UNIVERSITY OF HEALTH SCIENCES, LAHORE

Zero Module – M.Phil. MLS

Special Module: MLS Molecular Pathology & Cytogenetics

Institute of Allied Health Sciences

Activity	Details and Learning Outcomes	Setting	Duration
DNA / RNA Extraction & Quality Assessment	• Manual and kit-based extraction of DNA and RNA from diverse biological samples • Quantification and purity assessment using NanoDrop spectrophotometry • Agarose gel preparation and electrophoretic separation of nucleic acids • Visualization, image acquisition, and documentation using gel documentation system • Extract high-quality DNA and RNA suitable for downstream molecular assays • Evaluate nucleic acid concentration, purity, and integrity accurately • Compare efficiency and applicability of manual versus kit-based extraction methods • Apply biosafety, GLP, and proper molecular laboratory documentation practices	IAHS Lab, UHS, JC, KSK	1 Month
Conventional PCR & Amplification Optimization	• In-silico primer designing for target-specific gene amplification • Execution of simple conventional PCR reactions • Optimization of PCR conditions using gradient and touchdown PCR • Reverse transcriptase PCR including cDNA synthesis and amplification • Design and validate primers for molecular diagnostic and research applications • Perform and optimize conventional PCR assays with high specificity • Differentiate and apply various PCR strategies based on experimental needs	IAHS Lab, UHS, JC, KSK	1 Month

	• Interpret PCR amplification results and troubleshoot technical errors		
Real-Time PCR & Quantitative Gene Analysis	• Setup and execution of real-time quantitative PCR (qPCR) assays • Generation and analysis of amplification curves and Ct values • Relative and absolute quantification of gene expression • Melt curve analysis for product specificity and assay validation • Perform real-time PCR for quantitative molecular analysis • Accurately interpret qPCR data including Ct values and amplification kinetics • Assess specificity and reliability of qPCR assays using melt curve analysis • Apply qPCR findings in molecular pathology and cytogenetic research contexts	IAHS Lab, UHS, JC, KSK	1 Month

TRAINEE DAILY LOG

1. Trainee Information

Name of Postgraduate Student: _____

Rotation / Selection: Molecular Pathology & Cytogenetics

2. Daily Attendance & Timings

Arrival Time: _____ Departure Time: _____

3. Activities Performed Today:

a) Nucleic Acid Handling & Analysis

☐ DNA Extraction (Manual)
☐ DNA Extraction (Kit-based)
☐ RNA Extraction
☐ Nucleic Acid Quantification (NanoDrop)
☐ Agarose Gel Preparation
☐ Gel Electrophoresis
☐ Gel Documentation

b) PCR-Based Techniques

☐ Primer Designing
☐ Conventional PCR
☐ Gradient PCR
☐ Touchdown PCR
☐ Reverse Transcriptase PCR (RT-PCR)

c) Real-Time PCR Techniques

☐ Real-Time PCR (qPCR) Setup
☐ Quantitative PCR Run
☐ Ct Value Analysis
☐ Melt Curve Analysis

d) Supporting Laboratory Activities

☐ Reagent / Master Mix Preparation
☐ Instrument Setup & Calibration
☐ Use of Controls (Positive / Negative)
☐ SOP-based Laboratory Practice

DAILY REFLECTION & SUPERVISOR COMMENTS

4. Daily Reflection (Trainee)

5. Supervisor's Comments

6. Signatures

Postgraduate Student: _____

Supervisor / Focal Person: _____

UHS Coordinator (if applicable): _____

END OF ROTATION EVALUATION PROFORMA

Zero Module – M.Phil. Molecular Pathology & Cytogenetics

Discipline: Molecular Pathology & Cytogenetics

Department: Institute of Allied Health Sciences

Supervisor / Focal Person: _____

Health Institution / Department: _____

2. Evaluation Criteria

☐ Punctuality & Attendance

☐ Professional Behavior & Ethics

☐ Laboratory / Diagnostic Competence

☐ Clinical Reasoning & Interpretation Skills

☐ Execution of Molecular / Cytogenetic Techniques

☐ Documentation & Reporting

☐ Communication with Faculty / Staff

☐ Teamwork & Cooperation

☐ Critical Thinking & Problem Solving

☐ Overall Professional Attitude

SUPERVISOR'S NARRATIVE EVALUATION

Strengths:

Areas Needing Improvement:

Recommendations:

Overall Performance: ☐ Excellent ☐ Good ☐ Satisfactory ☐ Needs Improvement

Supervisor / Focal Person: _____

Postgraduate Student: _____

UHS Coordinator (if applicable): _____

UNIVERSITY OF HEALTH SCIENCES, LAHORE

Institute of Allied Health Sciences

SAMPLE REPORT

Test: _____

Sample ID: _____

Method: _____

Result: _____

Interpretation: _____

Note: _____

Prepared By: _____

Verified By: _____

Date: _____