



FUNDAMENTALS OF PROTEIN CHEMISTRY

PROF. SWAGATA DASGUPTA

Department of chemistry
IIT Kharagpur

PRE-REQUISITES : Biochemistry

INTENDED AUDIENCE : Undergraduate and Graduate students

COURSE OUTLINE :

The course provides an in-depth study into protein structure and function. Building up from an understanding of amino acids and the peptide bond that form the basics of protein structure, protein folding and denaturation will be studied followed by the techniques used for protein isolation and characterization. The importance of metalloproteins and motor proteins will be followed by a discussion on membrane proteins and transport. Important aspects of enzymes, their mechanisms, kinetics and inhibition will be looked into with specific examples. The discussion on protein interactions will cover protein-ligand and protein-protein interactions. Finally some special topics in Protein Chemistry will be discussed relevant to current literature.

ABOUT INSTRUCTOR :

Prof. Swagata Dasgupta completed her B.Sc. (Hons) in Chemistry from Presidency College, Kolkata and her M.Sc. from IIT Kanpur. After a Post M.Sc. in Bioscience she obtained her Ph.D. from Rensselaer Polytechnic Institute, USA. She then joined IIT Kharagpur and initiated research in Protein Chemistry in the Department of Chemistry at IIT Kharagpur. Her areas of interest are protein-protein and protein-small molecule interactions and protein structure analyses. Professor Swagata Dasgupta has contributed to teaching and research at IIT Kharagpur for the past 25 years. She has over 150 publications in peer reviewed journals with over 3800 citations. Her interdisciplinary research activities in biophysical chemistry have led to several ongoing research collaborations. Over the years her laboratory has become an active center of research with generous support from funding agencies. Graduate students from her laboratory are well-placed both in India and abroad. Her teaching contributions range from classroom teaching, web-course development, introduction of new courses and teaching laboratories, development of curriculum, and initiation of research in a new area in the department. A video course in Biochemistry under the aegis of the National Program on Technology Enhanced Learning funded by the Ministry of Human Resource Development has received overwhelming response worldwide by both students and educators. She has given many popular lectures to young scholars and students and has been invited to inspire young women to science. She has served on many Interview boards and is also actively involved as a reviewer in many journals. Her contributions have been recognized by the award of the Bronze medal by the Chemical Research Society of India (CRSI) for 2016. She also received the Darshan Ranganathan Memorial Lecture Award of CRSI in 2013. She was inducted as a Fellow of the West Bengal Academy of Science and Technology, India in 2014. She is an elected Member of the National Academy of Science, Allahabad since 2013 and a Fellow of the Indian Academy of Sciences, Bangalore since 2018.

COURSE PLAN :

Week 1: Amino acids and the Peptide Bond

Week 2: Protein Architecture

Week 3: Protein Folding and Denaturation

Week 4: Protein isolation and characterization

Week 5: Protein-ligand interactions

Week 6: Membrane Proteins and Transport

Week 7: Enzymes and Enzyme mechanisms

Week 8: Enzyme kinetics and Enzyme inhibition

Week 9: Metalloproteins and Motor Proteins

Week 10: Protein-Protein interactions

Week 11: Protein Structure analysis

Week 12: Special Topics in Protein Chemistry