Network Medicine & Disease Module Detection — Hands-on

Learn how to apply network science to human disease. This module introduces network medicine concepts, construction of interactomes and multi layer networks, and algorithmic strategies for detecting disease modules and subnetworks associated with phenotypes. You will implement random walk and diffusion based methods, centrality and community detection, and link network modules to biomarkers, comorbidities and drug repurposing hypotheses using Python, R and Cytoscape based workflows.

Network Medicine & Disease Module Detection

Help Desk · WhatsApp

Session Index

Session 1

Fee: Rs 8800 Apply Now

Network Medicine Foundations & Data Sources

Principles of network medicine

disease as network perturbation | **disease modules & neighborhoods** | **network based risk and resilience**

Network types & construction

PPI networks / co expression networks | **gene disease and drug disease bipartite graphs** | **multi layer and**

multiplex networks

Data sources & toolchain overview

STRING / BioGRID / IntAct | DisGeNET / OMIM (overview) | Cytoscape, igraph, NetworkX

Session 2

Fee: Rs 11800 Apply Now

Disease Module Detection & Network Propagation

Community detection & subnetworks

modularity based clustering | Louvain / Leiden (overview) | seed based module extraction

Network propagation & diffusion methods

random walk with restart (RWR) | heat diffusion & network smoothing | guilt by association scores

Scoring, ranking & validation

centrality and proximity measures | enrichment of known disease genes | cross validation and null models

Session 3

Fee: Rs 14800 Apply Now

Biomarkers, Comorbidities & Drug Repurposing

Network based biomarker and target discovery

hub and bottleneck analysis | module level signatures linking to omics differential signals

Comorbidity & disease disease networks

shared gene and pathway mechanisms | disease proximity and overlap | interpreting comorbidity patterns

Drug repurposing & network proximity

drug target networks **drug disease proximity metrics** **prioritizing candidates for follow up**

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Disease Module Discovery Project

End to end mini project on one disease or phenotype

Theory + Practical

From seeds to modules and hypotheses

seed selection from omics or literature **module detection and propagation** **biological and clinical interpretation**

Deliverables

PDF/HTML network medicine report **Python/R notebook and Cytoscape session** **environment.yml / requirements.txt**