

Biological Networks — Construction, Topology & Community Detection (Hands-on)

Learn how to construct, analyze, and interpret biological networks from omics and literature sources. You will build graphs (PPI, gene–gene co-expression, metabolite–reaction, microbe–microbe) and apply robust topology analysis, centrality measures, and community detection to uncover modules and pathway-level insights. Deliverables include a reproducible notebook and a polished Cytoscape session.

Biological Networks: Construction, Topology & Community Detection

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Session 1

Fee: Rs 8800 [Apply Now](#)

Data Sources & Network Construction

Network types & use-cases

[PPI / gene co-expression](#) [regulatory / metabolite–reaction](#) [microbiome co-occurrence](#)

Data ingestion & curation

[edge lists / SIF / GraphML](#) [identifier mapping](#)

thresholds & filtering

Toolchain

Cytoscape | igraph / NetworkX | NDEx | Gephi

Session 2

Fee: Rs 11800 | Apply Now

Topology, Centralities & Robustness

Global & local structure

degree/strength distributions | clustering, path
lengths | assortativity & motifs

Centrality portfolio

degree / betweenness / closeness | eigenvector /
PageRank | k-core / articulation

Null models & robustness

configuration model | percolation/attack simulations
statistical testing

Session 3

Fee: Rs 14800 | Apply Now

Community Detection & Module Biology

Algorithms & selection

Louvain / Leiden | Infomap / Walktrap | label
propagation

Validation & interpretation

modularity Q / conductance | stability / consensus
clustering | NMI/AMI vs. references

Biology of modules

GO/KEGG enrichment **driver nodes & targets** **visual encodings in Cytoscape**

Session 4

Fee: Rs 18800 [Apply Now](#)

Mini Capstone: Network Analysis Report

From raw table to insights: build, analyze & visualize a network

Theory + Practical

Reproducible outputs & packaging

notebook + Cytoscape .cys **GraphML/SIF exports**
module annotations

Deliverables

PDF/HTML report **.graphml / .sif / .cys**
requirements.txt/environment.yml