

HANDS-ON MOLECULAR BIOLOGY TECHNIQUES TRAINING

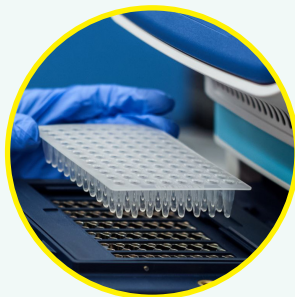
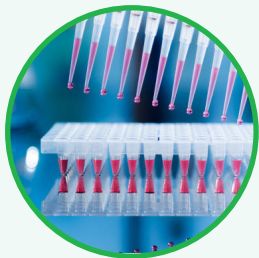
20th - 24th
APRIL 2026

Course Overview

This intensive training program provides participants with practical experience in molecular biology techniques thus this course will delve into the fascinating world of molecular biology. Whether you are a budding scientist, an experienced researcher or a curious student, the course is designed to equip you with essential skills and the underlying principles for working in a molecular biology laboratory.

Target Audience:

This course is suitable for researchers, scientists, laboratory analysts, laboratory technologists, technicians, and students seeking practical competence in modern molecular biology workflows.



Day 1	20-04-26	EVENTS
09:00 – 10:00 am		Introduction to Molecular Biology & Laboratory Foundations Registration, Orientation & Training Overview <ul style="list-style-type: none"> Registration, introductions, expectations Training goals, learning outcomes, and assessment approach Overview of molecular biology techniques and their applications in research, diagnostics, and biotechnology
10:00 – 10:30 am		TEA- BREAK
11:00 – 12:30 p.m		Biosafety & Laboratory Good Practices <ul style="list-style-type: none"> Laboratory Safety Procedures & Biosafety, BSLs, hazard identification, risk assessment, Aseptic techniques, contamination prevention, PPE use, contamination control, and waste management Good Laboratory Practice (GLP) and ISO 15189/17025 considerations
12:30 – 14:00 p.m		LUNCH - BREAK
14:00 – 16:30 p.m		Molecular Biology Laboratory Setup, Operations & Equipment <ul style="list-style-type: none"> Workflow layout, Prevention of cross-contamination & Dedicated areas for pre-PCR and post-PCR handling Overview of essential instruments/equipment, their use and proper handling: Micro-pipettes, Biosafety cabinets, Microcentrifuges, Vortex, thermal block, gel systems, PCR and qPCR systems, Calibration and verification requirements Structure, Stability & Handling of Nucleic acids (DNA/RNA) Enzymes, reagents in molecular workflows, Buffer chemistry and preparation

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Day 2	21-04-26	EVENTS
09:00 – 10:30 am		DNA/RNA Isolation, Purification & Validation Principles of Nucleic Acid Extraction <ul style="list-style-type: none"> Cell lysis, protein denaturation, nucleic acid precipitation, degradation and contamination avoidance, Sample handling, storage, and chain of custody High-Throughput Genomic DNA Extraction <ul style="list-style-type: none"> Column-based & magnetic bead-based extraction workflows Extraction of genomic DNA from biological samples (bacterial, plant, or tissue)
10:30 – 11:00 am		TEA- BREAK
11:00 – 12:30 p.m		DNA Purification Techniques <ul style="list-style-type: none"> Removal of proteins, polysaccharides, inhibitors. Concentration and cleanup methods (spin columns, ethanol precipitation) Isolation & Purification of RNA <ul style="list-style-type: none"> RNase-free workspace preparation, Handling RNA samples and Total RNA isolation using kits
12:30 – 14:00 p.m		LUNCH - BREAK
14:00 – 16:30 p.m		Validation of DNA/RNA Extraction, Molecular Biology Records & Data Handling <ul style="list-style-type: none"> Using fluorometers for quantification, Interpreting A260/280 and A260/230 ratios Integrity evaluation- gel or TapeStation overview Documentation of extraction results & troubleshooting low yields and contamination

Day 3	22-04-26	EVENTS
09:00 – 10:30 am		PCR, RT-PCR & Real-Time PCR Workflows Basics, Applications of PCR and Setup for cDNA Synthesis (RT-PCR) <ul style="list-style-type: none"> Principles of DNA amplification, Primer design basics and reaction optimization Types of PCR: endpoint PCR, RT-PCR, qPCR, dPCR Reverse transcription principles (cDNA synthesis from RNA samples) & Optimization of RT conditions
10:30 – 11:00 am		TEA- BREAK
11:00 – 12:30 p.m		Amplification of Gene of Interest and Interpretation of Conventional PCR Results <ul style="list-style-type: none"> Thermal-cycler programming, setting up master mixes, controls, and templates & Running PCR amplification of selected targets Expected band sizes, troubleshooting non-specific amplification, PCR inhibitors and how to manage them
12:30 – 14:00 p.m		LUNCH - BREAK
14:00 – 15:30 p.m		Real-Time PCR (qPCR): Principles, Set Up, Quantitative Applications & Data Interpretation <ul style="list-style-type: none"> SYBR Green and TaqMan, Amplification curves, Ct values, melt curves, Absolute vs relative quantification Plate layout: standards, controls, replicates Preparing, loading qPCR reactions & Running qPCR on instrument Efficiency calculations, Standard curve generation, Identification of poor amplification, primer-dimers, outliers

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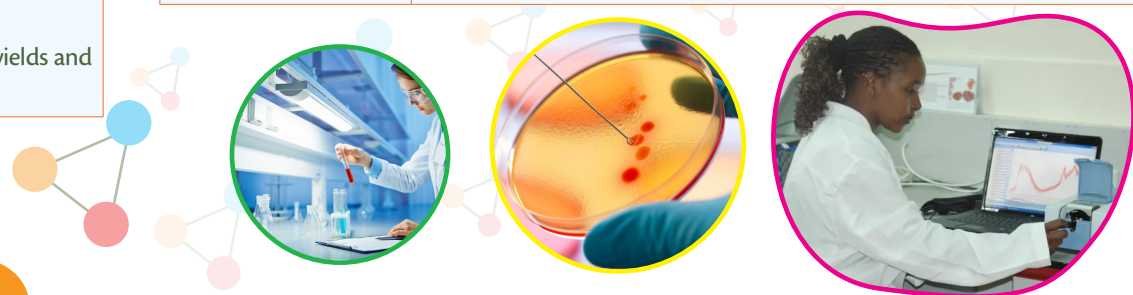
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Day 4	23-04-26	EVENTS
09:00 – 10:30 am		Gel Electrophoresis, Nucleic Acid Quantification & Microarrays Agarose Gel Preparation, Casting Loading & Running Samples <ul style="list-style-type: none"> Choosing gel concentration, Buffer preparation (TAE/TBE), Safe handling of stains & Casting gels Preparing ladders, loading dyes & Loading PCR products Electrophoresis & Analysis of DNA Bands <ul style="list-style-type: none"> Power settings, run time, safety, visualization & gel imaging Interpretation of band patterns-: size, intensity, specificity
10:30 – 11:00 am		TEA- BREAK
11:00 – 12:30 p.m		Microarray Experimentation <ul style="list-style-type: none"> Concept of DNA/RNA hybridization Types of microarrays (gene expression, SNP detection) and Applications in genomics & transcriptomics
12:30 – 14:00 p.m		LUNCH - BREAK
14:00 – 15:30 p.m		Using DNA/ RNA Microarrays <ul style="list-style-type: none"> Workflow overview: labeling → hybridization → washing → scanning Monitoring abundance of DNA/RNA Gene expression profiling & Interpretation of heat maps and expression data

Day 5	24-04-26	EVENTS
09:00 – 10:30 am		Molecular Cloning, Troubleshooting & NGS Workflows Molecular Cloning Techniques <ul style="list-style-type: none"> Restriction digestion overview, Ligation strategies (sticky vs blunt ends) & Vector preparation (plasmids) Host Cell Transformation, Replication & Expression <ul style="list-style-type: none"> Competent cell preparation, Heat-shock and electroporation methods Colony screening (PCR/blue-white screening) Confirmation of Successful Cloning <ul style="list-style-type: none"> Miniprep DNA extraction, PCR confirmation and restriction digestion and Interpretation of results DNA Sequencing <ul style="list-style-type: none"> Sanger sequencing workflow and when to use Sanger vs Next Generation Sequencing (NGS)
10:30 – 11:00 am		TEA- BREAK
11:00 – 12:30 p.m		Next Generation Sequencing (NGS) and its Workflow <ul style="list-style-type: none"> Types of NGS platforms (Illumina, Ion Torrent, Nanopore) & Applications (whole genome, amplicon sequencing, metagenomics) Sample QC → library preparation → sequencing → data analysis Indexing, adapters, and fragment size selection NGS Applications & Practical Insights <ul style="list-style-type: none"> Variant detection, Microbial identification, Transcriptomics and RNA-seq & Interpretation of sequencing data
12:30 – 14:00 p.m		LUNCH - BREAK
14:00 – 15:00 p.m		Recap of the course, closing ceremony and issuance of certificates



Deadline: 10th April 2026

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APRIL 2026

Cost Kes. 125,000.00
or USD 1,200.00
exclusive of taxes

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