

LS 453A Life Sciences Practicals III 3 Credits			
Coordinator: Prof. A.K. Saxena Participating Faculty Members (Module-wise): <i>Biophysics and Structural Biology:</i> Prof. A.K. Saxena*, Prof. S. Gourinath, Dr. K. Kar <i>Biostatistics:</i> Dr. S.K. Jha*, Dr. D. Kaur			
	S.No.	Topic	Faculty Name/ Contact Hours
Biophysics & Structural Biology (2 credits)	1.	Plasmid transformation in <i>E. coli</i> cells	AKS/ 2
	2.	Protein expression in small LB media	AKS/ 2
	3.	Protein expression checking on SDS-PAGE	AKS/ 1
	4.	Purification of egg white lysozyme and its characterization by SDS-PAGE.	SG/2
	5.	Setting up crystallization of Lysozyme	SG/1
	6.	Enzymatic assay of lysozyme	SG/2
	7.	Study of amyloid aggregation of globular proteins (Insulin and Lysozyme) under <i>in vitro</i> conditions using spectroscopy and microscopy techniques.	KK/3
	8.	Visualization of amyloid aggregates using amyloid specific staining assays (Thioflavin T, Congo red and Nile red)	KK/1
	9.	Effect of pH, denaturants and osmolytes on the process of protein amyloid aggregation.	KK/1
Biostatistics (1 credit)	1.	Statistical analysis with Sigma plot/SPSS/R software	DK/3
	2.	Data collection and group determination (biological and/or filed survey data), Tabulation and Graphical representation of data	DK/3
	3.	Hypothesis testing, application of appropriate methods to formulate and examine statistical associations between variables using biological and/or field survey data sets	DK/7
	4.	Factors associated with sample size determination, Calculation of sample size for single group experiment, for continuous variables, and for repeat studies.	SKJ/3

*Experiment to be followed through completion during the semester

Further Reading:

Biophysics & Structural Biology

1. Biophysical Chemistry by Cantor & P. Schimmel. Vol. I & II
2. Physical Biochemistry by David I Reifelder
3. Protein: Structure and molecular Properties by TE Creighton
4. Introduction to protein structure by Branden and Tooze

Biostatistics

1. Biostatistics: A Foundation for Analysis in the Health Sciences. Wayne W. Daniel and Chad L. Cross.
2. Biostatistics for the Biological and Health Sciences. Marc M. Triola, Mario F. Triola and Jason Roy.
3. Principles of Biostatistics. Marcello Pagano, Kimberlee Gauvreau and Heather Mattie.
4. Handouts will be provided in the course