

LS 639 MOLECULAR BIOPHYSICS
AK Saxena* and S Gourinath

S. No	Topics	Contact hours
1.	Primary, secondary, tertiary and quaternary structures of Proteins and Nucleic acids	2
2.	Forces that determine Biological structure and Function: Review of Thermodynamics, Electrostatics, Hydrophobic effects	2
3.	Structure based function predictions, Possibilities and Limitations	2
4.	Membrane protein- structure- function relationship, Biological Membranes, Membrane protein structures- How membrane Shape protein structure	2
5.	Membrane protein folding and stability, Formation of alpha-helical Sheet, Classification of membrane protein	2
6.	X- ray diffraction methods- problems and achievements	4
7.	Biophysical techniques: CD, NMR, Patch clamp method, SPR	4
8.	Protein-protein interactions: Structural prospective, structure based prediction	2
9.	Structural prospective of protein-protein interactions: detailed examples of Antigen-anti body, enzyme-substrate, cellular signalling proteins	2
10.	Protein recognition of DNA: structural prospective with examples of bacteriophage transcription factors and regulation	2
11.	Protein recognition of DNA: how prokaryotic transcription factors bind DNA and regulate transcription	2
12.	Eukaryotic transcriptional factors with unusual structural motifs and their binding of DNA	2
13.	Drugs by design : basic principles with example of Purine Nucleoside Phosphorylase (PNP) inhibitor design	2
14.	Structures of HIV protease and reverse transcriptase and their inhibitor design	2

Suggested Reading :

1. Principles of physical Biochemistry, van Holde, KE , Johnson, WC, Ho, PS Prentice Hall, Inc.,1998.
2. Proteins, Creighton, TE. ; WH Freeman & Co., 1993
3. Crystallography Made Crystal Clear: A Guide for User's of Macromolecular Models, Rhodes, G.; Academic Press, 1999
4. Techniques for the Study of Biological Structures and Function, Vol 2, Candor, CR and Schimmel, PR; WH Freeman & Co., 1990
5. Random walks in Biology, Berg, HC; Princeton University Press, 1993