# COURSE OF STUDIES

for

Master of Philosophy

in

Histopathology


**UNIVERSITY OF HEALTH SCIENCES, LAHORE PAKISTAN**

## Program Rationale/ Mission Statement:

The mission of M.Phil. Histopathology course is to produce high quality, patient centered knowledge and training with delivery of new scientific knowledge and its translation into clinical practice. The emerging Histopathologists will lead nationally and internationally in research, academics and clinical innovations.

Our pathologists will:

- Follow international standards of diagnostic and technological services in surgical pathology, cytopathology and its subspecialties to support patient care.

- Contribute to keep the innovative standards in the health care system of the country in particular and the society at large by continuing professional development and through research in the field that will also help in deciding the targeted treatment of patients and long-term follow-up.

Provide students with a strong foundation in both theoretical knowledge and practical skills related to the study of diseases at the cellular and tissue levels.

## Program Educational Objectives:

The objectives of M. Phil Program in Histopathology are to produce safe and knowledgeable Pathologists that can report Surgical Pathology and Cytopathology specimens independently. Also, they must be able to update their knowledge with time and take opinions from colleagues and seniors when needed. In addition, this course will help the students to become a good researcher.

## Program Learning Outcomes:

By the end of the program, the resident will be able to:

**General Learning Outcomes:**

- Keep up to date and practice evidence-based medicine.
- Maintain highest standards of practice.
- Participate in clinical governance and clinical audit.
- Demonstrate putting patients first.
- Demonstrate conflict resolution, management skills and leadership.
- Be an effective team player, leading the team if necessary.
- Communicate effectively with: - Patients and their attendants with empathy and compassion - seniors, peers, juniors, learners and other health professionals.

**Specific Learning Outcomes:**

- Obtain appropriate history to comprehend the presenting request for a pathological test.
- Collect / receive patient specimens according to prescribed protocol.
- Demonstrate research, and use of research in improving clinical practice.
- Perform requested tests.
- Interpret the results of tests and prepare reports to help clinicians make diagnosis.
- Apply the requisite knowledge and skills to think critically and solve problems.
- Demonstrate risk analysis.
- Ensure patient safety.
- Manage emergencies related to the specialty.
- Conduct conferences, journal club meetings, CPCs, slide seminars, data interpretation sessions, quality control meetings and hospital infection committees.
- Demonstrate effective teaching skills. Acquire teaching skills to effectively convey knowledge to students and junior researchers.
- Provide mentorship to students and colleagues in the field of Histopathology.
- Demonstrate honesty, integrity and timeliness (punctuality and task completion).
- Maintain confidentiality, patient autonomy, take appropriate consent and do no harm.
- Consults with colleagues and refer as necessary.
- Exhibit advocacy for their patients, practice (service/ department), profession (discipline/specialty) and population-based problems related to their specialty.

## SCHEME OF STUDIES (2-Year)

## MS/MPhil Histopathology

| Semester # | Course code | Course title | Credit hours | | |
|---|---|---|---|---|---|
| | | | Theory | Practical | Total |
| 1 | | Biostatistics and Research Methodology | 2 | 0 | 2 |
| | HP 401<br>HP 402<br>HP 403 | **Histopathology Major 01** (Head & Neck & Salivary gland Pathology)<br>**Histopathology Major 02** (Female Genital Tract & Breast Pathology)<br>**Histopathology Major 03** (Urinary System & Male Genital System Pathology) | 1<br>2<br>2 | 1<br>1<br>1 | 8 |
| | GP 104 | Elective Course-1 (General Pathology) | 2 | 0 | 2 |
| 2 | HP 404<br>HP 405<br>HP 406 | **Histopathology Major 04** (CNS Pathology , Soft tissue Pathology)<br>**Histopathology Major 05** (Endocrine, Musculoskeletal, Hematopoietic & Lymphoid systems Pathology)<br>**Histopathology Major 06** (Skin, Gastrointestinal Tract & Hepatobiliary Systems Pathology) | 2<br>1<br>2 | 1<br>1<br>1 | 8 |
| | | Elective Course-2 (Lab Management and Techniques/ Fundamentals of Molecular Cell Biology & Genetics) | 2 | 0 | 2 |
| 3 | Research (thesis) | | (3+3) 6 | | 6 |
| 4 | Professional (Clinical and Microscopy skills) | | 0 | | 2 |
| | | | | | **(Total: 30)** |

## Course Outline: DETAIL OF MAJOR COURSES

## M. PHIL HISTOPATHOLOGY (Semester System)

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**Major Course 01 (HP 401)** Credit Hours 1+1

**Basic Techniques in Histopathology & Cytology**

Specimen Handling and Processing, Routine staining, special staining, ICC, IHC, & IF Staining.

**Head & Neck and Salivary gland**

Oral cavity; Diseases of teeth and supporting structures, inflammatory / reactive lesions, infections (Herpies simplex viruses, oral candidiasis, deep fungal infections ), oral manifestations of systemic diseases (hairy leukoplakia), precancerous and cancerous lesions( leukoplakia and erythroplakia, Squamous cell carcinoma, Odontogenic cysts and tumors,.upper airways : nose, sinuses, and nasopharynx( inflammatory lesions and tumors), larynx( inflammatory lesions and tumors), EAR: ( inflammatory lesions and tumors) , Neck( branchial cyst , lymphoepithelial cyst, thyroglossal duct cyst, paraganglioma, salivary glands(inflammatory lesions and tumors).

**Major Course 02 (HP 402)** Credit Hours 2+1

**Female Genital Tract and Breast**

Female urogenital system with special emphasis on sexually transmitted diseases, cervical intraepithelial neoplasia, adenomyosis and endometriosis, endometrial hyperplasia and dysfunctional uterine bleeding, placental and gestational trophoblastic disease, ectopic pregnancy and toxemia of pregnancy, tumors and tumor like lesions of female genital tract. The course includes diseases of the breast with special emphasis on causes of the lump in breast, FNA cytology, nipple discharge, gynecomastia, etiology, pathogenesis, morphology and clinical features and natural history of mastitis, fibrocystic diseases, tumors and tumor like lesions of the breast.

**Major Course 03 (HP 403)** Credit Hours 2+1

**Urinary System (Kidney & Bladder)**

The course includes urinary system with special emphasis on azotemia, uremia, renal failure, polycystic renal disease, glomerulonephritis, nephritic and nephrotic syndrome, pyelonephritis, tubular necrosis, nephrosclerosis, tumors and tumor like lesions of the kidney and pelvis, tumors, tumor like lesions and inflammations of the urinary bladder.

**Male Genital System**

Male genital system with special emphasis on congenital conditions, inflammatory lesions of the male genital system, prostate hyperplasia and carcinoma, scrotal swelling, diseases of testicular adnexa, inflammation and tumors of testis and epididymis, male infertility.

**Major Course 04 (HP 404)** Credit Hours 2+1

**CNS**

The course also includes diseases of the nervous system with special emphasis on hydrocephalus, cerebral oedema, herniation of brain, intracranial hemorrhage, meningitis, brain abscess, viral encephalitis, Guillain- Barre syndrome, infectious polyneuropathies, toxic neuropathies and tumors of the nervous system.

**Soft Tissue**

The course also includes diseases WHO classification of soft tissue tumors,

Tumors of adipose tissue, Tumors of fibroblastic and fibrohistiocytic tissue, smooth muscle tumors, skeletal muscle tumors, tumors of neural origan tumors of uncertain origin.

**Major Course 05 (HP 405)** Credit Hours 1+1

**Endocrine System**

Endocrine system with special emphasis on hyper- and hypopituitarism, acromegaly and gigantism, morphology and clinical features of pituitary adenomas, disturbances of ADH secretions, hyper- and hypo-function of adrenal cortex, medulla, thyroid and para-thyroid glands, lab diagnosis of diseases of adrenals, thyroid and parathyroid glands, goiter and its types, causes of solitary thyroid nodule and its diagnostic approach, MEN syndrome, different types of hyper- and hypothyroidisms, primary secondary and tertiary hyperparathyroidism, different types of hypoparathyroidisms, calcium homeostasis, hyper- and hypocalcemia and tumors of the endocrine system.

**Musculoskeletal System**

This course includes musculoskeletal system with special emphasis on etiology, pathogenesis and clinico-morphological features of osteoporosis, achondroplasia, osteomyelitis, Paget's disease, osteoarthritis, rheumatoid arthritis, bone tumors and tumor like lesions, join tumors and tumor like lesions, muscular dystrophies, myopathies, myasthenia gravis and tumors and tumor like lesions of musculoskeletal system.

**Hematopoietic and Lymphoid System**

This course includes diseases of hematopoietic and lymphoid system with special emphasis on anemias, leukemias, lymphoma, multiple myeloma, bleeding disorders, blood groups and its related diseases.

**Major Course 06 (HP 406)** Credit Hours 2+1

**Skin**

The course includes diseases of the skin with special emphasis on terminology of skin lesions, different types of dermatitis, urticaria, erythematous lesions, psoriasis, pemphigus, bullous lesions, pre-malignant epithelial lesions, various types of warts and tumors of the skin.

**Gastrointestinal tract**

With special emphasis esophagitis, Barrett's esophagus, gastritis, peptic ulcer, Hirschsprung's disease, celiac diseases, tropical sprue, ischemic bowel disease, ulcero-inflammatory bowel disease, diseases of appendix (appendicitis and neuroendocrine tumors, mucinous lesions of appendix), clinico-pathological features of amebiasis, typhoid and tuberculosis, and tumors and tumor like lesions of gastrointestinal tract.

**Hepatobiliary System**

The course includes diseases of liver and biliary system with special emphasis on bilirubin metabolism, pathophysiology of jaundice, its clinical features and lab diagnosis, biliary obstruction, hepatic failure, various types of cirrhosis with pathogenesis and complications, different forms of hepatitis, liver abscess with clinical and morphological features, drug induced liver injury, alcoholic liver diseases, haemochromatosis, Wilson's disease , biliary cirrhosis, tumors and tumor like lesions of hepatobiliary system, pancreatitis and tumors and tumor like lesions of pancreas.

## Practical:

- **Understanding of Normal Anatomy and Histology:** Proficiency in the microscopic study of normal tissue structure is fundamental to recognizing abnormalities in pathological specimens

- **Grossing, Tissue processing and Embedding**

- **Microtomy and sectioning**

- **Staining techniques** (H&E, PAP Stain, Histochemical Stains (e.g.; PAS, PASD, Giemsa, Toluidine Blue, GMS, JMS, Mucicarmine, Masson Trichrome, Reticulin, Oil red O, ZN stain, Congo Red etc.) **Immunohistochemical stains** (e.g., Epithelial Lineage Markers, Lymphoma Markers, Muscle Specific Markers, Glial Markers, Melanoma Markers, Germ cell Markers and prognostic Markers Immunohistochemical stains etc.)

- **Microscopy of teaching slides and discussion on Multi-head Microscope**

- **Microscopic Examination**: Hands-on experience in using light microscopes (binocular Microscope of Olympus) to examine stained tissue sections. Students learn to identify normal histological structures and recognize pathological changes associated with different diseases.)

- **Diagnostic Histopathology** (Practical training in histopathological diagnosis, including the interpretation of tissue specimens to identify disease processes, evaluate tumor margins, assess tissue adequacy for diagnosis)

- **Sign-outs of common benign and malignant conditions(under supervision) along with synoptic reporting of malignant tumors according to CAP Protocols** (Head & neck, Female genital tract, Urinary System-Kidney & Bladder, Male Genital system, Central Nervous System, Soft tissue, Endocrine system, Musculoskeletal system, Lymphoid tissue, Skin, Gastrointestinal & Hepatobiliary systems)

- **Understanding of special staining and Immunohistochemical techniques**

- **Interpretation along with diagnostic utility of Special stains** and **Immunohistochemical stains for diagnostic purpose.**

- **Cytological Examination:** Hands on practice of performing Fine needle aspiration Cytology. Extend knowledge and skills in reporting of gynaecologic and non-gynaecological cytology, brush and aspiration cytology.

- **Frozen Section technique** (Training in the rapid freezing and sectioning of tissue samples for intraoperative diagnosis. Students learn to prepare and interpret frozen sections to guide surgical decision-making in real-time.)

- **Documentation and Reporting** (Practice in documenting histopathological findings accurately and concisely in pathology reports. Students learn to prepare comprehensive reports that communicate diagnostic impressions effectively to clinicians and other healthcare professionals)

- **Interdisciplinary Collaboration (**Opportunities for practical collaboration with other healthcare professionals, including clinicians, surgeons, radiologists, and molecular biologists. Students learn to integrate histopathological findings into patient care and treatment planning through interdisciplinary teamwork)

- **Participate in research activities.**

# Course Title: Professional & Teaching Skills Apprenticeship (PTSA)

Credit Hours:02

Professional Skills Apprenticeship credit hours: 01

Teaching Skills Apprenticeship credit hours (CMT): 01

**Professional Skills Apprenticeship:**

**Course Objective:**

The objective of this module is to equip the students with the necessary knowledge and practical abilities to excel in clinical practice, laboratory work, and/or research settings. Continuous learning and refinement of basic and advanced skills in Histopathology are essential for healthcare professionals and researchers alike. This module hence shall foster collaboration and teamwork necessary for effective communication and collaboration with related healthcare professionals, laboratory personnel, researchers, and other stakeholders in multidisciplinary healthcare environments.

**Course outline of Professional skills:**

1. **Immuno-histochemistry:**

(Practical Demonstrations)

At the end of the Course, students should be able to;

- Demonstrate the knowledge and skills related to basic techniques of immunohistochemistry including methods of antigen retrieval and trouble shootings
- Develop the ability to be judicious in ordering practices Demonstrate how an immunohistochemistry lab is organized from specimen receipt to report generation.
- Demonstrate the knowledge and skills related to the performance and interpretation of the common immunohistochemistry tests and controls.

## 2. Cytopathology:

At the end of the Course, students should be able to;

- Demonstrate the knowledge and skills related to the fundamentals of various specimen preparation techniques, including advantages and drawbacks of cytocentrifugation, membrane filtration, smears, and the new technology of monolayer ThinPreps.
- Appreciate the advantages and drawbacks of different staining methods such as wet fixed Papanicolaou versus air-dried modified Wright-Giemsa stains.
- Demonstrate the knowledge and skills related to proper specimen collection techniques for various specimen types including cervical/vaginal smears and fine needle aspiration specimens.
- Recognize cytomorphologic features of different cell types and range of normal morphology.
- Demonstrate the knowledge and skills related to the criteria of malignancy in various body sites and types of specimens.
- Gain experience in screening of cytology specimens to detect possibly rare abnormal cells amid a predominance of normal cells.
- Learn updated cytodiagnostic terminology, classification and grading systems for cervical/vaginal specimens.
- Describe the limitations of cytopathological diagnosis as compared to histopathologic diagnosis.
- Demonstrate the knowledge and skills related to the appropriate use of ancillary diagnostic techniques such as immunocytochemistry and electron microscopy in the work-up of diagnostics in cytopathology.

3. **Forensic Pathology:**

- Demonstrate the knowledge and skills related to the application of the principles and practice of forensic pathology.
- Develop a systematic approach to the forensic autopsy, including evaluation of gross, microscopic, biochemical, and genetic evidence.
- Interpret and correlate the postmortem pathologic findings with other clinical, laboratory, and evidentiary data.
- Demonstrate the knowledge and skills for presentation of autopsy findings to official personnel from the medical, legal, and investigative communities

4. **Immunofluorescence (Techniques and interpretation)**

- IgG, IgM, IgA, C3, C1q,(Reporting of Renal and Skin Biopsies)

5. **Quality Assurance:**

- Adherence to quality assurance protocols and standards to ensure the accuracy, reliability, and reproducibility of histopathological diagnoses, including participation in quality control activities and proficiency testing.

**Recommended Books:**


1. Walter & Israel General Pathology 7th Edition by J.B. Walter.
2. Robbins & Cotran Pathologic Basis of Disease, 10th Edition by Vinay Kumar, Abul K. Abbas, Jon C. Aster
3. Lever's Dermatopathology: Histopathology of the Skin, 12th Edition by David E Elder.
4. Rosai and Ackerman's Surgical Pathology, 11th Edition by John R. Goldblum,

Laura W. Lamps, Jesse K. McKenney, Jeffrey L. Myers

5. Mills and Sternberg's Diagnostic Surgical Pathology, 7th Edition, by Teri A. Longacre.
6. Atlas of Tumor Pathology [Fascicles] by the Armed Forces Institute of Pathology in Washington, DC.Principles and Techniques of Surgical Pathology by Waldemar A. Schmidt.
7. Theory and practice of histological techniques, 8th Edition by S. Kim Suvarna, Christopher Layton, John D. Bancroft.
8. Geeenfields's Neuropathology, 10th Edition by Colin Smith, Arie Perry, Gabor Kovacs, Thomas Jacques.
9. Surgical pathology of the GT tract, Liver, Biliary tract and Pancreas, 4th Edition by Robert D. Odze, John R. Goldblum.
10. WHO classification of Tumors [series] by International Agency for Research on Cancer (IARC) Publications.
11. AFIP Laboratory Methods in Histotechnology, 1st Edition by Edna B. Prophet, Bob Mills, Jacquelyn B. Arrington, Leslie H. Sobin.
12. AFIP Advanced Laboratory Methods in Histology and Pathology 1st Edition by Ulrika V. Mikel.
13. Porth's Essentials of Pathophysiology, 5th Edition by Tommie L Norris.
14. Diagnostic Cytopathology, 3rd Edition by Winifred Gray, Gabrijela Kocjan.
15. Cibas ES and Ducatman BS (2009) Cytology: Diagnostic Principles and Clinical Correlates (3rd ed) Saunders
16. Dacie and Lewis Practical Haematology, 12th Edition by Barbara J. Bain, Imelda Bates and Mike A Laffan.

17. Clinical Pathology Interpretations, 4th Edition by A.H.Nagi. Practical Guide for Health Researchers by World Health Organization, Regional Office for the Eastern Mediterranean, Cairo, 2004.

**Teaching Skills Apprenticeship**


All students of M Phil programme will get registered for the CMT Certification in the final semester. Completing the course work and successfully getting certified for CMT, which is a patent of UHS, will be a compulsory integral component of PTSA (Professional and Teaching Skills Apprenticeship) for the 4th semester of all M Phil programs at UHS.