Genome Assembly, Variant Calling & Annotation — Hands-on

Gain expertise in genome assembly, variant calling, and functional annotation with end-to-end, reproducible hands-on labs.

Genome Assembly, Variant Calling & Annotation

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Session Index

Session 1

Fee: Rs 6300 Apply Now

Assemblies & Polishing

De novo vs reference-guided assembly strategies

Theory

Short/long-read assemblers & hybrid approaches

SPAdes **MEGAHIT** **Flye** **Canu**

Polishing, scaffolding & assembly QC

Pilon **Racon** **QUAST** **BUSCO**

Session 2
Fee: Rs 8400 Apply Now
Mapping & Preprocessing

Read alignment for short/long reads; primary metrics
BWA-MEM2 Bowtie2 minimap2

SAM/BAM processing: sorting, indexing, duplicates, calibration
samtools Picard GATK BQSR

Coverage, insert-size & library complexity checks
mosdepth RSeQC preseq

Session 3
Fee: Rs 11200 Apply Now
Variant Calling & Annotation

SNP/indel callers, joint calling & cohort VCFs
GATK HaplotypeCaller bcftools FreeBayes

Filtering, normalization & quality models
GATK VQSR Hard filters bcftools norm

Functional effects & structural variants
SnpEff VEP Manta/Delly

Session 4
Fee: Rs 14000 Apply Now
Mini Capstone: AVA Pipeline

Design end-to-end assembly→variants→annotation workflow
Theory

Automate mapping, calling, filtering & reports

Snakemake Conda/Mamba MultiQC

Deliver VCFs, annotated tables & dashboards

pandas JupyterLab Quarto