

**DEPARTMENT OF PATHOLOGY  
LIAQUAT UNIVERSITY  
OF MEDICAL & HEALTH SCIENCES,  
JAMSHORO**



**Syllabus/Curriculum  
For  
M. Phil Haematology**

**LUMHS, Jamshoro**

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## INTRODUCTION

Liaquat University of Medical & Health Sciences aims to achieve prominence as a top- tier world class medical research and teaching University, producing topnotch healthcare providers operating excellence in every segment of the community. The mission of Liaquat University of Medical & Health Sciences is to foster excellence in health professional education and research, to educate and train undergraduate and graduate students of medical and health sciences in accordance with highest professional standards and ethical values and to meet the healthcare needs of the community through dissemination of knowledge and service. In view of shortage of qualified Haematologist in Pakistan, M.Phil program in Haematology has been designed to cater the need by providing highly qualified Haematologists which are trained in teaching, diagnosis, treatment, and prevention of disorders affecting the blood, bone marrow, haemostatic and blood bank through research, clinical care, education, training and advocacy in haematology. Haematology is a branch of medical sciences which contributes to patient care in many ways. It provides data that helps clinicians in coming to meaningful conclusions and thus facilitates correct therapy to patients. Department of pathology, Liaquat University Of Medical & Health Sciences has Stat- Of-Art Diagnostic & Research Laboratory with many of Stat Laboratories at various district of Sindh. The educational institutions play an important role in development and progress of society. Each institute of higher education has to look after the interest of the society in its areas of specialization. Liaquat university of medical and health sciences has to strive earnestly for both improving health care of the people and for providing a nucleus for a meaning and indigenous research to find solutions for the common health problems prevalent in the province and the country. Diagnostic & Research Laboratory is providing the services in the field of Haematology, Transfusion medicine, Chemical Pathology, Histopathology, Genetics & Molecular Biology. The Haematology Section is equipped with Stat-of-art analyzers, Sysmex XN1000i, CA1500, HPLC, Cell Separators, Automation in compatibility, Roche Modular C501 & E601. Therapeutic plasma Pheresis, blood component preparation and serological testing for TTI facilities are available 24/7. The Haematology section consists of the following five subsections: 3

1. Routine Haematology: This subsection deals with routine tests such as Complete Blood Count (CBC), Peripheral films, reticulocyte count, , ESR, bone marrow and bone trephines. Immunochromatographic techniques for detection of malaria and dengue are also performed routinely. More than 1000 CBC are performed daily. The laboratory also performs various specialized tests such as High performance chromatographic analysis of haemoglobin variants including HbA1c, Immunohistochemistry, special stains: PAS , sudan black, and iron. Serological tests like HIV and complete hepatitis A, B and C are also performed by ELISA as well as by PCR(Polymerase chain reaction).
2. Haemostasis Laboratory: This subsection deals with routine coagulation tests like bleeding time, clotting time,

prothrombin and partial thromboplastin time. Various specialized tests like thrombophilia screening, factor assays, von Willebrand antigen and RC of Assays are also performing. 3. Thalassemia & Hemoglobinopathies: This section deals with the testing like Hb Electrophoresis on automated analyzer of BioRad Variant II, D-10 , HPLC ARKRAY Japan and cellulose acetate. 4. Transfusion Medicine: Blood grouping, RhD typing, Direct, indirect Coomb's Testing and compatibility testing are performed. Blood donors are screened for transfusion transmitted infections are performed routinely. We have fully equipped facilities to prepare various blood products PRBCs, FFP, Cryoprecipitate and Platelets. Apheresis instruments are also available, which are used for therapeutic and donor apheresis procedures. 5. Cytogenetic Section: This section deals with the karyotyping testing to detect chromosomal abnormalities and also detecting Philadelphia chromosome in Chronic myeloid leukemia patients. A very comprehensive post graduate teaching program is in place and postgraduate trainees in haematology are on board under the supervision of highly qualified teachers and medical technologists. The presence of trained technical staff ensures high quality of diagnostic services, thus contributing to a broad structured postgraduate training program.

## **VISION STATEMENT OF LUMHS**

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Liaquat University of Medical & Health Sciences seeks to be a top-tier healthcare institution, producing ingenious academic leaders, medical researchers, and healthcare advocates to serve global community.

## **MISSION STATEMENT OF LUMHS**

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Fostering ideal learning environment to ensure modern scientific evidence based practices by imparting critical knowledge, analytical and psychomotor skills, and professional dedication among healthcare students, under the umbrella of virtuous professional, moral and ethical standards.

# Postgraduate Program in Haematology

**Degree Offered:** M.Phil in Haematology

- 1- **Duration:** Two Years
- 2- **Credit Hours:** 30 credit hours (24 credit hours course work & 06 credit hours research/thesis)
- 3- **Mission of the Program:** The M.Phil. Haematology Program at LUMHS is committed to developing competent, ethical, evidence-driven and research-oriented haematologists with advanced knowledge, diagnostic and laboratory skills, and professional excellence. The program fosters innovation, independent research, interdisciplinary collaboration and lifelong learning to improve healthcare, education and scientific advancement in haematology and transfusion medicine
- 4- **Rationale:**

In view of the shortage of qualified Haematologists in Pakistan, the M.Phil. program in Haematology is designed to cater for the need by preparing highly qualified Haematologists, to teach and carryout research in Universities, Research Centers and Medical Institutions. Production of M.Phil. degree holders in Haematology will boost quality of teaching and research in medical institutions
- 5- **Objectives:**

The Objectives of the M.Phil. program is that at the end of the training period trainee:

  - Demonstrates in depth knowledge of the subject in order to become a competent teacher in a medical institution.
  - Demonstrates adequate knowledge of related subjects in order to have a broad based comprehension of the independently.
  - Understanding research problems of the subjects and shows ability to conduct (plan + carryout) a research independently.
  - Is able to advise clinical colleagues on the appropriateness of diagnostic test.
  - Is able to Know the working principles and functions of the instruments used in haematology laboratory.

**6- Resources and Facilities:**

The Department of Pathology possess sufficient capabilities in terms of faculty, supporting staff and material resources to carry out the prescribed M.Phil. program in Haematology. The department has well-established & well equipped clinical laboratory with well-trained supporting technical staff.

**M.PHIL HAEMATOLOGY PROGRAM (02 YEARS) 30 CREDIT HOURS**

|               | <b>COURSE WORK</b>     | <b>24 Credit Hour</b> |
|---------------|------------------------|-----------------------|
| <b>Part-1</b> | Haematology+ workshops | 08 Credit Hour        |
|               | Minor-1                | 04 Credit Hour        |
| <b>Part-2</b> | Haematology+ workshops | 08Credit Hour         |
|               | Minor-2                | 04Credit Hour         |
|               | Research & Thesis      | 06 Credit Hour        |

**7- Course Contents:**

- 7.1 Core/ Basic /Fundamental Course .
- 7.2 Advanced Red Blood Cell Disorders
- 7.3 Advanced White Blood Cell Disorders
- 7.4 Advanced Hemorrhagic & Coagulation Disorders
- 7.5 Blood Banking & Transfusion Medicine
- 7.6 Slide Seminar
- 7.7 Research and Thesis

**8- Methods of Instructions:**

- 8.1 Lecture
- 8.2 Tutorial
- 8.3 Lab Work
- 8.4 Journal Club
- 8.5 Consultation
- 8.6 Self Study

**9- Reference Books:**

- 1. Post-graduate text book of Haematology by AV Hoffbrand.
- 2. Williams Text book of Haematology.
- 3. Dacie, J.V & Lewis,
- 4. Hemoglobin electrophoresis Text Book by Barbara J. Bain
- 5. Technical Manual AABB Pathology And Genetic Of Tumors Haematopoietic And Lymphoid Tissues.
- 6. Clinical diagnosis and management by laboratory methods .John Bernard Henry.
- 7. Hoffbrand, R.H & Lewis, S.M
- 8. Miale, J.B laboratory Medicine Haematology.
- 9. D. Pennington, B. Rush & P.Castaldi, eds.
- 10. Todd, Sanford & Davidson, Clinical Diagnosis and Management
- 11. Wintrobe, M.M et .al Clinical Haematology Lea and Febiger, Philadelphia 8<sup>th</sup> Edition.
- 12. Bone Marrow Pathology Barbara J. Bain

## **COURSE OUTLINES**

- The duration of course is two years.
- This two year course is comprised of:

### **SESSION – I :**

A. The Core/ Basic/ Fundamental course shall be comprised of:

- a. Research Methodology
- b. Biostatistics
- c. Epidemiology
- d. Biomedical Ethics
- e. Information Technology

- B-
- i. Instrumentation and practical work to make acquainted with surgical pathology
  - ii. Laboratory Sciences

**NOTE:** There should be examination of module / course, student have to secure CGPA 3.0 out of 4.0 if semester system or 1<sup>st</sup> class if Annual system to pass it, however failure may be given two chances of re-sit. The successful candidates only shall be eligible for registration in the M. Phil course.

### **SESSION II:**

M.Phil Part – I

### **SESSION III:**

M.Phil Part – II

### **SESSION IV:**

Thesis writing and Evaluation

## **QUALIFICATION FOR ADMISSION AND COURSE OF STUDY:**

- ❖ Basic Qualification: MBBS.
- ❖ Each candidate shall get admission in the course on merit basis after passing written and oral test as per University rules and regulations.

## **SESSION – I:**

### **Sub - Session A:**

| <b>SUBJECT / MODULE</b> | <b>WEIGHTAGE</b> | <b>NO: OF LECTURES</b> |
|-------------------------|------------------|------------------------|
| Research Methodology    | <b>30%</b>       | <b>33</b>              |
| Biostatistics           | <b>25%</b>       | <b>28</b>              |
| Epidemiology            | <b>15%</b>       | <b>16</b>              |
| Biomedical Ethics       | <b>10%</b>       | <b>11</b>              |
| Information             | <b>20%</b>       | <b>24</b>              |

### **Sub – Session B:**

1. Laboratory Sciences.
2. Instrumentation.

#### **Note:**

- ❖ The candidate is eligible to be registered in M. Phil, after passing examination of session- I

## **SESSION – II:**

### **M. Phil – Part – I**

**Subject :**

- Haematology (Major)
- General Pathology / Physiology / Anatomy / Pharmacology (Minor)

#### **Teaching Program Includes:**

- ❖ Lecture and Practical classes of each subject
- ❖ Slide seminars on Haematology work fortnightly
- ❖ Slide seminar on Histopathology work fortnightly
- ❖ General club meetings fortnightly

#### **Note :**

- ❖ The candidate is eligible to start Part-II Course on submission of synopsis after passing M.Phil Part-I examination.

### **SESSION – III:**

#### **M. Phil – Part – II**

**Subject :**

- Haematology (Major)
- Microbiology / Systemic Pathology (Minor)

#### **Teaching Program Includes:**

- ❖ Lecture and Practical classes of each subject
- ❖ Slide seminars on Haematology work fortnightly
- ❖ Slide seminar on Histopathology work fortnightly
- ❖ General club meetings fortnightly

Note:

- ❖ The candidate shall only be eligible to appear in Part-II examination, after approval of synopsis from the Board of Advanced Studies, LUMHS, Jamshoro.

### **SESSION – IV:**

Research work for Thesis writing and evaluation:

#### **Teaching Program :**

- ❖ Lecture and Practical classes of each subject
- ❖ Slide seminars on Haematology work fortnightly
- ❖ Slide seminar on Histopathology work fortnightly
- ❖ General club meetings fortnightly

### **EXAMINATION:**

#### **M.PHIL. PART – I:**

##### **Theory:**

- One Major and One Minor subject:

#### **Haematology (Major) – Comprising of Advanced RBCs and WBCs Disorders:**

Computer Based Examination:

- ❖ Single best : 100 MCQs
- ❖ Duration : 2 hours.
- ❖ Marks : 100

#### **Criteria of Passing:**

- Minimum Passing marks in each paper will be 60%
- Passing marks in Viva Voce and Practical will be 60%.

**General Pathology (Minor):**

Computer Based Examination:

- ❖ Single best : 100 MCQs
- ❖ Duration : 2 hours.
- ❖ Marks : 100

**Criteria of Passing:**

- **Minimum Passing marks in each paper will be 60%**
- **Passing marks in Viva Voce and Practical will be 60%.**

**NOTE:**

The candidates who succeed in theory in respective subject shall be eligible to appear in the Practical and Viva Voce examination.

**PRACTICAL AND VIVA VOCE EXAMINATION**

**Number of Examiners:-**

- Two Internal and Two External Examiners in each subject.

***Haematology (Major subject):***

Maximum marks = 100

- **Passing marks in viva voce and Practical will be 60%**

***General Pathology (Minor Subject):***

Maximum marks = 100

- **Passing marks in viva voce and Practical will be 60%**

**Notes:**

If the candidate fails in the Practical and Viva voce examination in respective subject, shall be declared as failure in that subject and shall be eligible to reappear in both parts (theory and practical) of that subject in the following examination as scheduled by University.

**M.PHIL. PART – II:**

**Theory:**

- One Major and One Minor subject:

**Haematology (Major) – Comprising of Advanced Hemorrhagic & Coagulation Disorders + Blood Banking & Transfusion Medicine:**

Computer Based Examination:

- ❖ Single best : 100 MCQs
- ❖ Duration : 2 hours.
- ❖ Marks : 100

**Criteria of Passing:**

- Minimum Passing marks in each paper will be 60%
- Passing marks in Viva Voce and Practical will be 60%.

**Microbiology/ Systemic Pathology (Minor):**

Computer Based Examination:

- ❖ Single best : 100 MCQs
- ❖ Duration : 2 hours.
- ❖ Marks : 100

**Criteria of Passing:**

- Minimum Passing marks in each paper will be 60%
- Passing marks in Viva Voce and Practical will be 60%.

**PRACTICAL AND VIVA VOCE EXAMINATION**

**Number of Examiners:-**

- Two Internal and Two External Examiners in each subject.

***Haematology (Major subject):***

Maximum marks = 100

- Passing marks in viva voce and Practical will be 60%

***Microbiology/ Systemic Pathology (Minor Subject):***

Maximum marks = 100

- Passing marks in viva voce and Practical will be 60%

**Note:**

If the candidate fails in the Practical and Viva voce examination in respective subject, shall be declared as failure in that subject and shall be eligible to reappear in both parts (theory and practical) of that subject in the following examination as scheduled by University.

**SECTION - III**

**SUBMISSION OF THESIS:**

The thesis examination shall be done as per University rules and regulations.

**EXAMINATIONS:**

- ❖ Each examination shall be held as per University rules and regulations.
- ❖ For each subject, the table of single based MCQs shall be as under:-

**TABLES OF SPECIFICATIONS FOR SINGLE BEST MCQs OF EACH SUBJECT**

**TABLE OF SPECIFICATION OF  
HAEMATOLOGY (MAJOR SUBJECT) FOR M. PHIL. (HAEM.) PART – I**

**PAPER – I**

**MARKS: 100**

**TIME: 02 HOURS**

| <b>S.<br/>NO.</b>  | <b>CONTENT</b>                                                                 | <b>C1</b> | <b>C2</b> | <b>C3</b> | <b>TOTAL</b> | <b>PERCENTAGE</b> |
|--------------------|--------------------------------------------------------------------------------|-----------|-----------|-----------|--------------|-------------------|
| <b>01</b>          | Advanced Red Blood Cell Disorders (Course Contents Mentioned On Page No. 16)   | <b>32</b> | <b>09</b> | <b>09</b> | <b>50</b>    | <b>50%</b>        |
| <b>02</b>          | Advanced White Blood Cell Disorders (Course Contents Mentioned On Page No. 17) | <b>32</b> | <b>09</b> | <b>09</b> | <b>50</b>    | <b>50%</b>        |
| <b>GRAND TOTAL</b> |                                                                                | <b>64</b> | <b>18</b> | <b>18</b> | <b>100</b>   | <b>100%</b>       |

**TABLE OF SPECIFICATION OF  
GENERAL PATHOLOGY (MINOR SUBJECT) FOR M. PHIL (HAEM) PART – I**

**PAPER - II**

**MARKS: 100**

**TIME: 02 HOURS**

| <b>S.<br/>NO.</b>  | <b>CONTENT</b>                                             | <b>C1</b> | <b>C2</b> | <b>C3</b> | <b>TOTAL</b> | <b>PERCENTAGE</b> |
|--------------------|------------------------------------------------------------|-----------|-----------|-----------|--------------|-------------------|
| <b>01</b>          | Cellular pathology: Cell Injury and Cell death             | <b>08</b> | <b>02</b> | <b>02</b> | <b>12</b>    | <b>12%</b>        |
| <b>02</b>          | Adaptations, Intracellular Accumulation and Cell Aging     | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>03</b>          | Acute and Chronic Inflammation                             | <b>08</b> | <b>02</b> | <b>02</b> | <b>12</b>    | <b>12%</b>        |
| <b>04</b>          | Tissue Repair: Cellular Growth, Fibrosis and Wound Healing | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>05</b>          | Hemodynamic Disorders, Thrombosis, and Shock               | <b>06</b> | <b>02</b> | <b>02</b> | <b>10</b>    | <b>10%</b>        |
| <b>06</b>          | Genetic Disorders                                          | <b>04</b> | <b>02</b> | <b>02</b> | <b>08</b>    | <b>08%</b>        |
| <b>07</b>          | Diseases of Immunity                                       | <b>06</b> | <b>02</b> | <b>02</b> | <b>10</b>    | <b>10%</b>        |
| <b>08</b>          | Neoplasia                                                  | <b>10</b> | <b>04</b> | <b>02</b> | <b>16</b>    | <b>16%</b>        |
| <b>09</b>          | Infectious Disorders                                       | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>10</b>          | Environmental and Nutritional Pathology                    | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>11</b>          | Diseases of Infancy and Childhood                          | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>12</b>          | Surgical Pathology Techniques                              | <b>02</b> | <b>00</b> | <b>00</b> | <b>02</b>    | <b>02%</b>        |
| <b>GRAND TOTAL</b> |                                                            | <b>54</b> | <b>24</b> | <b>22</b> | <b>100</b>   | <b>100%</b>       |

**TABLE OF SPECIFICATION OF  
HAEMATOLOGY (MAJOR SUBJECT) FOR M. PHIL. (HAEM.) PART – II**

**PAPER – I**

**MARKS: 100**

**TIME: 02 HOURS**

| <b>S.<br/>NO</b>   | <b>CONTENT</b>                                                                          | <b>C1</b> | <b>C2</b> | <b>C3</b> | <b>TOTAL</b> | <b>PERCENTAGE</b> |
|--------------------|-----------------------------------------------------------------------------------------|-----------|-----------|-----------|--------------|-------------------|
| <b>01</b>          | Advanced Hemorrhagic & Coagulation Disorders (Course Contents Mentioned On Page No. 18) | <b>32</b> | <b>09</b> | <b>09</b> | <b>50</b>    | <b>50%</b>        |
| <b>02</b>          | Blood Banking & Transfusion Medicine (Course Contents Mentioned On Page No. 18)         | <b>32</b> | <b>09</b> | <b>09</b> | <b>50</b>    | <b>50%</b>        |
| <b>GRAND TOTAL</b> |                                                                                         | <b>64</b> | <b>18</b> | <b>18</b> | <b>100</b>   | <b>100%</b>       |

**TABLE OF SPECIFICATION OF  
MICROBIOLOGY (MINOR SUBJECT) FOR M. PHIL (HAEM) PART – II**

**PAPER – II**

**MARKS: 100**

**TIME: 02 HOURS**

| <b>S.<br/>NO</b>   | <b>CONTENT</b>                           | <b>C1</b> | <b>C2</b> | <b>C3</b> | <b>TOTAL</b> | <b>PERCENTAGE</b>                      |
|--------------------|------------------------------------------|-----------|-----------|-----------|--------------|----------------------------------------|
| <b>01</b>          | General Microbiology                     | <b>10</b> | <b>02</b> | <b>02</b> | <b>14</b>    | <b>14% M. PHIL<br/>(HAEM) PART – I</b> |
| <b>02</b>          | Gram+ ve Cocci                           | <b>04</b> | <b>02</b> | <b>00</b> | <b>06</b>    | <b>06%</b>                             |
| <b>03</b>          | Gram-ve Cocci                            | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>                             |
| <b>04</b>          | Enterobacteriaceae                       | <b>06</b> | <b>02</b> | <b>02</b> | <b>10</b>    | <b>10%</b>                             |
| <b>05</b>          | Other Gram-ve Bacilli                    | <b>06</b> | <b>02</b> | <b>02</b> | <b>10</b>    | <b>10%</b>                             |
| <b>06</b>          | Gram+ve Bacilli                          | <b>04</b> | <b>02</b> | <b>02</b> | <b>08</b>    | <b>08%</b>                             |
| <b>07</b>          | Mycobacteria                             | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>                             |
| <b>08</b>          | Chlamydia, Rickettsia, and<br>Mycoplasma | <b>04</b> | <b>00</b> | <b>02</b> | <b>06</b>    | <b>06%</b>                             |
| <b>09</b>          | Viruses                                  | <b>06</b> | <b>02</b> | <b>02</b> | <b>10</b>    | <b>10%</b>                             |
| <b>10</b>          | Mycology                                 | <b>04</b> | <b>00</b> | <b>00</b> | <b>04</b>    | <b>04%</b>                             |
| <b>11</b>          | Parasitology: Protozoa and<br>Helminthes | <b>18</b> | <b>04</b> | <b>02</b> | <b>24</b>    | <b>24%</b>                             |
| <b>GRAND TOTAL</b> |                                          | <b>66</b> | <b>20</b> | <b>14</b> | <b>100</b>   | <b>100%</b>                            |

**TABLE OF SPECIFICATION OF  
SYSTEMIC PATHOLOGY (MINOR SUBJECT) FOR M. PHIL (HAEM) PART – II**

**PAPER – II**

**MARKS: 100**

**TIME: 02 HOURS**

| <b>S.<br/>NO</b>   | <b>CONTENT</b>                                              | <b>C1</b> | <b>C2</b> | <b>C3</b> | <b>TOTAL</b> | <b>PERCENTAGE</b> |
|--------------------|-------------------------------------------------------------|-----------|-----------|-----------|--------------|-------------------|
| <b>01</b>          | Blood Vessels                                               | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>        |
| <b>02</b>          | Heart                                                       | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>03</b>          | Lung                                                        | <b>04</b> | <b>02</b> | <b>02</b> | <b>08</b>    | <b>08%</b>        |
| <b>04</b>          | Head & Neck (Oral cavity, Nose, Ear, Neck, Salivary glands) | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>05</b>          | Gastrointestinal tract                                      | <b>04</b> | <b>04</b> | <b>02</b> | <b>10</b>    | <b>10%</b>        |
| <b>06</b>          | Liver and biliary tract                                     | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>07</b>          | Pancreas (Exocrine)                                         | <b>02</b> | <b>00</b> | <b>00</b> | <b>02</b>    | <b>02%</b>        |
| <b>08</b>          | Kidney                                                      | <b>04</b> | <b>02</b> | <b>02</b> | <b>08</b>    | <b>08%</b>        |
| <b>09</b>          | Lower Urinary tract                                         | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>        |
| <b>10</b>          | Male Genital System                                         | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>11</b>          | Female Genital Tract                                        | <b>04</b> | <b>02</b> | <b>02</b> | <b>08</b>    | <b>08%</b>        |
| <b>12</b>          | Breast                                                      | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>        |
| <b>13</b>          | Endocrine System                                            | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>14</b>          | Skin                                                        | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>        |
| <b>15</b>          | Bone, Joints and soft Tissue                                | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>16</b>          | Peripheral Nerve and Skeletal muscle                        | <b>02</b> | <b>02</b> | <b>00</b> | <b>04</b>    | <b>04%</b>        |
| <b>17</b>          | CNS                                                         | <b>02</b> | <b>02</b> | <b>02</b> | <b>06</b>    | <b>06%</b>        |
| <b>18</b>          | Eye                                                         | <b>02</b> | <b>00</b> | <b>00</b> | <b>02</b>    |                   |
| <b>GRAND TOTAL</b> |                                                             | <b>44</b> | <b>34</b> | <b>22</b> | <b>100</b>   | <b>100%</b>       |

**AWARD OF DEGREE:**

A certificate to be called “M.Phil. in Haematology” under the seal of Liaquat University of Medical & Health Sciences will be awarded to each successful candidate in the Annual Convocation.

**TUTION FEES AND STIPEND:**

- ❖ As per University rules and regulations.

**APPLICATIONS:**

- ❖ Applications may be sent on prescribed form, as per University rules.

**COURSE OUTLINES M.PHIL. (HAEMATOLOGY) PART – I**  
**HAEMATOLOGY (MAJOR)**

**HAEMATOLOGY:**

**I. Advanced Red Blood Cell Disorders:**

1. Stem cells and Haematopoiesis.
2. Red Blood cells, development & morphology.
3. Iron metabolism and disorders of haeme synthesis.
4. Iron deficiency anemia.
5. Sideroblastic anemia & iron overload.
6. Anemia of chronic disorders.
7. Megaloblastic anemia.
8. Hereditary hemolytic anemia.
9. Acquired hemolytic anemia.
10. Immune hemolytic anemia.
11. Non immune hemolytic anemia.
12. Structure, genetic control and synthesis of hemoglobin.
13. Thalassemias.
14. Structural hemoglobin variants related to thalassemia.
15. Hemoglobinopathies.
16. Sick cell disease.
17. Pancytopenia
18. Aplastic Anaemia
19. Pure Red cells Aplasia.
20. Congenital Dyserythropoetic anemias.

**Practicals:**

1. Automation in hematology, their principles and interpretation of results.
2. Other automation used in routine laboratory e-g staining machines slide maker, ESR analysis.
3. Staining technique in routine use.
4. Morphology of all normal and abnormal haemopoietic cells found in peripheral blood, bone marrow & body fluids.
5. Examine the reports of cell morphology.
6. Manually performed test, ESR, Reticulocyte count, Heinz bodies, Screening test for IM, Malaria.
7. Manual cell counting & associated techniques.
8. Quality control in hematology.
9. Coomb's test.

## **II. Advanced White Blood Cell Disorders:**

1. Leukocytosis & granulocytes dysfunction disorders.
2. Granulocytopenia.
3. Lymphopenia & lymphocyte dysfunction syndrome.
4. Molecular basis of leukemia and lymphoma reaction.
5. Acute myeloid leukemia.
6. Acute Lymphoblastic leukemia.
7. Lab diagnosis of acute leukemias.
8. Cytochemical stains & FISH technology, immunological markers, immune-histochemical stains.
9. Chronic myeloproliferative diseases.
10. Chronic myeloid leukemia.
11. Polycythemia Rubra Vera.
12. Myelofibrosis.
13. Essential thrombocythemia.
14. B-cell neoplasms
15. B-lymphoblastic leukemia / lymphoma.
16. Lymphoplasmacytic lymphoma (Waldenstrom's macroglobulinemia)
17. Chronic lymphocytic leukemia/ small lymphocytic lymphoma.
18. Hairy cell leukemia.
19. Plasma cells disorder.
20. Multiple myeloma, plasmacytoma & other cells disorders.
21. Amyloidosis.
22. B-cell lymphomas.
23. B-cell and proliferation of uncertain malignant potential.
24. T-cells and NK-cells neoplasia.
25. Hodgkins Lymphoma.
26. Histiocytic and dendritic cells neoplasms.
27. Mastocytosis.
28. Complications of hematological malignancies.
29. Haematological changes in pregnancy.
30. Hematological manifestations in infectious and malignant diseases.
31. Myelodysplastic syndrome.

### **Practicals:**

#### **Slides for review:**

1. Acute myeloid leukemia.
2. Chronic myeloid leukemia.
3. Acute lymphoblastic leukemia.
4. Chronic lymphocytic leukemia.
5. Multiple myeloma and paraproteinemia.
6. Flowcytometry of peripheral blood, bone marrow, body fluids, lymph nodes and other tissues.
7. Cytogenetics.
8. Therapeutic phlebotomy.

### **III. Advanced Hemorrhagic & Coagulation Disorders:**

1. Physiological structures & functions of Platelets.
2. Role of Platelets in the coagulation/ hemostasis.
3. Blood coagulation pathways.
4. Fibrinolysis.
5. Bleeding disorders.
6. Vascular bleeding disorders.
7. Qualitative disorder of platelets.
8. Quantitative Platelet disorders.
9. Diagnosis of Platelet disorders.
10. Platelets transfusion.
11. Coagulation disorders.
12. Hereditary disorder of the coagulation factors.
13. Hemophilia.
14. Von-Willebrand disease.
15. Acquired coagulation disorders.
16. Vitamin K deficiency.
17. Disseminated intra vascular coagulation.
18. Coagulation deficiency caused by antibodies.
19. Anti phospholipids syndrome.
20. Thrombosis.
21. Anti thrombosis therapy.

#### **Practicals:**

1. Bleeding time
2. Clotting time
3. Prothrombin time
4. APTT (Activated Partial Thromboplastin Time)
5. Fibrin degradation product
6. D-dimers
7. Platelets function test/ Aggregometry
8. Mixing studies of plasma
9. Coagulation factors and inhibitors assay

### **IV. Blood Banking & Transfusion Medicine**

#### **Course Contents:**

1. Blood cells antigens
2. Blood groups antibodies
3. ABO blood groups
4. ABO sub-groups
5. Rhesus system
6. Lewis system
7. Kell system

8. P system
9. Lutheran system
10. Duffy system
11. Testing red cells antigens and antibodies
12. The anti-globulin test
13. Immunological reactions involving erythrocytes
14. Factors affecting agglutination
15. Agglutination and agglutination inhibition
16. Haemolysis
17. Fetomaternal incompatibility
18. Indications for blood transfusion
19. Diseases transmitted by the blood transfusion
20. Viral hepatitis and blood transfusion
21. Investigation of blood transfusion reaction
22. HLA antigens
23. Preparation of cellular components
24. Preparation of plasma components
25. Selection and recruitments of blood donors and control of inventory
26. Aphaeresis
27. Blood transfusion
28. Immunosuppression/ Immunodeficiency

### **Practicals:**

1. Blood grouping
2. Forward grouping
3. Reverse grouping
4. Cross match
5. Anti-globulin test and antibody screening
6. Screening of donor's & storage
7. Preparation of cellular components
8. Preparation & blood storage of plasma components
9. Aphaeresis

**COURSE OUTLINES M.PHIL. (HAEMATOLOGY) PART – I**  
**SUBJECT: GENERAL PATHOLOGY (MINOR).**

**CELL INJURY, ADAPTATION & CELL DEATH**

1. Introduction, Causes & Definitions
2. Mechanisms of reversible & irreversible injury
3. Subcellular changes due to cell injury.
4. Cell Death. Necrosis and Apoptosis
5. Intracellular accumulation: Water, Lipids, Glycogen & Proteins and Pigments.
6. Calcification, Hyaline change.
7. Cellular Adaptation: Atrophy, Hypertrophy, Hyperplasia and Metaplasia.
8. Cellular Aging.

**INFLAMMATION & REPAIR**

1. Introduction, Definition and General features of Inflammation.
2. Acute inflammation: Sequence of events.
3. Chemical Mediators of inflammation
4. Outcome of inflammation
5. Chronic inflammation.
6. Morphological types of Acute and chronic inflammation.
7. Repair: Definitions, types of cells, Stem cells.
8. Cell cycle.
9. Steps of wound healing by primary and secondary intention.
10. Disorders of repair

**HAEMODYNAMIC DISORDERS**

1. Edema
2. Congestion & Hemorrhages
3. Thrombosis, introduction & Pathogenesis
4. Thrombosis, Morphology & Fate
5. Embolism
6. Infarction
7. Shock

## **IMMUNITY / IMMUNOPATHOLOGY**

1. Immunity – Introduction & Innate Immunity
2. Adaptive Immunity
3. Hyper sensitivity reaction
4. Autoimmunity
5. Immunodeficiency

## **NEOPLASIA**

1. Neoplasia – Introduction & Nomenclature
2. Characteristic of Benign & Malignant tumors
3. Spread of malignant tumor
4. Epidemiology of cancer
5. Molecular basis of cancer, Principles
6. Evasion of Apoptosis & Defects in DNA repair
7. Etiology of cancer, Chemical carcinogens
8. Etiology of cancer, Viral & radiation
9. Clinical features of neoplasia
10. Lab Diagnosis of neoplasia

## **GENETIC DISEASES**

1. Mutations and Mendelian Disorders.
2. Molecular Basis of Single gene (Mendelian) Disorders.
3. Disorders associated with defects in structural Proteins.
4. Disorders associated with defects in Enzymes.
5. Disorders associated with defects in Proteins that regulate Cell Growth.
6. Disorders with Multifactorial Inheritance.
7. Over view of Normal Karyotype and Cytogenetic disorders.
8. Diagnosis of Genetic diseases.

## **INFECTIOUS DISEASES**

1. General Principles of Microbial Pathogenesis.
2. Transmission and Dissemination of Microbes.
3. How microorganisms cause disease. Mechanisms of Viral, bacterial injury.
4. New and emerging infectious diseases and Special techniques for diagnosis of infectious agents.

## **ENVIRONMENTAL AND NUTRITIONAL PATHOLOGY.**

1. Introduction of occupational and environmental diseases and mechanisms of toxicity.
2. Common environmental and occupational Exposure
3. Nutrition and disease.
4. Obesity, Diet and diseases.

## **DISEASES OF INFANCY AND CHILDHOOD**

1. Congenital Anomalies.
2. Inborn errors of metabolism and other genetic disorders.
3. Tumors and tumor like conditions.

## **COURSE OUTLINES M.PHIL. (HAEMATOLOGY) PART – II**

### **SUBJECT: MICROBIOLOGY (MINOR)**

#### **GENERAL BACTERIOLOGY**

1. Introduction & Structure of bacterial cells
2. Growth & Genetics
3. Classification of medically important bacteria
4. Pathogenesis
5. Host defenses
6. Laboratory diagnosis
7. Sterilization & disinfection

#### **GENERAL VIROLOGY**

1. Structure & Replication
2. Classification of medically important viruses
3. Pathogenesis
4. Laboratory diagnosis

#### **PARASITOLOGY**

1. Protozoa: Class Rhizopoda
2. Leishmania
3. Trypanosoma
4. Sporozoa
5. Helminths – Cestodes
6. Trematodes
7. Nematodes

## **MYCOLOGY**

1. Basic mycology
2. Cutaneous & subcutaneous mycoses
3. Systemic mycoses
4. Opportunistic mycoses

## **SPECIAL BACTERIOLOGY**

1. Gram-positive cocci
2. Gram-negative cocci
3. Gram-positive rods
4. Gram-negative rods related to the enteric tract
5. Gram- negative rods related to the respiratory tract
6. Gram- negative rods related to animal sources (Zoonosis).
7. Mycobacteria
8. Actinomycetes
9. Mycoplasmas
10. Spirochetes
11. Chlamydiae
12. Rickettsiae

## **SPECIAL VIROLOGY**

1. DNA enveloped viruses
2. DNA non enveloped viruses
3. RNA Enveloped viruses
4. RNA Non enveloped viruses
5. Hepatitis viruses
6. Arboviruses
7. Tumor viruses
8. Slow viruses & prions
9. Human immunodeficiency virus

## **COURSE OUTLINES M.PHIL. (HAEMATOLOGY) PART – II**

### **SUBJECT: SPECIAL PATHOLOGY (MINOR)**

#### **BLOOD VESSELS**

- 1- Vascular Wall Cells and Their Response To Injury
- 2- Congenital Anomalies, Arteriosclerosis.
- 3- Hypertensive Vascular Disease
- 4- Aneurysms and Dissections
- 5- Inflammatory vascular Disease
- 6- Veins and Lymphatics abnormalities
- 7- Tumors
- 8- Pathology Of Vascular Interventions

#### **THE HEART**

- 1- Myocardium, Blood Supply, Valves & effects of aging.
- 2- Heart failure
- 3- Congenital Heart Disease
- 4- Ischemic Heart Disease
- 5- Hypertensive Heart Disease
- 6- Valvular Heart Disease and Endocarditis.
- 7- Cardiomyopathies
- 8- Pericardial Disease
- 9- Tumors

#### **LYMPH NODES**

- 1- Introduction
- 2- Reactive (inflammatory) changes
- 3- Lymphoid Neoplasms—Definitions, classifications & Hodgkin Lymphoma
- 4- Non Hodgkin Lymphoma

## **THE LUNG**

- 1- Congenital Anomalies, collapse and acute lung injury.
- 2- Obstructive Pulmonary Diseases
- 3- Diffuse interstitial (restrictive, infiltrative) Diseases - Fibrosing and Granulomatous Diseases
- 4- Pulmonary Eosinophilia & Smoking – Related Interstitial Diseases
- 5- Diseases of Vascular Origin
- 6- Acute Pneumonias
- 7- Atypical,& Nosocomial (Pneumonias)
- 8- Lung Abscess & chronic Pneumonias
- 9- Tumors
- 10- Pleural Effusion & Pneumothorax

## **HEAD AND NECK**

- 1- Benign Lesions. Of Oral Cavity
- 2- Tumors and Precancerous Lesions of Oral Cavity.
- 3- Inflammatory lesion of Nose and Nasopharynx.
- 4- Tumors of the Nose, Sinuses, Nasopharynx and Larynx.
- 5- Ear
- 6- Neck
- 7- Salivary Glands Tumors

## **GASTROINTESTINAL TRACT**

- 1- Esophagus
- 2- Stomach
- 3- Gastric Carcinoma
- 4- Small and Large Intestines
- 5- Idiopathic Inflammatory Bowel Disease.
- 6- Intestinal Obstruction
- 7- Tumors of the Small and Large Intestine
- 8- Appendix and Peritoneum.

## **LIVER AND BILIARY TRACT**

### **The Liver**

- 1- Introduction
- 2- Infectious disorders + Drug and toxin – induced liver disease
- 3- Metabolic liver disease.
- 4- Intrahepatic Biliary tract Diseases ( including liver cysts )
- 5- Circulatory disorders.
- 6- Hepatic disease associated with pregnancy
- 7- Hepatic complications of organ or bone marrow transplantation.
- 8- Nodules and Tumors

### **The Biliary tract**

- 1- Benign Lesions
- 2- Tumors.

## **THE PANCREAS**

- 1- Introduction + Pancreatitis + non neoplastic cysts.
- 2- Neoplasms.

## **THE KIDNEY**

- 1- Introduction.
- 2- Congenital anomalies and cystic diseases of the Kidney
- 3- Glomerular diseases.
- 4- Diseases affecting tubules and interstitium
- 5- Diseases of blood vessels.
- 6- Obstructive uropathy & urolithiasis,
- 7- Tumors of the kidney.

## **THE LOWER URINARY TRACT**

- 1- Introduction
- 2- Ureters - congenital anomalies, inflammations & tumors
- 3- Urinary Bladder and urethra.

## **THE MALE GENITAL TRACT**

- 1- Introduction
- 2- Penis
- 3- Testis and epididymis—Benign lesions.
- 4- Testis and epididymis Tumors.
- 5- Prostate --- introduction and benign lesions
- 6- Prostate --- Tumors.

## **FEMALE GENITAL TACT**

- 1- Embryology, Anatomy and Infections of the Female Genital Tract
- 2- Benign Lesions of Vulva
- 3- Premalignant and Malignant Neoplasm's of Vulva
- 4- Congenital Anomalies Premaligant and Malignant Neoplasms of Vagina
- 5- Inflammations and polyps of cervix
- 6- Cervical intra-epithelial Neoplasia
- 7- Squamous Cell Carcinoma cervix
- 8- Endometrial Histology in the Menstrual Cycle and Functional Endometrial Disorders
- 9- Chronic Endometritis, Endometriosis, Adenomyosis and Endometrial Polyps
- 10- Endometrial Hyperplasia and Malignant Tumors of Endometrium.
- 11- Tumors of Myometrium
- 12- Non Neoplastic and Functional Cysts Ovary
- 13- Tumors of Mullerian Epithelium
- 14- Germ Cells, Sex Cord – Stromal Tumors (Ovary)
- 15- Gestational and Placental Disorders.

## **THE BREAST**

- 1- Introduction – Histology, Physiological changes
- 2- Benign lesions of Breast
- 3- Carcinoma of the breast --- incidence, epidemiology
- 4- Etiology and Pathogenesis
- 5- Classification of Breast carcinoma
- 6- Stromal tumors
- 7- The male Breast

## **THE ENDOCRINE SYSTEM**

- 1- Introduction.
- 2- Pituitary gland.
- 3- Thyroid gland.
- 4- Para thyroid glands.
- 5- Pancreas.
- 6- Adrenal glands

## **THE SKIN**

- 1- Introduction
- 2- Disorders of pigmentation and melanocytes.
- 3- Benign epithelial tumors
- 4- Pre-malignant and malignant epidermal tumors
- 5- Tumors of the Dermis
- 6- Skin - Acute and chronic inflammatory lesions.
- 7- Dermatoses + infection and infestation.

## **BONES JOINTS AND SOFT TISSUE TUMORS**

- 1- Introduction
- 2- Osteoporosis + Rickets + osteomalacia
- 3- Osteomyelitis
- 4- Bone tumors and tumor like lesions
- 5- Osteoarthritis + rheumatoid arthritis + infectious arthritis
- 6- Soft tissue benign tumors
- 7- Soft tissue malignant tumors

## **PERIPHERAL NERVE SKELETAL MUSCLE**

- 1- Introduction
- 2- Inflammatory lesion
- 3- Diseases of peripheral nerve
- 4- Diseases of skeletal muscle

## **THE CENTRAL NERVOUS SYSTEM**

- 1- Introduction
- 2- Benign lesions
- 3- Tumors

## **THE EYE**

- 1- Introduction.
- 2- Benign lesions
- 3- Malignant lesions

**TEACHING FACULTY/STAFF IN THE DEPARTMENT OF PATHOLOGY:**

|                                           |                                                                     |
|-------------------------------------------|---------------------------------------------------------------------|
| <b><u>VICE CHANCELLOR / PROFESSOR</u></b> |                                                                     |
| <b>01</b>                                 | Prof. Ikram Din Ujjan (MBBS, M.Phil., Ph.D., FCPS – Haematology)    |
| <b><u>CHAIRMAN / PROFESSOR</u></b>        |                                                                     |
| <b>02</b>                                 | Prof. Abid Hussain Chang (MBBS, M.Phil. – Microbiology)             |
| <b><u>PROFESSORS</u></b>                  |                                                                     |
| <b>03</b>                                 | Dr. Kiran Aamir (MBBS, FCPS – Haematology)                          |
| <b><u>ASSOCIATE PROFESSORS</u></b>        |                                                                     |
| <b>04</b>                                 | Dr. Muhammad Rahil Khan (MBBS, FCPS – Histopathology)               |
| <b>05</b>                                 | Dr. Naila Shaikh (MBBS, M.Phil., Ph.D. – Molecular Biology)         |
| <b>06</b>                                 | Dr. Nazia Hafeez (MBBS, FCPS – Haematology)                         |
| <b><u>ASSISTANT PROFESSORS</u></b>        |                                                                     |
| <b>07</b>                                 | Dr. Zahida Shaikh (MBBS, M.Phil. – Microbiology)                    |
| <b>08</b>                                 | Dr. Abdul Rehman Khalil Shaikh (MBBS, M.Phil., Ph.D. – Haematology) |
| <b>09</b>                                 | Dr. Yusra Shafquat (MBBS, FCPS – Microbiology)                      |
| <b>10</b>                                 | Dr. Faheem Memon (MBBS, M.Phil., Ph.D. – Haematology)               |
| <b>11</b>                                 | Dr. Furqan Ahmed Bhatti (MBBS, M.Phil., Ph.D. – Virology)           |
| <b>12</b>                                 | Dr. Sidra Kadir (MBBS, FCPS – Haematology)                          |
| <b>13</b>                                 | Dr. Zahid Ali Nohri (MBBS, M.Phil, FCPS – Histopathology)           |
| <b><u>LECTURERS</u></b>                   |                                                                     |
| <b>14</b>                                 | Dr. Khalid Yousuf Memon (MBBS, DCP, M.Phil. – Haematology)          |
| <b>15</b>                                 | Dr. Shabnam Rustamani (MBBS, DCP, M.Phil. – Haematology)            |
| <b>16</b>                                 | Dr. Muhammad Ali Memon (MBBS)                                       |
| <b>17</b>                                 | Dr. Sorath Sindhu (MBBS, M.Phil. – Histopathology)                  |
| <b>18</b>                                 | Dr. Rameez Iqbal Memon (MBBS, M.Phil. – Haematology)                |
| <b>19</b>                                 | Dr. Yasmeen Bhutto (MBBS)                                           |
| <b>20</b>                                 | Dr. Elaf Rasool (MBBS)                                              |
| <b>21</b>                                 | Dr. Amara Urooj                                                     |
| <b>22</b>                                 | Dr. Hina Khokhar (MBBS)                                             |
| <b>23</b>                                 | Dr. Ghulam Fatima (MBBS, M.Phil Pathology)                          |
| <b>24</b>                                 | Dr. Noreen Jalbani (MBBS, FCPS – Haematology)                       |
| <b>25</b>                                 | Dr. Sindhu Qasim (MBBS)                                             |
| <b>26</b>                                 | Dr. Sara Shafi (MBBS, M.Phil. – Haematology)                        |
| <b>27</b>                                 | Dr. Sharique Ahmed Khan (MBBS)                                      |

### **POST GRADUATE TEACHING FACILITIES AVAILABLE**

|     |                                                                               |   |    |
|-----|-------------------------------------------------------------------------------|---|----|
| 1.  | TELE-PROMAR WITH TRANSFORMER (LEITZ)                                          | = | 01 |
| 2.  | TELEVISION SONY TRINITRON                                                     | = | 01 |
| 3.  | NIKON MICROSCOPE (BINOCULAR)                                                  | = | 03 |
| 4.  | NIKON TWO HEADED MICROSCOPE WITH<br>FLOURSCENCE & DARK FIELD ATTACHMENT       | = | 01 |
| 5.  | MULTI-HEADED MIRCROSCOPE (FIVE OBSERVERS)                                     | = | 01 |
| 6.  | INVERTED MICROSCOPE                                                           | = | 01 |
| 7.  | EPIDOSCOPE                                                                    | = | 02 |
| 8.  | SCREEN                                                                        | = | 01 |
| 9.  | BOOK SHELVES                                                                  | = | 02 |
| 10. | TRINOCULAR MICROSCOPE (TWO OBSERVERS)                                         | = | 01 |
| 11. | TRINOCULAR MICROSCOPE WITH ATTACHED<br>DIGITAL CAMERA, SOFTWARE, PC & MONITOR | = | 01 |
| 12. | ZOME-STEREO MICROSCOPE                                                        | = | 01 |
| 13. | MULTIMEDIA PROJECTOR WITH ATTACHED LAPTOP                                     | = | 01 |
| 14. | OVERHEAD PROJECTOR                                                            | = | 02 |
| 15. | SLIDE PROJECTOR                                                               | = | 02 |
| 16. | EPIDIASCOPE                                                                   | = | 02 |
| 17. | MOTORIZED SCREEN                                                              | = | 02 |

## **DEPARTMENTAL LIBRARY FACILITY**

### **BOOKS IN SHELF - 01**

|                                              |   |    |
|----------------------------------------------|---|----|
| 1. FISHER CATALOGUE 70                       | = | 01 |
| 2. LABORATORIES SUPPLIES SCIENTIFIC EQUIP:   | = | 03 |
| 3. CATALOGUE 200 LABORATORY APPARATUS EQUIP  | = | 01 |
| 4. CATALOGUE 80/82                           | = | 01 |
| 5. FISHER CHEMICAL INDEX 71C                 | = | 01 |
| 6. CHEMICAL LAB APPARATUS CATOLOGY 56S       | = | 01 |
| 7. GERMAN SCIENTIFIC SUPPLIES                | = | 01 |
| 8. MODREN LAB EQUIP:                         | = | 01 |
| 9. GENERAL CATALOGUE                         | = | 02 |
| 10. FISHER MODREN LAB: EQUIP:                | = | 01 |
| 11. GRIFFIN LAB: EQUIPMENTS:                 | = | 01 |
| 12. LAB: CHEMICALS                           | = | 02 |
| 13. SCHACHARDT MUNCHON KATOLOG               | = | 01 |
| 14. BDH LAB: CHEMICALS CATOLOGY              | = | 01 |
| 15. THE LCIMBLE COTOLOGUE OF LAB: GLASSWARE  | = | 01 |
| 16. BDH LAB CHEMICALS                        | = | 01 |
| 17. GENCO INSTRUEMENTS FOR LAB: SCIENCES     | = | 01 |
| 18. LAB: EQUIPMENT AND SCIENTIFICS APPARATUS | = | 01 |
| 19. GENERAL APPARATUS, AND MEDICAL SCIENCES  | = | 01 |
| 20. CLINICAL MATHODS IN SURGERY K.DAS        | = | 01 |
| 21. COMMUNITY MEDICINE VIVA                  | = | 01 |
| 22. THE GLAXO VOLUME                         | = | 07 |
| 23. THE JANERAL SOCIETY OF MEDINCE           | = | 01 |
| 24. MEDICAL PERFERNCE LIST                   | = | 03 |
| 25. LAB: EQUIPMENT                           | = | 03 |
| 26. MEDINCE GOLWALLA                         | = | 01 |
| 27. TURTOX BIOLOGICAL SUPPLIES               | = | 01 |
| 28. GALLEN LCAMP                             | = | 01 |
| 29. SCIENTIFIC SUPPLIES CATOLOGY             | = | 01 |

|                                                   |   |    |
|---------------------------------------------------|---|----|
| 30. MEDINCE DAVIDSON`S                            | = | 01 |
| 31. GERMAN SCIENTIFIC SUPPLIES                    | = | 01 |
| 32. ZEISS INFORMATION                             | = | 32 |
| 33. JOURNAL OF THE PAKISTAN MEDICAL ASSOCTION     | = | 06 |
| 34. NEWS AND REVIEW                               | = | 12 |
| 35. THE JOURNAL OF THE PAKISTAN MEDICAL ASSOCTION | = | 97 |
| 36. SCIENTIFIC TECHNICAL SUPPLIES                 | = | 01 |
| 37. WORD HEALTH                                   | = | 06 |
| 38. JPMA                                          | = | 04 |

#### **BOOKS IN SHELF - 02**

|                                                    |   |    |
|----------------------------------------------------|---|----|
| 1. MORCLC DIAGNOSTIC MATERIAL                      | = | 34 |
| 2. PAKISTAN MEDICAL FORUM                          | = | 14 |
| 3. COLLEGE OF AMERICAN PATHOLOGIST                 | = | 36 |
| 4. JENA REVIEW                                     | = | 13 |
| 5. BULLETIN OF WEST ZONE                           | = | 14 |
| 6. RAWAL MEDICAL JOURNAL                           | = | 11 |
| 7. PAKISTAN MEDICAL REVIEW                         | = | 08 |
| 8. THE MEDICAL                                     | = | 09 |
| 9. TRIANGLE THE SANDOZ JOURNAL OF MEDICAL SCIENCES | = | 04 |
| 10. PAKISTAN JOURNAL OF MEDICAL RESARCH            | = | 08 |
| 11. PAKISTAN JOURNAL OF MEDICAL RESARCH            | = | 05 |
| 12. MISLL PRINT MATERIAL                           | = | 17 |
| 13. BIO CHEMICAL REAGENT CATOLOGUE                 | = | 28 |
| 14. INSTRUMENT CATALGUE                            | = | 28 |
| 15. HAEMOTOLOGY                                    | = | 07 |

|     |                                                                     |    |
|-----|---------------------------------------------------------------------|----|
| 1.  | The Journal of Pakistan Medical Association.                        | 87 |
| 2.  | Medical Progress Journal.                                           | 10 |
| 3.  | The Journal of American Medical Association.                        | 08 |
| 4.  | M I S L.                                                            | 23 |
| 5.  | R A W A L, Journal of the Pakistan Medical Association,             | 26 |
| 6.  | Catalogues.                                                         | 17 |
| 7.  | International Journal.                                              | 12 |
| 8.  | General Pathology- Clinically correlated by Mohammad Firdous.       | 01 |
| 9.  | Physiological Chemistry by Harper.                                  | 01 |
| 10. | Text book of Pathology by William Boyd.                             |    |
| 11. | Liaquat Medical College Magazine.                                   | 07 |
| 12. | Cancer treatment by Amanullah Khan.                                 |    |
| 13. | Biochemical organic compounds for research and Diagnostic Reagents. | 01 |
| 14. | Skin and systemic Disease Vol (I)                                   | 01 |
| 15. | Churchil Livingstone Catalogue                                      | 14 |
| 16. | Medical Sindhi literature                                           | 17 |
| 17. | Souvenirs                                                           | 35 |
| 18. | College of Physicians and surgeons of Pakistan                      | 16 |
| 19. | Society of Obstetricians and Gynaecologists of Pakistan             | 16 |
| 20. | Annals of Saudi Medicine                                            | 05 |

**D. PATHOLOGY MUSEUM:**  
**MUSEUM SPECIMENS**

| SPECIMEN        | DESCRIPTION                                                                                                                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SMALL INTESTINE | Stricture,<br>Lymphoma, (2)<br>Typhoid ulcer<br>Polyps<br>Milliary Tuberculosis<br>Adenocarcinoma<br>Intussusception, (2)<br>Chronic Peptic ulcer<br>Ulcer cancer<br>Infiltrative carcinoma<br>carcinoma intestine<br>Amoebic ulcer. (2) |

|              |                                                                                                                                                                                                                                         |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COLON        | Ulcerative carcinoma                                                                                                                                                                                                                    |
| APPENDIX     | Acute appendicitis with faecolith.                                                                                                                                                                                                      |
| STOMACH      | Trichobezoar<br>Phytobezoar<br>Carcinoma Pyloric end<br>Carcinoma (2)<br>Pyloric stenosis<br>Carcinoma of stomach linitus plastica with pyloric stenosis                                                                                |
| LIVER        | Hydatid cyst of liver<br>Congenital cyst (2)<br>Honeycomb liver (Autolytic change<br>Liver abscess.                                                                                                                                     |
| SPLEEN       | Ruptured<br>Enlarged spleen (4)                                                                                                                                                                                                         |
| GALL BLADDER | Gall stone + cholecystitis<br>Chronic cholecystitis                                                                                                                                                                                     |
| HYDETID CYST | Calcified (2)                                                                                                                                                                                                                           |
| KIDNEY       | Acute nephritis,<br>Hydronephrosis + stone (5)<br>Chronic nephritis (contracted) (2)<br>End stage contracted kidney.<br>Congenital cyst<br>Pyelonephritis chronic (4)<br>Wilm`s tumor<br>Renal cell carcinoma,<br>Clear cell carcinoma. |
| LUNG         | Anthraxis (3)<br>Lung Tuberculosis<br>Carcinoma lung<br>Bronchiectasis (3)<br>Lobar Pneumonia (3)                                                                                                                                       |
| HEART        | Normal<br>Fibrinous Pericarditis (2)                                                                                                                                                                                                    |
| VESSEL       | Syphilitic Aortitis (2)<br>Aorta atherosclerosis (3)                                                                                                                                                                                    |

|         |                                                                                                                                                                                                                                                                                                                                                                                             |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| THYROID | Colloid goitre (3)<br>Colloid adenoma<br>Thyroid carcinoma<br>Thyroid multinodular goitre                                                                                                                                                                                                                                                                                                   |
| TESTES  | Seminoma (4)<br>Embryonal carcinoma (2)                                                                                                                                                                                                                                                                                                                                                     |
| UTERUS  | Adenocarcinoma (2)<br>Leiomyoma (4)<br>Degenerated leiomyoma<br>Leiomyoma with cystic degeneration<br>Bicornuate uterus<br>Uterus Leiomyomatous Polyps<br>Fibroid uterus<br>carcinoma endometrium<br>Endometrial Polyps<br>Choriocarcinoma<br>Gartner's Polyps endometrium<br>Fallopian tubes (Ectopic pregnancy)                                                                           |
| OVARY   | Papillary cystadenocarcinoma<br>Adenocarcinoma (4)<br>Ovarian chocolate cyst<br>Adherent Placenta<br>Ovarian abscess<br>Mucinous cystadenoma<br>Ovary cystadenoma, mixed, serous & mucinous<br>Ectopic pregnancy<br>Adenoma of Ovary (3)<br>Granulosa cell tumor ovary (2)<br>Ovary cystadenocarcinoma<br>Ovary serous cystadenoma<br>Ovary cyst fibroadenoma<br>Ovary mucinous cystadenoma |
| BREAST  | Breast duct cell carcinoma<br>Breast carcinoma (2)<br>Breast scirrhous carcinoma<br>Fungating breast carcinoma<br>Breast cystosarcomaphyllodes. (Benign), Giant fibroadenoma<br>Fibroadenoma                                                                                                                                                                                                |
| PENIS   | Squamous cell carcinoma (2)                                                                                                                                                                                                                                                                                                                                                                 |

|                 |                                                                                                                                                   |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| SKIN            | Sebacious cyst<br>Skin (wart)<br>Skin multiple sebacious cyst<br>Malignant melanoma (3)<br>Dermato fibrosarcoma<br>Papillary cyst<br>Dermoid cyst |
| FOOT            | Medura of food<br>Foot sarcoma<br>Mycetoma                                                                                                        |
| BONE            | Osteochondroma<br>Giant cells tumor of bone<br>Osteogenic sarcoma (2)<br>Bone osteoclastoma<br>Chondrosercoma                                     |
| MUSCLE          | Rhabdomyosarcoma                                                                                                                                  |
| SOFT TISSUE     | Lipoma                                                                                                                                            |
| LYRNPHNODE      | Tuberculosis lynrph node<br>Lyrnphoma<br>Hodgkins disease<br>Malignant Lymphoma                                                                   |
| FINGER          | Osteoclastoma of finger                                                                                                                           |
| EYE             | Ratinoblastoma                                                                                                                                    |
| URINARY BLADDER | Pappillary carcinoma                                                                                                                              |
| PARASITE        | Tape worms<br>Round worms                                                                                                                         |

## DIAGNOSTIC LABORATORIES:

### DIAGNOSTIC AND RESEARCH LABORATORY HYDERABAD

#### EQUIPMENTS

|     |                                        |   |    |
|-----|----------------------------------------|---|----|
| 1.  | CHEMISTRY ANALYSER (HITACHI- 902)      | = | 01 |
| 2.  | CHEMISTRY ANALYSER (COBAS MIRA)        | = | 01 |
| 3.  | CHEMISTRY ANALYSER (TECHNO 168)        | = | 01 |
| 4.  | CHEMISTRY ANALYSER (Photometer 4010)   | = | 01 |
| 5.  | ELECTROLYTE ANALYSER (BIOLYTE)         | = | 01 |
| 6.  | CHEMISTRY / ELISA ANALYSER (Chem Well) | = | 01 |
| 7.  | AUTOMATED ELECTROPHORESIS (GENIO)      | = | 01 |
| 8.  | HAEMATOLOGY ANALYSER (SYSMEX 9500)     | = | 01 |
| 9.  | HAEMATOLOGY ANALYSER (SYSMEX KX-21)    | = | 01 |
| 10. | BLOOD CELL SEPARATOR (HAEMONETICS)     | = | 01 |
| 11. | PLATELET AGITATOR                      | = | 01 |
| 12. | INCUBATOR                              | = | 01 |
| 13. | OVEN                                   | = | 01 |
| 14. | BLOOD BANK UNIT                        | = | 01 |
| 15. | CENRIFUGE MACHINE                      | = | 01 |
| 16. | MICROSCOPE (BINOCULAR)                 | = | 03 |
| 17. | REFRIGERATOR                           | = | 01 |
| 18. | DEEP FREEZER                           | = | 03 |
| 19. | ESR STAND                              | = | 02 |
| 20. | ESR PIPETTES                           | = | 30 |
| 21. | GLASS PIPETTES                         | = | 25 |
| 22. | PIPETTE STAND                          | = | 02 |
| 23. | TUBE RACKS                             | = | 05 |
| 24. | JUSTER (2 SETS)                        | = | 07 |
| 25. | JUSTER STAND                           | = | 01 |
| 26. | STOP WATCH                             | = | 01 |

|     |                            |   |    |
|-----|----------------------------|---|----|
| 27. | UPS (WHOLE LAB REQUIRMENT) | = | 01 |
| 28. | GENERATOR                  | = | 01 |
| 29. | COMPUTER (Pentium – IV)    | = | 04 |

|     |                         |   |    |
|-----|-------------------------|---|----|
| 30. | PRINTER (Dot matrix)    | = | 03 |
| 31. | PRINTER (LASERJET)      | = | 02 |
| 32. | SPIT A/C                | = | 05 |
| 33. | STABILIZER              | = | 03 |
| 34. | BLOOD GAS ANALYZER      | = | 01 |
| a)  | H/E STAINING SET        | = | 01 |
| b)  | PAP STAINING SET        | = | 01 |
| c)  | LEISHMAN'S STAINING SET | = | 01 |

#### **AT DEPARTMENT OF PATHOLOGY JAMSHORO CAMPUS**

#### **HEMATOLOGY DIAGNOSTIC LAB**

#### **EQUIPMENTS**

|     |                           |   |    |
|-----|---------------------------|---|----|
| 1.  | MICROSCOPE (BINOCULAR)    | = | 02 |
| 2.  | OVEN                      | = | 01 |
| 3.  | COMPUTER WITH ACCESSORIES | = | 01 |
| 4.  | PRINTER                   | = | 01 |
| 5.  | HB METER (SAHLI)          | = | 05 |
| 6.  | WEIGHING MACHINE          | = | 01 |
| 7.  | NEUBAR COUNTING CHAMBER   | = | 02 |
| 8.  | ESR PIPETTES              | = | 20 |
| 9.  | RBC PIPETTES              | = | 05 |
| 10. | WBC PIPETTES              | = | 05 |
| 11. | HB PIPETTES               | = | 05 |
| 12. | ESR STAND                 | = | 02 |
| 13. | TIMER                     | = | 01 |
| 14. | STAINING STAND            | = | 01 |

#### **HISTOPATHOLOGY DIAGNOSTIC LAB:**

#### **EQUIPMENTS**

|     |                           |   |          |
|-----|---------------------------|---|----------|
| 1.  | TISSUE PROCESSOR          | = | 02       |
| 2.  | CRYTOME                   | = | 01       |
| 3.  | ROTATORY MICROTOME        | = | 02       |
| 4.  | ELECTRONIC MICROTOME      | = | 01       |
| 5.  | TISSUE BATH               | = | 02       |
| 6.  | HOT PLATE                 | = | 02       |
| 7.  | INCUBATOR                 | = | 01       |
| 8.  | COMPUTER WITH ACCESSORIES | = | 01       |
| 9.  | PRINTER (HP 5L)           | = | 01       |
| 10. | REFRIGERATOR              | = | 01       |
| 11. | AIR CONDITIONER           | = | 01       |
| 12. | KNIFE SHARPNER            | = | 01       |
| 13. | STAINING RACKS            |   |          |
| a)  | H/E STAINING SET          | = | 01       |
| b)  | PAP STAINING SET          | = | 01       |
| c)  | GIEMSA STAINING SET       | = | 01       |
| d)  | PAS STAINING SET          | = | 01       |
| e)  | CONGO RED STAINING SET    | = | 01       |
| f)  | SILVER TRICHROME STAIN    | = | 01       |
| g)  | SUDAN BLACK STAIN         | = | 01       |
| h)  | CONGO RED STAIN           | = | 01       |
| i)  | GIEMSA STAIN              | = | 01       |
| j)  | Z. N. STAIN               | = | 01       |
| 14. | BLOCK FRAME               | = | 12 PAIRS |
| 15. | DIAMOND PENCIL            | = | 02       |
| 16. | BURNER                    | = | 02       |
| 17. | MOULDS                    | = | 10       |

#### **MICROBIOLOGY DIAGNOSTIC LAB**

#### **EQUIPMENTS**

|    |           |   |    |
|----|-----------|---|----|
| 1. | INCUBATOR | = | 01 |
|----|-----------|---|----|

|     |                        |   |    |
|-----|------------------------|---|----|
| 2.  | AUTOCLAVE              | = | 01 |
| 3.  | OVEN                   | = | 01 |
| 4.  | MICROSCOPE (BINOCULAR) | = | 01 |
| 5.  | COLONY COUNTER         | = | 01 |
| 6.  | STAINING RACK          | = | 10 |
| 7.  | BURNERS                | = | 02 |
| 8.  | WIRE LOOPS             | = | 05 |
| 9.  | DEEP FREEZER           | = | 01 |
| 10. | REFRIGERATOR           | = | 01 |
| 11. | WEIGHING MACHINE       | = | 01 |
| 12. | ANAEROBIC JAR          | = | 01 |
| 13. | MACNTOSH JAR           | = | 01 |

### **CHEMICAL PATHOLOGY DIAGNOSTIC LAB**

#### **INSTRUMENTS**

#### **QUANTITY**

|                                           |   |    |
|-------------------------------------------|---|----|
| PHOTOMETER 4010                           | = | 02 |
| PRINTER                                   | = | 01 |
| WATER BATH                                | = | 02 |
| PUMP                                      | = | 02 |
| FP.901 CHEMISTRY ANALYZER (LAB: SYSTEM)   | = | 01 |
| FP.910 COAGULATION ANALYZER (LAB: SYSTEM) | = | 01 |
| FP. 401 INCUBATOR (LAB: SYSTEM)           | = | 01 |
| FP. 410 INCUBATOR (LAB: SYSTEM)           | = | 01 |
| PHOTO ELECTRIC COLORIMETET AE-II          | = | 02 |
| CENTRIFUGE MACHINE                        | = | 03 |
| FINNI PIPETTES (JUSTERS)                  | = | 31 |
| MICROSCOPE (OLYMPUS) MONOCULAR            | = | 01 |
| ELECTRO PHORESIS (SHANDAN)                | = | 01 |
| AIRCONDITIONER WITH STABILIZER            | = | 01 |

|                                 |   |    |
|---------------------------------|---|----|
| DEEPPREZER WITH STABILIZER      | = | 01 |
| U.P.S.                          | = | 04 |
| ELECTRIC WEIGHING MACHINE       | = | 01 |
| UNISKAN II (LAB: SYSTEM)        | = | 01 |
| UNISKAN II (LAB: SYSTEM)        | = | 01 |
| FLAME PHOTOMETER 410C           | = | 01 |
| FLAME PHOTOMETER 410            | = | 01 |
| INCUBATOR                       | = | 01 |
| HOT AIR OVEN                    | = | 01 |
| PIPETTE STAND                   | = | 03 |
| AUTOMATIC PIPETTE STAND         | = | 01 |
| MICRO CO <sub>2</sub> APPARATUS | = | 01 |
| REFRIGERATOR / DEEP FREEZERS    |   |    |

## **AVAILABLE DIAGNOSTIC FACILITIES**

### **HISTOPATHOLOGY & CYTOLOGY**

#### **1. SPECIMENS / BIOPSIES FOR SURGICAL PATHOLOGY.**

- (a) H & E Stain
- (b) PAS stain
- (c) Silver trichrome stain
- (d) Congo Red Stain
- (e) Sudan Black Stain
- (f) Giemsa Stain
- (g) Z. N. Stain

#### **2. CYTOLOGY**

- (a) Exfoliative cytology
- (b) F. N. A.
- (c) Fluid
- (d) Post coital Smear

## 2. BIO-CHEMISTRY

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| 1. Acid phosphatase group       | 33. Semen Analysis                |
| 2. Acid phosphatase total       | 34. Serum Electrolytes            |
| 3. Acid phosphatase prostatic   | 35. Sodium                        |
| 4. Aldolase                     | 36. SGOT                          |
| 5. Alkaline phosphatase         | 37. SGPT                          |
| 6. Alpha HBDH                   | 38. Sperm Antibody (Auto)         |
| 7. Amylase                      | 39. Sperm Antibody (Wife's)       |
| 8. Bence Jones Protein          | 40. Stool Fat Globules            |
| 9. Bicarbonate                  | 41. Stool Occult Blood            |
| 10. Bilirubin group             | 42. Stool Reducing Sugar          |
| 11. Direct Bilirubin            | 43. Sweat Chloride                |
| 12. Drug cortisol (Elisa)       | 44. Total Lipids                  |
| 13. Gamma GT                    | 45. Total Protein Group           |
| 14. G.6PD                       | 46. Triglycerides                 |
| 15. Glucose challenge Test      | 47. Urine microalbumin            |
| 16. Glucose Fasting             | 48. Uric Acid                     |
| 17. Glucose Random              | 49. Urine Albumin                 |
| 18. HDL                         | 50. Urine Amylase                 |
| 19. Iron / TIBC                 | 51. Urine Bile Pigment            |
| 20. LDH                         | 52. Urine Bile Salts              |
| 21. LDL                         | 53. Urine Calcium                 |
| 22. Lipase                      | 54. Urine Chloride                |
| 23. Lipid Profile               | 55. Urine Cortisol (Elisa)        |
| 24. Lipoprotein Electrophoresis | 56. Urine magnesium               |
| 25. Lithium                     | 57. Urine pH                      |
| 26. Liver Profile               | 58. Urine phosphorus              |
| 27. Magnesium                   | 59. Urine Protein Electrophoresis |
| 28. Occult Blood                | 60. Urine Protein                 |
| 29. Phosphorus                  | 61. Urine reducing substances     |
| 30. Protein Electrophoresis     | 62. Urine Sodium                  |
| 31. Renin                       | 63. Urine Urea                    |
| 32. Salmonella typhidot         | 64. Urine urea-Nitrogen           |

### **3. MICROBIOLOGY**

- |                                    |                                   |
|------------------------------------|-----------------------------------|
| 1. AFB Smear                       | 7. Fungus Culture                 |
| 2. AFB Culture                     | 8. Fungus Smear / KOH Preparation |
| 3. Anaerobic Culture               | 9. Gram-staining                  |
| 4. Aerobic Culture                 | 10. Parasitic Identification      |
| 5. Blood Culture                   | 11. Scrapping                     |
| 6. Flouresescent Treponeantibodies |                                   |

### **4. HAEMATOLOGY:**

- |                                  |                               |
|----------------------------------|-------------------------------|
| 1. Absolute Eosinophils count    | 11. Hb Electrophoresis        |
| 2. APTT                          | 12. Malarial Parasite         |
| 3. Bleeding Time                 | 13. Osmotic Fragility Test    |
| 4. Donor work Platelet Emergency | 14. Peripheral Blood Film     |
| 5. Donor work platelet pharesis  | 15. Platelet counts           |
| 6. ESR                           | 16. Prothrombin Time          |
| 7. Hemoglobin F                  | 17. RBC Morphology            |
| 8. Hemoglobin                    | 18. Sputum for Eosinophils    |
| 9. Hematocrit                    | 19. Total Glycated Hemoglobin |
| 10. HbA1C                        | 20. White Blood Cell Count    |

## **5. ELISA TECHNIQUE**

- |                                    |                                    |
|------------------------------------|------------------------------------|
| 1. Alpha Fetoprotein               | 23. Hepatitis E. Virus             |
| 2. Amoebiasis – EHA                | 24. Hepatitis profile              |
| 3. ANA Groups Test                 | 25. Hepatitis B Profile            |
| 4. Anti-ds DNA                     | 26. Hepatitis C Virus              |
| 5. Antibody Screening              | 27. Herpes Simplex – I – IgM       |
| 6. Antibody titre                  | 28. HIV                            |
| 7. Beta HCG                        | 29. HIV – Device                   |
| 8. Echinococcus Antibodies         | 30. Lupus Erythematosus antibodies |
| 9. Ferritin                        | 31. Parathormone                   |
| 10. Free T3                        | 32. Prostatic Specific             |
| 11. Fresh Plasma Screening         | 33. Rubella IgG                    |
| 12. FSH                            | 34. Rubella IgM                    |
| 13. Free T4                        | 35. T3                             |
| 14. Growth Hormone                 | 36. T4                             |
| 15. Helicobacter pylori antibodies | 37. TSH                            |
| 16. Hepatitis B Core Total         | 38. Testosterone                   |
| 17. Hep. A. antibody IgM           | 39. TROCH                          |
| 18. Hep. B. Surface Antibody       | 40. Toxoplasma IgG                 |
| 19. Hep. B Surface Antigen         | 41. Toxoplasma IgM                 |
| 20. Hep. Be Antibody               | 42. Typhidot                       |
| 21. Hep. Be Antigen                | 43. Urine Cortisol                 |
| 22. Hep. Delta Antibodies          |                                    |

## **6. SEROLOGY/ IMMUNOLOGY**

1. Mantoux Test
2. R. A factor with titre
3. Pregnancy Test (Latex)
4. Widal Test
5. **Anti-streptolysin “O”**

## LIST OF PRESCRIBED TEXT BOOKS AND JOURNALS BOOKS

### Recommended Reference Books (Latest Editions)

- **Hoffbrand's Postgraduate Haematology.** 8th Edition. Wiley-Blackwell, 2024.
- **Williams Hematology.** 11th Edition. McGraw-Hill Education, 2025.
- **Dacie and Lewis Practical Haematology.** 13th Edition. Elsevier, 2021.
- **Bain BJ. Haemoglobinopathy Diagnosis.** 3rd Edition. Wiley-Blackwell, 2020.
- **AABB Technical Manual.** 21st Edition. AABB Press, 2023.
- **Bain BJ. Bone Marrow Pathology.** 6th Edition. Wiley-Blackwell, 2024.
- **Hoffbrand's Essential Haematology.** 9th Edition. Wiley-Blackwell, 2024.
- **Miale's Laboratory Medicine: Hematology.** 8th Edition. McGraw-Hill Education, 2022.
- **WHO Classification of Tumours Editorial Board. WHO Classification of Tumours: Haematolymphoid Tumours.** 5th Edition. International Agency for Research on Cancer (IARC), 2024.
- **Harmening DM. Modern Blood Banking and Transfusion Practices.** 8th Edition. F.A. Davis Company, 2023.
- **Rodak's Hematology: Clinical Principles and Applications.** 7th Edition. Elsevier, 2024.
- **Rosai and Ackerman's Surgical Pathology.** 12th Edition. Elsevier, 2023.
- **Greer JP, Arber DA, Glader B, et al. Wintrobe's Clinical Hematology.** 15th Edition. Wolters Kluwer, 2024.
- **Henry's Clinical Diagnosis and Management by Laboratory Methods.** 25th Edition. Elsevier, 2022.
- **Clinical Hematology Atlas.** 6th Edition. Elsevier, 2021.

### Recommended Guidelines (Essential for M.Phil. Training)

- **World Health Organization (WHO).** Classification of Haematolymphoid Tumours (5th Edition, 2024).
- **International Council for Standardization in Haematology (ICSH)** Guidelines (latest updates).
- **Clinical and Laboratory Standards Institute (CLSI)** Standards for Haematology and Coagulation (latest editions).
- **British Society for Haematology (BSH)** Guidelines (latest updates).
- **AABB Standards for Blood Banks and Transfusion Services.** 34th Edition, 2024.

## **JOURNALS**

- Blood
- Transfusion medicine
- British journal of haematology
- Lancet
- New England journal of medicine
- Haemostasis and thrombosis
- Seminars in haematology
- American journal of clinical pathology
- Journal of laboratory and clinical medicine.

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