

## Systems Biology Foundations & Standards — Hands-on

Build a rigorous foundation in systems biology and community standards for executable models. This module connects conceptual modeling paradigms with SBML, SBGN and COMBINE Archives so that your pathway and network models are reusable, shareable and compliant with FAIR principles.

# Systems Biology Foundations & Standards

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### Session 1

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

## Systems Biology Concepts & Modeling Paradigms

From pathways to systems level behavior

**feedback and feedforward loops** | **homeostasis and oscillations** | **emergent properties**

Modeling formalisms and assumptions

**ODE and deterministic models** | **stochastic and Gillespie view** | **logical and constraint based**

States, parameters and observables

**species and compartments** **rate laws and units**  
**linking data to models**

### **Session 2**

**Fee: Rs 11800** Apply Now

## **SBML, SBGN & Model Encodings**

SBML structure and common patterns

**species and reactions** **parameters and rules** **events**  
**and initialisation**

SBGN diagrams and pathway communication

**process description maps** **entity relationship views**  
**activity flow schematics**

FAIR friendly metadata and archives

**annotations and ontologies** **COMBINE Archive basics**  
**MIRIAM style reporting**

### **Session 3**

**Fee: Rs 14800** Apply Now

## **Repositories, Tools & Workflows**

Model repositories and discovery

**BioModels and CellML** **JWS Online and VCell**  
**community curated models**

Simulation and analysis toolchain

**COPASI and tellurium** **Python based workflows**  
**parameter scans and basic sensitivity**

Reproducible configurations

**environment capture** **version control of models**  
**notebooks and reports**

**Session 4**

**Fee: Rs 18800** Apply Now

## Mini Capstone: Pathway to Executable Model

From pathway diagram to SBML and SBGN

**Theory + Practical**

Basic simulations and scenario analysis

**time course runs** **parameter changes** **qualitative sensitivity**

Packaging and documentation

**COMBINE Archive** **metadata and README** **FAIR oriented deliverables**