

Longitudinal Microbiome Dynamics & Time-Series Modeling

— Hands-on

Learn how to handle microbiome data collected over time rather than single snapshots. This module focuses on longitudinal study design, temporal diversity metrics, trajectories and transitions, and the use of mixed effects and basic time series models to relate microbiome dynamics with clinical or environmental variables.

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Session 1

Fee: Rs 8800 [Apply Now](#)

Longitudinal Study Designs & Data Structures

Types of longitudinal microbiome designs

[repeated measures cohorts](#) [intervention and crossover designs](#) [time varying exposures and outcomes](#)

Data structures for longitudinal analysis

[wide vs long tables](#) [subject identifiers and visit](#)

times handling irregular sampling and dropouts

Toolchain setup in R and Python

tidyverse / data.table pandas for long format data
basic visual checks over time

Session 2

Fee: Rs 11800 Apply Now

Temporal Diversity, Trajectories & Visualisation

Tracking alpha and beta diversity over time

within subject diversity trajectories distance to
baseline measures stability vs volatility metrics

Visualising longitudinal microbiome changes

spaghetti plots and smoothed lines stacked barplots
over time animated or faceted ordination views

Simple transition and state summaries

state definitions for communities transition matrices
overview time in state and switching frequency

Session 3

Fee: Rs 14800 Apply Now

Time-Series & Mixed-Effects Modeling

Mixed-effects models for repeated microbiome measures

random intercept and slope ideas lme4 / nlme style
syntax in R handling time varying covariates

Basic time series concepts for microbiome data

autocorrelation and partial autocorrelation lagged
features and simple AR style ideas smoothing and
spline based time trends

Linking dynamics to outcomes and exposures

baseline vs change and rate of change **simple joint models overview** **interpreting model coefficients and plots**

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: Longitudinal Microbiome Story

Designing a longitudinal analysis for one dataset

guided theory plus practical

Building temporal diversity, trajectory and model outputs

per subject trajectories and summaries **one mixed effects or time series model** **clear plots for manuscripts or presentations**

Deliverables: longitudinal report and figure set

PDF or HTML summary **time series figures and tables** **methods notes for reproducibility**