Microbiome Ecology — Alpha/Beta Diversity & Ordination — Hands-on

Gain practical skills in microbiome ecology by moving from feature tables to diversity metrics and ordination plots that actually answer biological questions. This module covers alpha and beta diversity, distance measures, ordination (PCoA/NMDS), PERMANOVA style testing and ecological visualizations using R, phyloseq and vegan.

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Session 1
Fee: Rs 8800 Apply Now

From Feature Tables to Ecology Concepts

Ecological view of microbiome feature tables

samples as communities **features as species or ASVs** **abundance vs presence/absence**

Key ecology notions for microbiome data

richness, evenness and dominance **niche, turnover and dispersion** **within vs between community**

differences

Toolchain: R, phyloseq and vegan basics

importing feature tables and metadata phyloseq objects quick community summaries

Session 2
Fee: Rs 11800 Apply Now

Alpha Diversity & Rarefaction

Richness and diversity indices

Observed richness / Chao1 Shannon / Simpson phylogenetic diversity overview

Depth, rarefaction and normalization choices

rarefaction curves and their limits minimum depth decisions alternatives to rarefaction

Visualising alpha diversity and testing associations

boxplots and violin plots in R non parametric tests adjusting for covariates overview

Session 3
Fee: Rs 14800 Apply Now

Beta Diversity, Ordination & PERMANOVA

Distance and dissimilarity measures

Bray−Curtis and Jaccard UniFrac (unweighted/weighted) when to use which metric

Ordination methods and interpretation

PCoA vs NMDS vs PCA stress and fit diagnostics overlaying metadata and gradients

Testing group differences: PERMANOVA and friends

adonis/adonis2 in vegan permutation based p values dispersion and centroid checks

Session 4
Fee: Rs 18800 Apply Now

Mini Capstone: Ecology Dashboard in R

Designing an ecology focused analysis for one dataset

guided theory plus practical

Building alpha/beta diversity and ordination panels in R

phyloseq and vegan plotting group overlays and centroids PERMANOVA summary outputs

Deliverables: ecology summary sheet and figures

alpha diversity table and plots ordination figure with interpretation short narrative for reports or manuscripts