

Soil Microbiome & Biogeochemical Cycles Modeling — Hands-on

Build end-to-end, decision-focused soil microbiome analytics linked to biogeochemical cycling. You will plan soil sampling and metadata collection, run amplicon/shotgun pipelines, reconstruct MAGs and annotate pathways, and translate community structure into process-level inferences for carbon, nitrogen, phosphorus and sulfur cycles. The module integrates geospatial modeling, environmental covariates, and simple process/stoichiometric models for actionable maps and reports.

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Session Index

[Session 1 — Soil Sampling, Metadata & Covariates](#) [Session 2 — Amplicon/Shotgun Pipelines & MAGs](#) [Session 3 — Pathways & Cycle Inference \(C/N/P/S\)](#) [Session 4 — Geospatial Models, Flux Maps & Reporting](#)

Session 1

Fee: Rs 8800 [Apply Now](#)

Soil Sampling, Metadata & Covariates

Sampling design & stratification

[depth horizons & cores](#) [replicates & blocking](#)
[seasonality/time series](#)

Metadata & edaphic measurements

[pH, SOC, texture, moisture](#) [temperature & rainfall](#)

management & land use

Standards & data capture

MIxS/ENVO fields GPS & geotag QA/QC chain-of-custody & SOPs

Session 2

Fee: Rs 11800 Apply Now

Amplicon/Shotgun Pipelines & MAGs

Amplicon & shotgun foundations

16S/ITS for soils QC, assembly & profiling contamination controls

MAGs: binning & QA/QC

binning/refinement quality (completeness/contam.) taxonomy & dereplication

Functional profiling

HUMANn/DRAM annotations KO/EC/MetaCyc/KEGG ARGs & nitrogen genes (nif/nos)

Session 3

Fee: Rs 14800 Apply Now

Pathways & Cycle Inference (C/N/P/S)

Cycle markers & stoichiometry

carbon decomposition/enzymes nitrification/denitrification genes P & S turnover pathways

From potential to process

indices & composite scores link to soil chemistry uncertainty & sensitivity

Simplified process models (overview)

first-order/Arrhenius kinetics **enzyme-kinetic soil models** **data→flux heuristics**

Session 4

Fee: Rs 18800 Apply Now

Geospatial Models, Flux Maps & Reproducible Reporting

Geo-statistics & mapping

kriging/IDW interpolations **covariate models (RF/GBM)** **QGIS/leaflet outputs**

Flux indicators & risk layers

C mineralization/N₂O potential **hotspots/hot moments management scenarios**

Reporting & deliverables

Quarto notebooks & dashboards **tables/figures + env files** **SOPs & limitations**