

Constraint-Based Metabolic Modeling (FBA/FVA) — Hands-on

Build, simulate, and analyze metabolic network models with constraint-based methods. You will learn curation of genome-scale models (GEMs), objective functions, bounds, and exchange reactions; run FBA/FVA/pFBA; perform gene/reaction knockouts; and generate phenotype predictions and strain designs. Models and reports are packaged with community standards (SBML, COBRA format, MEMOTE).

Constraint-Based Metabolic Modeling (FBA/FVA)

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Session 1

Fee: Rs 8800 [Apply Now](#)

GEM Basics, Media & Model Setup

Model anatomy & standards

[SBML / COBRA format](#) [GPR rules](#) [BiGG / ModelSEED](#)

Media, exchange & biomass objective

[bounds & uptake limits](#) [transport/leakage](#) [biomass calibration](#)

Toolchain

COBRApy / COBRA Toolbox (MATLAB) **OptFlux /**
cameo **memote / Escher**

Session 2

Fee: Rs 11800 Apply Now

FBA/FVA, pFBA & Pathway Analysis

Steady-state & optimality concepts

S·v = 0, bounds **LP formulation** **shadow prices**

Analyses

FBA / FVA **parsimonious FBA (pFBA)** **GIMME/iMAT**
overview

Visualization & reporting

Escher maps **flux distributions** **pathway summaries**

Session 3

Fee: Rs 14800 Apply Now

Knockouts, Design & Data Integration

Essentiality & lethality screens

single/double gene KO **reaction deletions** **synthetic**
lethality

Strain design & MILP formulations

OptKnock/OptGene **room/MOMA** **production**
envelopes

Contextualization & dynamics (overview)

transcriptomics: iMAT/GIMME **rFBA / dFBA concepts**
basic validation vs. growth data

Session 4

Fee: Rs 18800 [Apply Now](#)

Mini Capstone: From Curation to Simulation

Case study: media design, FBA/FVA and KO predictions for a product/growth trade-off

Theory + Practical

Packaging & QC

SBML + JSON model **memote summary** **Escher map exports**

Deliverables

PDF/HTML report **.sbml / .mat / .json**
requirements.txt/environment.yml