BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI (RAJASTHAN)
INSTRUCTION DIVISION
SECOND SEMESTER 2015-2016
Course Handout (Part II)

Date: 5/1/2016

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

COURSE NO: CHEM F323
COURSE TITLE: Biophysical Chemistry
INSTRUCTOR IN CHARGE: Dr. Ajay Kumar Sah

1. SCOPE AND OBJECTIVE:

The objective of the course is to introduce the students to the concepts of physical principles in the biological and biomimetic molecular systems. Properties and conformations of biomolecules like amino acids, proteins, nucleotides, nucleic acids as well as biomimetic systems like monolayers and bilayers are to be discussed. Related physical phenomena in these systems like structural transitions, protein folding, membrane equilibria are to be discussed. Emphasis will also be given to understand the principles of major experimental techniques applied to understand these physical problems.

2. Text Book: "Biophysical Chemistry", EDD note, Nilashis Nandi, BITS.
3. Reference Book: " Biophysical Chemistry, Part I, Part II and Part III", Charles R Cantor and Paul R. Schimmel, W.H. Freeman and Co., New York.

4. Course Plan

Lecture	**Learning Objective**	**Topics to be covered**	**References to Chap/Section No. of text/ref book**
	Understanding:		
1-3	Chemical properties of basic units of life	Properties of amino acids	I.1-I.3 + Class notes
4-5	Lower level of structure of unit of life	Primary structure of proteins	I.4-I.8
6-7	Basic interactions which drives structures	Intermolecular interactions	II
8	Further interactions which drives structures	Hydrogen bonding	III
9	Specific interactions driving structures	Hydrophobic effect and interaction and hydration	IV
10	Higher level structure	Quaternary structure of proteins	V
11,12	Basic units of DNA, RNA	Properties of nucleotides	VI
13	Nucleic acid	Structure of nucleic acids	VI.

14,15	Biomimetic systems	Lipids, monolayers and bilayers	VII
16,17	Role of lipids	Lipids in membranes and Protein lipid interaction	VII
18	Function of membranes	Membrane equilibria	VIII
19-20	Principles of chain systems	Conformation dependent properties	XI
21,22	Structural changes in proteins	Helix coil transitions	XII
23,24	How protein folds	Protein folding	XIII + Class notes
25-27	Analytical methods	Different physical methods used Biological system	Class notes
28-31	How structure is determined	X-ray crystallography	XIV + Class notes
32,33	Principles of techniques	Light scattering	XV
34-35	Do	Measurement of size and shape	Ref. 10.1
36,37	Do	Dielectric spectroscopy	XVI
38-40	Biological recognition	Molecular recognition	Class notes

5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid Semester Test Book (OB)	90 min.	30 %	18/3 2:00 -3:30 PM	Open
Assignment and class tests;		25%	Continuous	Closed book (CB) for Class tests, OB for assignments
Compre. Exam.	3 hrs.	45 %	13/5 FN	CB

6. Chamber Consultation Hours: To be announced.

7. Notices: Notices, if any, concerning the course will be displayed on the Notice Board of Chemistry department

Instructor In-Charge/CHEM F323