

SRM UNIVERSITY
DEPARTMENT OF BIOINFORMATICS
SCHOOL OF BIOENGINEERING

Lecture Plan

Subject code: BI 0621

Subject: Macromolecular Biophysics

Credits: 3

Semester: III

Lecture Hour	Contents	Learning Outcome
	Unit 1:	
1.	Structural properties of amino acids	This unit introduces to understand the structural properties biomolecules
2.	Dissociation Characteristics of Amino acids,	
3.	Structural Properties of Proteins	
4.	Structural Properties of Nucleic Acids	
5.	Ramachandran plot	
6.	Water and its properties, Collagen, Keratin, Elastin, Resilin	
7.	Ribose-phosphate backbone, B and Z family of DNA.	
	Unit 2	This unit introduces various molecular forces that are involved in biomolecules
8.	Physics Of Biomolecules: Molecular Forces, Strong Force, Inter-molecular weak forces	
9.		
10.	Van der Waals Force, Lenard-Jones Potential, Hydrogen Bond	
11.		
12.	Hydrophobic-Hydrophilic Force, Principle of Molecular recognition.	
13.		
	Unit 3	
14.	Physical Techniques In Structure Determination: Optical Rotary Dispersion, Circular Dichroism	This chapter introduces the various physical techniques to view the molecule
15.	Absorption Spectroscopy, Absorption by oriented molecules	
16.	X-ray absorption Spectroscopy	
17.	Flow Cytometry, Ultraviolet Spectroscopy	

18.	Infrared Spectroscopy.	This chapter used to Understand the signal transmission in neurons
	Unit 4	
19.	Neurobiophysics: Concepts of membrane transport,	
20.		
21.		
22.	Membrane-pore diffusion	
23.	Active transport	
24.		
25.	Action potential	
26.	Signal transmission	
27.		
28.	Signal reception	
29.	Photoreceptors.	
	Unit 5	
30.	Bioenergetics: Bioenergetics and ATP Molecules	This unit is useful to understand the energetics involved in various biochemical processes
31.		
32.	Energetics of cellular respiration	
33.		
34.	Chemiosmotic Theory	
35.		
36.	Photosynthesis	
37.	Emersion Effect	
38.	Mechanism and energetics of muscle contraction	
39.		

Reference Books

- 1.P. Narayanan, Essentials of Biophysics, New Age International Ltd., II edition, 2007.
2. P.K. Srivastava, Elementary Biophysics an Introduction, Narosa Publishing House, 2005.
3. Charles R. Cantor, Paul Reinhard Schimmel, Biophysical Chemistry: The conformation of biological macromolecule PART I, W. H. Freeman, 1980.

Signature of the staff

Signature of HOD

