

**Aim**

To gain thorough knowledge about the basics of semiochemistry and its applications there of.

## Course outcomes

**Unit 1**-Student will have a thorough understanding on the basic interactions in host guest systems

**Unit 2**-Student will understand the concept of molecular receptors and various stimuli responsive processes in switchable systems

**Unit 3**-A thorough understanding about various molecular recognition mechanisms will be gained by the student

**Unit 4**-Student will acquire the essential skills to bring together simple molecular systems to make a switchable molecular systems by the combination of various substrate stimuli pairs.

**Unit 5**-To have an idea about future prospects in semiochemistry with special reference to multiple recognition sites.

## Module 1

**Molecular interactions**

Atoms, molecules, chemical bonds, van der Waals forces, dipole dipole interactions, London dispersion forces. Non covalent interaction, electrostatic interaction, hydrogen bonding. pi pi stacking, hydrophobic interaction, strength and selectivity of host guest interaction

## Module 2

**Molecular receptors**

Semiochemistry, sensors, signal response pairs, supramolecular receptors, crown ethers, cryptands, cyclodextrins, tweezers, molecular clefts, Information and Signals, Supramolecular Photochemistry. Molecular and Supramolecular Photonic Devices , Light Conversion and Energy Transfer Devices , Photosensitive Molecular Receptors , Photoinduced Electron Transfer in Photoactive Devices Photoinduced Reactions in Supramolecular Species , Supramolecular Effects in Photochemical Hole Burning , Molecular and Supramolecular Electronic Devices , Supramolecular Electrochemistry

## Module 3

## Molecular Recognition

Lock and Key model of recognition, complementary interactions, Chemo, regio stereo binding, synthetic hosts, recognition of spherical ions, tetrahedral guests, calixarenes, cancerands, cyclophanes,

Module 4

## Molecular Switchable systems

Switching Devices and Signals, Signals and Information , Photoswitching Devices, Electroswitching Devices , Switching of Ionic and Molecular Processes , Mechanical Switching Processes

Module 5

## Multiple Recognition

Molecular recognition between crown ether and cation, synthesis of crown ether, crown ether as synthetic cation channels, phase transfer catalysts, tetrahedral and chiral recognition cyclodextrins hosts as enzyme mimics as drug carriers Co receptor molecules, Binding of Zwitter ions, Ditopic receptors, Cation Anion cooperativity, Stereochemical recognition . Triacid Clefs, Chemical sensors

References/Text Books

1. Supramolecular chemistry by Jonathan W. Steed
2. Supramolecular chemistry by Jean Marie Lehn
3. Supramolecular Chemistry — Fundamentals and Applications- Katsuhiko Ariga Toyoki Kunitake

## SCHEME OF EVALUATION

SI No.	In- semester assessment		End – semester assessment	
	1	Periodical test	30 marks	End Semester Examination
2	Assignment	10 marks		
3	Seminar	10 marks		
4	<b>Sub total</b>	<b>50</b>	<b>50</b>	
	<b>Grand total</b>		<b>100</b>	

**ACTIVITIES/ CONTENT WITH DIRECT BEARING ON EMPLOYABILITY/  
ENTREPRENEURSHIP/ SKILL DEVELOPMENT (based on NAAC Criteria):**

The learner will get a clear understanding of the concepts and ideas regarding the technical and theoretically relevant area which is explored in the course. This course will equip the learner to build a career as a Faculty in Chemistry, Research Scientist in groups working on Supramolecular chemistry