Advanced Histopathology and Tissue Processing Training Course

Professional Development Training Course Outline

Category	Biotechnology and Pharmaceutical Development	**Duration**	10 Days
Base Fee	$4,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The field of Histopathology is at the forefront of Precision Diagnostics, serving as the definitive link between tissue pathology and patient management, particularly in Oncology and Molecular Medicine. The demand for Diagnostic Excellence mandates continuous professional development in both classical and contemporary techniques. Advanced Histopathology and Tissue Processing Training Course is meticulously designed to bridge the gap between foundational laboratory skills and the complex requirements of modern Clinical Pathology and Biomedical Research. It provides an intensive, hands-on immersion in state-of-the-art Tissue Processing and Advanced Staining Techniques, directly tackling the procedural challenges that impact Specimen Quality and Diagnostic Accuracy.

This training specifically focuses on mastering the intricacies of Immunohistochemistry (IHC), navigating the rapidly evolving landscape of Digital Pathology, and implementing stringent Quality Assurance (QA) and Regulatory Compliance in high-throughput environments. Participants will gain critical expertise in Complex Specimen Dissection and specialized processing workflows for delicate and rare tissue types. By integrating technical skill development with Case-Based Learning and Workflow Optimization, this course ensures graduates are proficient, adaptable, and ready to lead their institutions towards achieving the highest standards in Pathology Laboratory Management and contributing vital information for Personalized Healthcare.

Programme Curriculum

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Introduction

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Course Duration

10 days

Course Objectives

1. Master Complex Specimen Dissection and Grossing protocols for high-stakes surgical resections.
2. Implement Advanced Fixation Strategies to optimize tissue preservation for subsequent molecular analysis
3. Troubleshoot and resolve common and complex Tissue Processing Artifacts and errors.
4. Attain high proficiency in Cryosectioning and Microtomy for hard, fatty, and delicate tissues
5. Execute specialized Decalcification and Resin Embedding techniques for research-grade specimen analysis.
6. Apply a comprehensive range of Special Stains and Histochemical Techniques for definitive diagnosis.
7. Design and validate multi-marker panels using Multiplex Immunohistochemistry (IHC).
8. Interpret and digitally analyze slides using Digital Pathology and Image Analysis Software.
9. Develop robust Quality Control (QC) and Quality Assurance (QA) programs specific to the advanced histology lab.
10. Ensure Regulatory Compliance in all tissue processing and diagnostic workflows.
11. Integrate Computational Pathology tools and Artificial Intelligence (AI) principles into daily practice.
12. Analyze and manage Workflow Optimization to improve laboratory turnaround time (TAT) and efficiency.
13. Utilize Real-World Case Studies to inform clinical decision-making and multidisciplinary team (MDT) discussions.

Target Audience

1. Histology Technicians & Technologists.
2. Senior Biomedical Scientists (BMS) in Pathology/Histology.
3. Pathology Residents & Fellows requiring in-depth technical lab knowledge.
4. Medical Laboratory Scientists focused on diagnostic specialization.
5. Quality Assurance & Compliance Officers in clinical or research laboratories.
6. Pathology Assistants involved in grossing and specimen triage.
7. Laboratory Managers & Supervisors.

8. Biomedical Researchers who process and analyze their own complex tissue samples.

Course Modules

Module 1: Advanced Specimen Grossing and Triage

- Principles of Macroscopic Examination and Inking.
- Complex Surgical Resection Dissection Protocols
- Specialized techniques for Core Biopsies and small fragments.
- Protocols for Tumor Banking and research specimens.
- Case Study: Dissection of a multi-nodular thyroidectomy for malignancy.

Module 2: Chemical Principles of Fixation and Processing

- Optimization of Formalin Fixation for IHC and Molecular preservation.
- Non-aqueous and alternative fixatives
- Tissue Permeabilization and factors affecting subsequent staining.
- Chemistry of Dehydration and Clearing agents and their artifacts.
- Case Study: Evaluating the impact of delayed fixation on HER2/neu expression in breast tissue.

Module 3: Non-Routine Tissue Processing

- Protocols for Hard and Dense Tissues
- Advanced Decalcification methods
- Specialized techniques for Adipose Tissue and brain/nerve tissue.
- Microwave-Assisted Processing and rapid protocols.
- Case Study: Processing a large bone resection for osteosarcoma, from fixation to embedding.

Module 4: Embedding and Microtomy Mastery

- Optimal tissue orientation for different specimens
- Troubleshooting difficult blocks
- Techniques for creating whole-slide mounts.
- Cryomicrotomy for specialized frozen sections and MOHS surgery.
- Case Study: Resolving grossing and cutting artifacts in skin elliptical excisions.

Module 5: Quality Control and H&E Staining

- Principles of the Hematoxylin and Eosin (H&E) reaction.
- Systematic identification of Staining Artifacts
- Automated Stainer validation and preventative maintenance.
- Establishing Reference Standards for H&E color and quality.
- Case Study: A QC audit identifies a formalin contamination causing nuclear bubbling artifact.

Module 6: Advanced Histochemical Stains

- Theory and application of Connective Tissue Stains
- Stains for Microorganisms and Pigments
- Quantification and interpretation of results.
- Validation and documentation of in-house stain procedures.
- Case Study: Using a panel of special stains to differentiate a lung nodule as infectious vs. neoplastic.

Module 7: Fundamental Immunohistochemistry (IHC)

- Epitope Retrieval Methods and optimization.
- Selection of primary antibodies and IHC Panel Design.
- Detection Systems and chromogens.
- Validation and Titration procedures for new antibodies.
- Case Study: Troubleshooting weak positivity in a CD30 stain due to inadequate heat retrieval.

Module 8: Multiplex and Quantitative IHC

- Principles of Multiplex IHC for simultaneous marker detection.
- Digital image analysis of multi-stained slides.
- Protocols for Immunofluorescence (IF) and dual staining.
- Quantification of markers and establishing cut-offs.
- Case Study: Utilizing a multiplex panel to map immune cell infiltration within a tumor microenvironment.

Module 9: Digital Pathology and WSI

- WSI Scanner operation, calibration, and image quality assessment.
- Laboratory transition to a Digital Workflow and LIS integration.
- Telepathology and remote consultation protocols.
- Ethical and legal considerations in digital slide management.
- Case Study: Establishing a secure, high-resolution telepathology network for rapid renal biopsy reporting.

Module 10: Computational Pathology and AI Integration

- Introduction to Image Analysis Algorithms for pathology.
- Use of Artificial Intelligence (AI) tools for quantification
- Data Management and annotation protocols for machine learning.
- Validation of AI-Assisted Diagnostics in the clinical setting.
- Case Study: Implementing an AI algorithm to streamline the counting of Ki-67 positive cells in a meningioma biopsy.

Module 11: Renal and Neuropathology Processing

- Specialized fixation and processing for Renal Biopsies.
- Cryoprotection and processing of unfixed brain tissue.
- Handling of Muscle and Nerve Biopsies for enzyme histochemistry.
- Techniques for Amyloid and other complex deposits.
- Case Study: A technical flow-chart detailing the steps for a single kidney core to yield H&E, IF, and EM sections.

Module 12: Molecular Pathology Specimen Handling

- Impact of pre-analytical variables on Nucleic Acid Integrity.
- Microdissection and enrichment techniques
- Processing for In Situ Hybridization (ISH) and FISH.
- Preparation of FFPE scrolls and curls for Next-Generation Sequencing (NGS).
- Case Study: Analyzing a fixation error that resulted in poor DNA yield from a melanoma specimen.

Module 13: Laboratory Quality and Compliance

- Implementing a Lean Six Sigma approach to lab workflow.

- Root cause analysis of errors and Preventive Action Plans (CAPA).
- External Quality Assessment (EQA) schemes and participation.
- Documentation and record-keeping for Accreditation.
- Case Study: Using a Spaghetti Diagram to optimize the path of a cassette through the tissue processor and embedding station.

Module 14: Laboratory Safety and Ergonomics

- Safe handling and disposal of hazardous fixatives and solvents
- Management of chemical exposure and ventilation systems.
- Ergonomics in the grossing station and microtomy.
- Decontamination and biohazard protocols.
- Case Study: Developing an emergency protocol for a major formalin spill in the processing area.

Module 15: Leadership and Problem Solving

- Strategies for leading a technical team in a High-Throughput Lab.
- Managing supply chain and Inventory Control for costly reagents.
- MDT communication and the role of the technologist.
- Mentorship and training of junior staff.
- Case Study: Role-playing a scenario involving a technical conflict between the grossing and microtomy sections of the lab.

Training Methodology

The course employs a highly interactive and practical methodology:

- Hands-on Laboratory Sessions.
- Case-Based Learning.
- Simulation-Based Training.
- Instructor-Led Didactic Lectures.
- Troubleshooting Workshops
- Group Problem-Solving.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call +254769199797

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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