

Bioinformatics Technician Competency Matrix

Competency Area	Competency	Entry Level	Mid Level	Advanced Level
Core Lab Skills	Molecular Biology Techniques	Perform basic DNA/RNA extraction, PCR/qPCR, sequencing preparation, and genotyping.	Can independently run standard molecular assays and troubleshoot common lab issues.	Designs experiments, optimizes protocols, and trains others in advanced molecular biology methods.
Computational Skills	Bioinformatics Software Proficiency	Operate basic sequence analysis tools such as BLAST and MEGA.	Use multiple software platforms for sequence annotation, genome browsing, and comparative genomics.	Develops custom scripts, integrates multiple bioinformatics pipelines, and automates workflows.
Computational Skills	Genomic Data Management	Enter and organize sequence data in spreadsheets or simple databases.	Maintain and curate datasets in specialized bioinformatics databases with proper annotation standards.	Implements large-scale data management systems, ensuring compliance with metadata and FAIR data principles.
Computational Skills	Sequence Alignment & Assembly	Perform guided multiple sequence alignments using software defaults.	Independently run genome assembly pipelines and adjust parameters for accuracy.	Develops or customizes assembly algorithms, resolves complex genome assemblies, and validates outputs.
Computational Skills	Database Navigation & Mining	Search NCBI or GenBank for specific sequences and datasets.	Retrieve and filter relevant datasets from multiple public and private databases.	Integrates multiple databases into automated data mining workflows for large-scale projects.
Computational Skills	Data Visualization	Generate basic graphs and charts from bioinformatics outputs.	Produce publication-quality phylogenetic trees, heatmaps, and genomic maps.	Designs advanced interactive dashboards and 3D genome visualizations for research teams.
Computational Skills	Statistical & Computational Analysis	Run basic statistical analyses with Excel or simple R scripts.	Perform advanced statistical modeling in R or Python for biological data.	Develops predictive computational models and machine learning tools for pathogen data.
Domain Knowledge	Pathogen Genomics & Epidemiology	Understand basic pathogen classification and detection methods.	Analyze genetic markers for virulence, resistance, and epidemiological tracing.	Leads genomic surveillance projects and develops novel molecular epidemiology strategies.
Computational Skills	Laboratory Information Management Systems (LIMS)	Enter sample data into LIMS accurately.	Configure and maintain LIMS workflows for lab processes.	Integrates LIMS with sequencing platforms and bioinformatics databases.
Regulatory & Compliance Skills	Biosecurity Protocol Adherence	Follow established biosafety and data security guidelines.	Ensure team compliance with BSL protocols and regulatory data protection standards.	Designs, audits, and improves biosecurity and biosafety programs at institutional level.