Environmental Metagenomics & eDNA — Hands-on

Learn how to design, execute and analyse environmental metagenomics and environmental DNA (eDNA) surveys across water, soil and air. This module covers field sampling and filtration strategies, DNA extraction and QC, sequencing based community profiling and biodiversity reporting for ecology, conservation and environmental monitoring programs.

Environmental Metagenomics & eDNA

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Session Index

Session 1

Fee: Rs 8800 Apply Now

Environmental Metagenomics & eDNA Foundations

What is environmental metagenomics and eDNA

water, soil, sediment and air based surveys
community profiling versus targeted detection
applications in ecology, conservation and monitoring

Study design for environmental and eDNA projects

defining questions, scales and sampling frames
replication, controls and temporal designs
choosing amplicon, shotgun or hybrid approaches

Contamination, degradation and detection limits in eDNA

sources of contamination and field blanks **environmental DNA persistence and decay** **limits of detection and occupancy style thinking**

Session 2

Fee: Rs 11800 Apply Now

Field Sampling, Filtration & DNA Extraction

Field sampling protocols for water, soil and sediments

grab versus integrated samples **depth, volume and replicate strategies** **metadata capture for environmental context**

Filtration and concentration strategies for eDNA

filter types, pore sizes and clogging issues **on site versus lab based filtration** **preservation buffers and storage conditions**

DNA extraction and QC for environmental matrices

dealing with inhibitors and low biomass **yield, purity and integrity checks** **aliquoting strategy for sequencing and archiving**

Session 3

Fee: Rs 14800 Apply Now

eDNA Bioinformatics & Biodiversity Profiling

Amplicon and shotgun options for eDNA analysis

marker choice for taxa of interest **primer bias and reference coverage** **multi marker and multi kingdom strategies**

Bioinformatics pipelines for eDNA reads to taxa

QC, trimming and chimera awareness **ASVs, OTUs**

and direct classification **reference databases and confidence scoring**

Biodiversity metrics and ecological summaries from eDNA

richness, diversity and evenness indices **beta diversity and community shifts** **indicator species and detection maps**

Session 4

Fee: Rs 18800 Apply Now

Mini Capstone: eDNA Survey to Biodiversity Report

End to end environmental eDNA workflow on a case study

theory plus guided practical from raw reads

Translating outputs into biodiversity and monitoring insights

species lists and detection confidence views **maps, trend plots and risk flags** **communicating caveats to non specialists**

Deliverables: pipeline sketch, result tables and survey report

analysis notebook or command log **species by site matrices and diversity summary** **PDF or HTML environmental eDNA report**