

Department of Chemical Sciences

Graduate Course on

Biophysics and Biochemistry

Course Content

1. The cell and its constituents: an overview
2. Molecular building blocks: Proteins
 - A) Structure and function
 - B) Theoretical tools: Concepts of statistical mechanics, Forces and interactions which determine biomolecular structure, Intermolecular interactions, Theoretical description of folding
 - C) Experimental tools: Measurement of three dimensional structure, secondary structure, size, intramolecular distances, calorimetry, denaturants, folding kinetics, single molecule techniques
 - D) Intrinsically disordered proteins
 - E) Current understanding of protein folding and open questions
3. Other molecular building blocks: DNA/RNA: Structure, function (replication, transcription, translation, control)
4. Lipids and cell membranes, water
5. The Cell: in detail
 - A) Essential functions of a cell, biological and chemical networks, experimental tools of measurement (light microscopy)
 - B) Transport, Diffusion and dissipation in cellular systems: Theoretical framework, experimental tools (FCS and FRAP)
 - C) Membrane proteins, Energy transduction, Signal transduction
6. Special cells: Neurons and neuronal communication: Theoretical description, Experimental tools (electrophysiology)

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Venue: Lecture room AG80

Days: Mondays, Wednesdays and Fridays

Time: 11:30 hr to 13:00 hr

The first lecture starts on Monday, January 16, 2017.