

# Structure Guided Mutagenesis & Protein Design — Hands-on

Learn how to use 3D structural information to plan, prioritise and interpret protein mutations. This module covers hotspot identification, in silico mutagenesis, stability and binding impact assessment, and multi parameter protein design so that you can propose rational, testable mutations for improved activity, specificity, stability or developability.

## Structure Guided Mutagenesis & Protein Design

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### Session 1

**Fee: Rs 8800** [Apply Now](#)

### Principles of Structure Guided Mutagenesis

From sequence based to structure guided design

**rational vs random mutagenesis** **when structure adds value** **design objectives and constraints**

Identifying structural hotspots for mutation

**active and allosteric sites** **interfaces and binding pockets** **stability cores and flexible loops**

Reading structures for design decisions

**contacts, hydrogen bonds and packing** **solvent exposure and networks** **leveraging existing mutational data**

### **Session 2**

**Fee: Rs 11800** Apply Now

## **In Silico Mutagenesis & Stability Assessment**

In silico alanine scanning and saturation mutagenesis

**probing contribution of side chains** **systematic exploration of substitutions** **interpreting scan results for design**

Stability and ddG style calculations for mutants

**folding stability predictions** **binding free energy impact overview** **limits, error bars and ranking logic**

Filtering designs for expression and solubility

**charged and polar surface design** **removing aggregation prone motifs** **balancing stability with function**

### **Session 3**

**Fee: Rs 14800** Apply Now

## **Modelling Mutants & Functional Impact**

Building and relaxing mutant models

**side chain replacement workflows** **local minimisation and clean up** **checking for clashes and distortions**

Assessing impact on binding and activity

**docking mutants with ligands or partners** **simple MD based checks of flexibility** **qualitative mechanism of**

### **action hypotheses**

Multi parameter design thinking

**activity vs stability vs specificity** **developability**  
**considerations** **trade offs and design envelopes**

### **Session 4**

**Fee: Rs 18800** Apply Now

## **Design Campaigns, Ranking & Case Study**

End to end structure guided design case study

**Theory + Practical**

Ranking and selecting variants for experiments

**scoring tables and design sheets** **shortlisting**  
**primary and backup designs** **communicating risk and**  
**confidence levels**

Reporting and documenting design rationale

**figures of before vs after structures** **clear mechanism**  
**and objective statements** **notebooks and files for**  
**reproducibility**