



CURRICULUM

FOR

M.D. HISTOPATHOLOGY

Shaheed Zulfiqar Ali Bhutto Medical University

ISLAMABAD, PAKISTAN

Revised: Jan 2021

Curriculum Committee

Dr.Ahmareen Khalid Sheikh HOD Department associate Professor

Dr. Summaya Sohail Chaudry -Registrar Pathology Consultant histopathology

INTRODUCTION:

Pathology is the backbone of medicine in the world. The quality education, training and research will help the clinicians for rational use of drugs and innovation of new techniques for better diagnostic yield of the disease. The primary goal of postgraduate education in pathology at Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), Islamabad Pakistan is to train pathologists not only in theory of pathology but to offer supervised and carefully guided practical training in different disciplines of pathology to enable the pathologist to coordinate with other specialties of medicine and to practice as a specialist independently.

Doctor of Medicine (MD) in Histopathology started in Pathology department of SZABMU, Islamabad. The aim is to produce high quality pathologists in practical experience include excellent training, teaching, research, advanced diagnostic skills, collaboration with other specialties and patient care along with moral and ethical values.

RATIONALE

Histopathology focuses on the largest number and widest variety of specimens and has the largest workforce of the cellular pathology specialties. Histopathology is the study of all organs, tissues and cells, in the context of the patient and their medical history, in order to provide a diagnosis. Additional skills, relating to immunohistochemistry and molecular genetics, are increasingly used to support diagnostics, offer prognostic information, and guide therapeutic decisions.

The residency program in Histopathology consists of 04 years of intensive training with the aim of producing pathologists who have sufficient knowledge and experience for “the safe and unsupervised practice of pathology” and are ready to practice as a consultant in the medical multidisciplinary team. Residents completing the program must have the skills to be life-long learners in a rapidly changing medical profession.

AIMS AND OBJECTIVES

CAPABILITIES IN PRACTICE (CiP)

The program will aim in acquiring generic and specialty capabilities in practice Learning outcomes – CiPs. The list is continuously growing with the advancements in field of pathology .However some are listed below

GENERIC CiPs

1. Able to function effectively within healthcare and other organizational and management systems to deliver consistent high-quality patient care.
2. Able to work within ethical and legal frameworks across all aspects of clinical practice.
3. Communicates effectively and is able to share decision making, while maintaining

appropriate situational awareness, professional behavior and professional judgment.

4. Maintains patient safety at the forefront of clinical working. Can utilise quality improvement activity realistically within the constraints of the role.
5. Able to contribute to and support research.
6. Behaves as an educator in the context of the role and promotes educational culture.
7. Able to self-appraise, learn, and adapt.

SPECIALITY Capabilities in Practice(CIP)

8. Able to demonstrate leadership and management within the laboratory setting for the benefit of patient care.
9. Able to use laboratory and other services effectively in the investigation, diagnosis, and management of patients, relatives, and the deceased.
10. Able to manage and contribute to a multidisciplinary team effectively.
11. Able to take, manage and interpret pathological specimens accurately and safely, mindful of risks to self and others.
- 12-Should be able to perform Touch imprint, cytology and frozen section processing.
- 13-Should be able to perform the proper and adequate sampling procedure of FNA.
- 14-To be able to adopt the quality assurance procedures in cyto / Histo section .
- 15- Knowledge about common special stains, molecular pathology and autopsy procedures.
- 16-Should be able to perform the process of fixation, tissue processing, block preparation, cutting, staining and proper slide preparation
- 17- Should be able to join international and national fellowship programs to bring advancement in the field of pathology
- 18- To comprehend the advancement in field of histopathology incorporating use of digital pathology ,clinical pathology and AI based techniques

ENTRY CRITERIA :

- M.B.B.S.
- Two years professional experience (one year house job and one year experience in pathology will be preferred in a recognized teaching hospital.
- Passed NTS / Entry Examination (Written & Oral)
- Passed MD part 1

Duration of Program:

- Minimum period of four years from the date of registration, and the maximum period shall eight years for submission of thesis.
- Candidates with M.phil degree in concerned specialty will be considered for two years exemption in training and from Mid-Term Assessment examination.

Supervisor:

The supervisor shall be professor, Associate professor having the qualification of MD / Ph.D / FCPS / /FRCPath / Diplomate of American board, M.Phil (Old course of 4 years) or any other equivalent qualification with five years experience in relevant field. The supervisor of relevant field of specialization will approve the topic of research, synopsis and thesis title. The professor/Head of the department or unit can have up-to two trainees per year and Associate professor will have one per year.

CONTENT OF LEARNING**A) Allied and Specialties****Rotation Schedule:**

First 6 months	Specialty (Histopathology)
7-18 months	Minor Subjects <u>Hematology</u> 4 months / <u>Microbiology</u> including virology and immunology 3.5months +2weeks <u>Chemical Pathology</u> including Molecular pathology 3.5months + 2 weeks.
19-24 months	Specialty (Histopathology)
3 rd & 4 th year	Specialty (Histopathology)

Longitudinal Evaluation (Log Book, Assignments and Assessments):

The log book will be maintained through out the program with following parameters.

- Record of competence of technical skills
- Record of assignments
- Record of attitude, moral and ethical values
- Record of journal clubs, conference, presentation, grand clinic-pathological rounds

The log book will be developed by concerned department and submitted to the University at the end of training by the candidate.

Credits distribution year wise

Credit distribution is based on the estimation that the average full time student workload for an academic year is about 1500 hours and per semester is 750 hours (as per international standards). An academic year of SZAB Medical University shall comprise of two semesters, each of a minimum duration of 16 weeks teaching. A course of one credit hour means one hour of class room teaching or 3 hours of laboratory work per week. Considering the fact that post-graduate students have to fulfill their duties while following their master course, 5452 hours of student workload have been distributed over a 4 years period, corresponding to 172 credits.

	1 st year	2 nd year	3 rd year	4 th year
Practical work (Gross, FNA Microscopy, Histotech, Slide session)	13 credits	20 credits	20 credits	20 credits
Tutorials, Participation & Presentation in Journal club, CPC, Clinical rounds, workshops, Conferences	19	20	16	16
Assessment	2 credits	2 credits	2 credits	2 Credits
Thesis	10 credits			10 Credits
Total / year	34 credits	42 credits	48 credits	48 credits
Total Master	172 credits			

B)Research

Synopsis:

The topic of thesis will be assigned during the first 3 months of candidate induction in to the training program. The synopsis will be approved by Advanced Studies & Research Board (AS&RB) of SZABMU within 6 months of program.

Research articles and case reports :

The candidate will be encouraged to establish liaison with other universities for the purpose of research ,international collaboration , workshops and webinars

Thesis:

The thesis shall form a distinct contribution to and afford evidence of originality, shown by the discovery of new facts, by the exercise of independent critical judgment or by the invention of new method of investigation. It shall not include Descriptive research work / research work for which a degree has been already awarded by any university / college.

The candidate shall in the first instance submit four unbound copies of complete thesis along with a prescribed application form duly forwarded to university by his/her supervisor and Dean of the college. The vice Chancellor shall appoint two external examiners from the approved list of external examiners for evaluation of thesis. The candidate will submit the research thesis in final year of training six months before completion of the training.

Mandatory Workshops:

- Communication skills
 - Research methodology and proposed synopsis writing
 - Biostatistics
 - Medical writing
- Candidate will submit copy of certificate of attendance of above-mentioned workshops to the University

ASSESSMENTS**Mid-Term Assessment (MTA) Examination:**

After second year, Mid-Term Assessment (MTA) Examination will be conducted by SZABMU. It will include two papers as under:

Paper I:	General Pathology	(50 Single Best MCQs)
Paper II:	Clinical pathology	(Total 50 MCQs from Haematology, Microbiology and Chemical Pathology with 33% weightage to each discipline).

Three chances will be given to each candidate at the six monthly intervals. In case of three consecutive failures or absence, the candidate will be removed from training. The candidate will not be promoted to 3rd year till he / she will pass the MTA Examination.

Final Examination:

After the thesis has been judged by the external examiners and Advanced Studies & Research Board (AS & RB), the student will have to appear in the final examination. The final examination will be conducted in major subject by a board of three examiners (2 external & 1 internal as facilitator). The senior examiner in the specialty will be the chairman of the Board. The internal examiner / supervisor will not be the paper setter and will act as convener of the examination.

Theory papers:

Paper I:	Specialty	MCQs	100 Marks
Paper II:	Specialty	SAQs	100 Marks

Viva Voce, Practical and Thesis Defense:

Viva Voce	200 Marks
Practical (Macroscopic/gross station , Surgical cases , Cytology cases , Long case including Immunohistochemistry , Immunoflorescence and emerging molecular OSPE station , frozen section)	100 Marks
Thesis Defense	100 Marks
Total Marks	600 Marks

Viva Voce, Practical and Thesis Defense Examination:

Examination will consist of table viva, slides examination, performance of any practical procedure and Thesis Defense. Final examination (Theory papers) will be conducted in the months of March & September of each calendar year, simultaneously with other disciplines of MD/MS/MDS. A candidate shall be required to obtain a minimum of 60% marks in each paper and each part of viva Voce examination. In case pass in theory and thesis defense and failed in viva Voce or practical three chances will be given to reappear in Viva Voce and practical examination.

TABLE OF SPECIFICATION

The duration of course is 4 years . the distribution of curriculum as per years is specified

Part I (First 6 months in Histopathology):**Theory:**

- Normal cell and cell adaptations
- Cell injury, Necrosis & Gangrene

- Storage Disorders, Pigmentation, Calcification
- Metaplasia & Dysplasia
- Acute inflammation, Chemical mediators of acute inflammation
- Chronic inflammation, Chronic granulomatous inflammation
- Morphologic patterns of inflammation
- Repair & Healing, Factors affecting repair
- Edema, Hemorrhage / Thrombosis, Embolism/ Infarction, Shock
- Immunity, Histocompatibility antigens
- Hypersensitivity reactions, Autoimmune diseases, Amyloidosis, AIDS
- Nutritional disorders, Vitamin disorders
- Molecular pathology Next generation sequencing ,FISH ,PCR.
- Environmental disorders, Atherosclerosis

Practical:

Diagnosis of the following lesions on gross specimens and microscopic slides:

Normal tissue histology of human organs

CELL DAMAGE & DEGENERATIONS

Organized hemorrhage, Necrosis, Fatty change

INFLAMMATION:

Acute appendicitis, Granulation tissue, Abscess

Acute & Chronic Cholecystitis, Ulcerative colitis, Acute & Chronic Hepatitis, Osteomyelitis

CHRONIC GRANULOMATOUS INFLAMMATION

Tuberculosis lymphnode, endometrium, bone, Sarcoidosis lymph node

FUNGAL & Parasitic INFECTIONS

NON-NEOPLASTIC DISORDERS OF GROWTH

Squamous metaplasia cervix, bronchus

Hyperplastic epithelium oral mucosa, oesophagus

Polyp endocervical, rectal, nasal, Goitre, Verruca

Fibrocystic changes breast

ENDOMETRIUM & NON-NEOPLASTIC LESIONS OF FEMALE GENITAL SYSTEM

Proliferative / Secretory phase Endometrium, Atrophic changes endometrium

Placental tissue, Decidual tissue and reaction, Hormonal imbalance

Nabothian cysts, Ectopic pregnancy, Adenomyosis / Endometriosis, Luteal cyst

VASCULAR & CIRCULATORY DISTURBANCES:

Oedema, Congestion, Thrombosis, Infarction, Gangrene

At the end of 6 months test (Written, viva Voce and practical) will be taken to evaluate the performance of the candidate. The evaluation results will be communicated in final examination

Part II:

7-18 months Rotation in minor subjects. 4 months in each subject i.e. Hematology, Microbiology +immunology , Molecular and Chemical pathology . The curriculum will be prepared by relevant incharge of the each department. The candidate will be full time involved in those departments. At the end of rotation in each department internal examination will be taken. The results will be communicated to supervisor of candidate & Head of department.

Part III:

19-24 months (Histopathology)

Theory:

Genetics, Mitosis & Meiosis, Chromosomal disorders, Mendelian disorder, Molecular biology tests
Neoplasia

Difference of benign & malignant tumor, Carcinogenesis, Grading & staging of malignant tumor,
Biology of tumor growth, Role of cytology, adequacy criteria for thyroid , cervical smears

Gross techniques

Immunostaining,

Electron & Fluorescent microscopy

Quality Assurance

Autopsy Examination

Research methodology

Use of Computers in surgical pathology

Museum technologies

Photography in surgical pathology

Case reports and poster presentation

Effective teaching methodology

Management principles

Tools and methods of evaluation

Practical:

TUMORS: FEMALE GENITAL SYSTEM:

Leiomyoma / Leiomyosarcoma, Uterus Hydatiform mole / Choriocarcinoma, Trophoblastic cells, Cystadenoma / Teratoma, ovary Squamous cell carcinoma, cervix, Adenocarcinoma, cervix, Endometrium Dysgerminoma, ovary, role of pap smears in screening

GASTROINTESTINALTRACT, LIVER AND GALL BLADDER

Carcinoid tumor, small intestine, Lymphoma, gut, Hepatocellular carcinoma, Liver, Cholangiocarcinoma, Bile duct, Metastatic carcinoma, Liver Squamous cell carcinoma, Oesophagus Adenocarcinoma, Gall Bladder

LUNG AND UPPER RESPIRATORY SYSTEM:

Squamous cell carcinoma, Larynx, Bronchus, Lung Adenocarcinoma, Metastatic carcinoma,

BREAST:

Fibroadenoma, Duct papilloma Phylloides tumor, Invasive carcinoma NST, all epithelial and stromal malignancies of breast, molecular subtyping of breast carcinoma .

MESENCHYMAL:

Lipoma, Fibroma, Neurofibroma, Hemangioma, Lymphangioma, Myxoma Rhabdomyosarcoma, Fibrosarcoma, Leiomyosarcoma, Liposarcoma.

ORAL CAVITY & SALIVARY GLANDS:

Pleomorphic adenoma, Mucoepidermoid carcinoma, Adenoid cystic carcinoma

SKIN: Nevus, Melanoma, Basal cell carcinoma, Squamous papilloma, Seborrhic keratosis, Molluscum contagiosum

RENAL AND MALE GENITAL SYSTEM

Urothelial carcinoma, Renal cell carcinoma Wilm's tumor Adenomuscular hyperplasia, Adenocarcinoma, Prostate, Seminoma / Germ cell tumor, Testis

LYMHNODES:

Hodgkin's / Non-Hodgkin's lymphoma, Metastatic carcinoma

ENDOCRINE ORGANS:

Follicular adenoma / Carcinoma, Thyroid

Papillary carcinoma, Thyroid

Small blue cell tumors (Neuroblastoma / Retinoblastoma)

BONES & JOINTS:

Osteochondroma / Chondroma

Osteosarcoma/ Chondrosarcoma

Giant cell tumor
Metastatic carcinoma

Methodology:

The major emphasis will be on practical work. The resident shall be required to work full time in very discipline of pathology assigned

Weekly tutorial classes will be given by the Pathologist

The student will remain on duty physically round the clock as assigned.

There shall be journal club on weekly basis.

Slide seminar will be conducted on regular basis

Clinico-pathological grand rounds must be attended by residents

The candidate will attend interdepartmental meetings. This will give opportunity to

Correlate pathological findings with the clinical findings.

Assessment Test:

At the end, there shall be a comprehensive test comprising of theory and practical.

MID-TERM ASSESSMENT (MTA) EXAMINATION:

At the end of 2nd year, MTA examination will be conducted by SZABMU along with other disciplines as mentioned in rules of MD/ MS/ MDS. Only those students can appear in the examination, who have completed two years training to the satisfaction of Faculty and Head of Pathology Department.

Part IV:

3rd & 4th Year (Histopathology):

Theory:

Cardiovascular diseases including diseases of blood vessels

Respiratory System including mediastinum

Urinary System

Diseases of male & female genital systems

Lymph nodes & Spleen Thymus , Eye & Ear

Salivary glands, Teeth & Gums

Liver & Biliary System

Nervous system

Muscles, Skeletal System , Joints & Bones

Breast

Endocrine system

Skin & subcutaneous tissue

Collagen diseases

Mesenchymal tumors of soft tissue

Effects of radiation

Miscellaneous lesions not covered in above sections.

Practical:

Students should be responsible for describing gross specimen and write down the microscopy of slides and get it checked by pathologist.

Perform tissue sectioning and staining of slides

Perform touch imprints, frozen section cutting and staining.

Perform FNA, Cytology slide preparation and staining

Interpretation of cytology and FNA slides.

Know the procedure of Immunohistochemistry / Immunofluorescence.

Student shall be taught the procedure s of autopsy and shall do autopsies with his own hands.

Learn quality assurance techniques

Perform photography of gross specimens & microscopic slides.

Know the use of computer

The student shall be responsible for describing gross specimens, write down microscopic diagnosis independently and get it checked by pathologist.

To carry out the detailed postmortem examination and write down gross and microscopic appearance with final diagnosis when ever possible.

The resident shall be on duty by rotation in evening and night to perform tests and to supervise emergency tests during that period.

Thesis:

At the beginning of the program the topic of thesis is allotted to the student for writing of synopsis, data collection and thesis. The subject of thesis is selected by the student after advice from the supervisor.

The thesis should be completed and submitted 6 months before the final examination to the University after signature from supervisor and Dean of SZABMU, Islamabad.

Assessment Tests:

The candidate will be examined in theory & Practical after every 3 months during 3rd & 4th year. The results will be communicated to supervisor, Head of Department and later in final examination to the examiners. The log Book will be maintained through out the program duly signed by supervisor/ Head of Department on regular basis. After the completion of residency training, the log book will be submitted in the University before final examination.

LEARNING RESOURCES

EXAMINATION PREPARATION SUGGESTIONS

ABOUT THE EXAM QUESTIONS

- Each MCQ is multiple-choice with only one correct answer.

- Short Answer Questions (SAQs) have a stem and four possible responses.
- Two types of questions are incorporated in the exam:
 1. Questions designed to test basic recall knowledge, direct interpretation of data, or simple synthesis of information
 2. Questions that require a higher level of thought process, reasoning skills, or interpretation of data to arrive at the correct answer.
- Any calculations needed on the exam will not require a calculator.
- Questions are updated and reevaluated annually. Candidates should expect to see questions on technical advances or issues that occurred during the past year.

Following activities have been identified as beneficial for examination preparation:

- Reviewing clinical case studies and reports from various sources (journals, textbooks, and Web sites)

Recommended Reading:

List of Books:

Book	Author	Edition	Publisher	Year of Publication
Surgical pathology	Ackermans	11 th edition	Elsevier	2018
Diagnostic Surgical Pathology	Sternberg's	6 th edition	Lippincott Williams & Wilkins	2017
Diseases of skin	Lever's	10 th edition	Lippincott Williams & Wilkins	2010
Gynaecological & obstetric pathology	Berek & Novak	16th edition	W. B. Saunders Company	2019
Pathologic basis of diseases	Kumar, Robbins	10 th edition	Saunders	2018
General pathology	Walter & Israel	7 th edition	W.B Saunders	1997

			company	
Text book of pathology	W.D.A Anderson	10 th edition	Elsevier Health Sciences	1995
Diseases of breast	Haegensens	3 rd edition	Saunders	1986
Renal Disease	Jacob Churg	1 st edition	Igaku-Shoin	1982
Histochemistry	Pearse	4 th edition	Scion publishers	2008
Carleton's histological Techniques	Drury	5 th edition	oxford	1980
Textbook of clinical pathology	Miller	4 th edition	Lippincot William and Wilkins	2005
Clinical diagnosis & management by laborartory methods	Jhonbernard Henry	20 th edition	Saunders	2001
Medical laboratory technology	Lynch	4 th edition	Saunders	1993
Microbiology	Monica cheesebrough	2 nd edition	Cambridge university press	2006
Practical hematology	Dacie	11 th edition	Churchill Livingstone	2012
Clinical Hematology	Wintrobe	10 th edition	Lippincot William and Wilkins	1999
Clinical chemical pathology	Gray	10 th edition	Hodder Arnold	1985
AFIP manual	Masood Anwar	3 rd edition	AFIP, Rawalpindi, Pakistan	2018
Molecular pathology	W.coleman & Gregory Tsongates	2 nd edition	Elsevier	2017
CAP cancer protocols				
RCPATH datasets				

List of Journals:

Journal of Clinical Pathology
Archives of Pathology & Laboratory Medicine
cancer
American Journal of Clinical Pathology
Human Pathology
New England Journal of Medicine
Acta Cytologica
Journal of CPSP
International Journal of Pathology
PMA Journal
Annals of PIMS
Modern pathology
Pakistan Journal of Pathology

Credit Hours:

	Session / week	Contact Hours / week	Total contact Hours	Credit Hours
General Pathology 1 semester (7 Credit)				
Lecture / Tutorial	4	4	64 (1 Sem)	4
Practical	3	9	144 (1 Sem)	3
Histotech (2 Credit)				
Tutorial / Lecture	1	1	12 (12 wks)	1
Practical	1	3	36 (12 wks)	1
Journal Club, Presentation	4	4	64x8=512 (8 sem)	32
Seminar, CPC, Workshops 8 semester (32 credit)				

Literature survey	1	3	48x8=384 (8 sem)	8
8 semester (8 credit)				

Assessment	1	3	3x8=24 (8 sem)	8
8 semester (8 credit)				

Minor 3 Subjects 4 months in each subject 2 semester (21 credit)

Lecture / Tutorial	4	4	48x3=144 (2 sem)	12
Practical	3	9	108x3=324 (2 sem)	9

Special Pathology 5 semester (20 Credit)

Tutorial	2	2	32x5=160 (5 sem)	10
Practical	2	6	96x5=480 (5 sem)	10

Surgical Histopathology 6 semesters (24 Credit)

Gross:	2	6	96x6=576 (6 sem)	12
FNA:	2	6	96x6=576 (6 sem)	12

Cytology 6 semesters (24 Credit)

Tutorial / Lecture	2	2	32x6=192 (6 sem)	12
Practical	2	6	96x6=576 (6 sem)	12

Slide Session	1	3	48x6=288 (6 sem)	6
6 semesters (6 credit)				

Research	5	15	240x4=960 (4 sem)	20
-----------------	---	----	-------------------	----

4 semesters (20 credit)

OBJECTIVE OF PROGRAM:

At the end of the program resident should be confident to perform the following items independently:

1. Should be able to practice histopathology and be able to do specialized procedures.
2. Should also be able to do tests in general pathology including routine procedures in other branches of pathology.
3. Should be able to know the routine procedure of sample collection of all specimens in section and to get relevant information from wards, concerned Doctor or request form for interpretation of lesion.
4. Should understand and explain the morphology of normal and abnormal cells.
5. Should be able to perform the gross examination of biopsy specimen according to internationally accepted procedures.
6. Should be able to perform the process of fixation, tissue processing, block preparation, cutting, staining and proper slide preparation.
7. Should be able to perform Touch imprint, cytology and frozen section processing.
8. Should be able to perform the proper and adequate sampling procedure of FNA.
9. To be able to adopt the quality assurance procedures in cyto / Histo section.
10. Knowledge about common special stains used in section.
11. Diagnosis of common lesions in section and case discussion with seniors.
12. Good presentation in journal clubs and grand rounds and active participation in academic activities.
13. Should be able to deliver confidently about his / her practical training, research and teaching experience to colleagues and audience at different forums.
14. Should be able to Co-ordinate with fellows of other specialties in different conferences.
15. Learn and adopt the moral values such as Punctuality, Discipline, positive attitude, polite behavior, good communication, respect for each other, patient care.
- 16- Should be able to join international and national fellowship programs to bring advancement in the field of pathology
- 17- To comprehend the advancement in field of histopathology incorporating use of digital pathology, clinical pathology and AI based techniques

18- should be a safe pathologist ready to render diagnosis for therapeutic management

PROGRAM EVALUATION

- a) **Feedback form by students**
- b) **Feedback form by faculty**
- c) **Feedback form by external examiners**
- d) **Feedback form from Head of department /Board of committee**
- e) **Feedback evaluation in terms of capabilities in practice CIP acquired ,publication research projects .**