Structure and Dynamics of Biomolecules

I. Biomembranes
Cell membranes, membrane models, self assembly, lipid bilayers, lipid polymorphism.
Physical methods for studying structural and dynamic properties of membranes.
Effects of additives on membrane structure and dynamics (sterols, peptides, ...).
Non-lamellar lipid phases; membrane fusion.
Lateral organization of membranes (domains, rafts).
Dynamic and thermomechanical properties of membranes.
Lipid-peptide interactions, membrane proteins, membrane transport.
Applications: drug delivery.

II. Proteins
Protein stability, free energy landscape.
Folding kinetics, folding theories.
Misfolding and amyloidogenesis of proteins.
Conformational dynamics; Single molecule techniques.
Molecular dynamics computer simulations of biomolecules.

Text books:

Original papers are cited during the lecture.