lecture sessions held	Pedagogy	Activity	Unit Objective	Unit Learning outcome	Remark
Unit 01	Terpenoids: Classification,	1	1	Participative	MST & Assignment	To learn about natural products such as terpenoids, alkaloids and steroids.	Explain natural products, their types and synthesis.	
	general method of structure elucidation,	1	2					
	chemistry of menthol, camphor, and abietic acid.	1	1					
		2	2					
	Biosynthesis of terpenoids-acetate hypothesis,	1	1					
	isoprene rule, mevalonic acid	1	1					
	and non- mevalonic acid pathways.	2	2					
	Alkaloids: Classification of alkaloids,	1	1					
	structure elucidation of morphine,	1	1					
	nicotine, and quinine.	1	1					
	Steroids: General introduction on their biosynthesis,	1	1					

	structure determination of progesterone, cortisone, and cholesterol.	1 2	1 2					
Unit 02	<p>Proteins and enzymes: Structure, conformation and properties of proteins,</p> <p>protein sequence determination methods.</p> <p>Enzyme classification, their kinetics and inhibition mechanism.</p> <p>Carbohydrates: General introduction and classification,</p> <p>general methods of structure and ring size elucidation, structure determination of maltose, lactose and sucrose.</p> <p>Natural Pigments: General discussion of carotenoids and flavonoids,</p> <p>structure elucidation and synthesis of flavone, flavonol, chromone,</p> <p>xanthone and porphyrins (chlorophyll).</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1</p> <p>2</p> <p>2</p> <p>2</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>2</p> <p>2</p>	Participative	<p>9 marks</p> <p>mark</p>	<p>To impart the knowledge about biomolecules including proteins, enzymes, carbohydrates and natural pigments.</p>	<p>Describe the chemistry of proteins, enzymes or carbohydrates and their structure determination methods.</p>	

t 03	<p>Heterocyclic Compounds: General behavior,</p> <p>Classification &amp; Nomenclature,</p> <p>Criteria of aromaticity.</p> <p>Five membered Heterocycles: Synthesis and reactions of 1, 3-Azoles: Imidazole, Thiazole and Oxazole</p> <p>Six membered Heterocycles with two heteroatoms:</p> <p>Detailed study of Pyrimidines and Purines.</p> <p>Structural elucidation of uric acid and caffeine.</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p>	<p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p>	<p>Participative</p>	<p>085</p>	<p>To understand the chemistry of heterocyclic compounds.</p>	<p>Demonstrate heterocyclic compounds with respect to their structure, synthesis and reactions.</p>	

Unit 04	Ylides: General methods of formation,	1	1			To get the knowledge of protecting groups and their role in organic synthesis	Comprehend the types of protecting groups in organic synthesis and their significance.	
	General study of reactions with their mechanisms of Nitrogen (Ammonium, Immonium, Diazonium),	2	1					
	Phosphorous and Sulphur ylides and their applications.	3	2					
	Protecting Group Chemistry: Role of Protective groups in organic synthesis,	2	1	Participative	Amph			
	Protection of Hydroxy group (1, 2 and 1,3 diols),	2	1					
	Phenols (Esters & ethers),	2	1					
	Protection of amino group (carbamates)	1	1					
	and Protection of carbonyl group (acetal and ketal).	2	1					