# MASTER OF PATHOLOGY (HAEMATOLOGY)

***Department of Haematology***
***School of Medical Sciences***
***Universiti Sains Malaysia***
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***16150 Kubang Kerian***
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TRAINING CURRICULUM FOR TRAINEES AND SUPERVISORS
UNIVERSITI SAINS MALAYSIA

-2016-

**MASTER OF PATHOLOGY (HAEMATOLOGY)**

1 AIM

A four-year post-graduate training program in Haematology.

2 BACKGROUND

The Master of Pathology (Haematology) programme is a post-graduate programme with the primary objective of producing a competent specialist (laboratory haematologist) who will lead the laboratory and provide the diagnostic and consultation services to the clinicians. The programme is comprised of stage 1 of one-year duration and stage 2 of three years duration. The training centers include public universities' teaching hospitals (closed system) and the accredited hospital of Ministry of Health (open system).

3 STRUCTURE OF COURSE

The training is divided into 2 stage with total of 4 years duration.

The Stage 1 course (1-year duration) - 10 weeks of training in Haematology and Transfusion Medicine Laboratory and 10 weeks of training in each of the other 3 major sub-disciplines of pathology (Anatomic Pathology, Medical Microbiology and Chemical Pathology with some input from immunology, genetics and forensic pathology.

Stage 2 course (3-years duration) - in-service training in Haematology and Transfusion Medicine Laboratory and candidates are expected to be responsible for their own learning. The candidate shall undertake a research project and submit a research dissertation report.

<table>
<tr><th>STAGE 1</th><th colspan="3">STAGE 2</th></tr>
<tr><td><u>YEAR 1</u><br>2 semesters<br>(48 weeks of T&L,log book)</td><td><u>YEAR 2</u><br>2 semesters<br>(48 weeksT&L,in-service<br>training, log book, and research activity)</td><td><u>YEAR 3</u><br>2 semesters<br>(48 weeks T&L, in-service<br>training, log book, and research activity)</td><td><u>YEAR 4</u><br>2 semesters<br>(48 weeks T&L, in-service<br>training, log book, and research activity)</td></tr>
<tr><td></td><td>Semester 1</td><td>Semester 3</td><td>Semester 5</td></tr>
<tr><td rowspan="4">TCL: Lectures<br><br>SCL: Practical, Seminar, Case Study, Journal Critique.<br><br>SDL: Writing case book.<br><br>Rotation:<br>-10 weeks in every discipline of Pathology.<br>- Orientation week (1 week)<br>- Intensive course (2 weeks)<br>- Study leave (3 weeks)<br><br>Total= 46 weeks</td><td>SCL: in-service training in laboratory/ward/clinic/mortuary at University Hospital or MOH Hospital.</td><td>SCL: in-service training in laboratory/ward/clinic/mortuary at University Hospital or MOH Hospital.</td><td>SCL: in-service training in laboratory/ward/clinic/mortuary at University Hospital or MOH Hospital.</td></tr>
<tr><td>TCL: Research methodology and preparation of research proposal.<br><br>SCL: Practical, Seminar, Case Study, Journal Critique</td><td>SCL: Practical, Seminar, Case Study, Journal Critique</td><td rowspan="2">SDL : Carrying out research activity / writing case book<br><br>** Submission and assessment of dissertation, log book and case book to examiner(s).</td></tr>
<tr><td>SDL: Case book writing / research proposal writing</td><td>SDL : Carrying out research activity / writing case book<br>.</td></tr>
<tr><td>Semester 2</td><td>Semester 4</td><td>Semester 6</td></tr>
<tr><td>PART 1 PROFESSIONAL EXAMINATION<br>(2 weeks)</td><td>SCL: in-service training in laboratory/ward/clinic/mortuary at University Hospital or MOH Hospital.</td><td>SCL: in-service training in laboratory/ward/clinic/mortuary at University Hospital or MOH Hospital.</td><td>SCL: in-service training in laboratory/ward/clinic/mortuary at University Hospital or MOH Hospital.</td></tr>
<tr><td></td><td>SDL : Carrying out research activity / writing case book</td><td>SDL : Carrying out research activity / writing case book</td><td>ASSESSMENT of dissertation, log book and case book<br>and<br>PART 2 PROFESSIONAL EXAMINATION<br>(2 weeks)</td></tr>
</table>

*T& L = Teaching and Learning; TCL = Teacher-centered Learning; SCL = Student-centered Learning; SDL = Self-directed Learning; MOH = Ministry of Health

3.1 Curriculum structure for stage 1

The curriculum is divided into 2 parts. **(Appendix I: Syllabus)**

a. Theoretical aspects

b. Practical aspects

| Year | Training in | Curriculum and training place | Assessment |
|---|---|---|---|
| 1 (10 weeks each) | 1. Haematology and Transfusion medicine<br>2. Anatomic Pathology<br>3. Medical Microbiology<br>4. Chemical Pathology | • lectures<br>• seminars<br>• case presentations<br>• practical/slide sessions<br>• case report<br>• log book | 1. Continuous assessment<br>2. End posting assessment<br>3. Professional examination I |

3.2 Curriculum structure for stage 2

The curriculum is divided into 3 parts. **(Appendix II: Syllabus)**

a. Theoretical aspects

b. Practical aspects

c. Research aspects

| Year | Curriculum and training place | Assessment |
|---|---|---|
| 2, 3, 4 | • Haematology laboratory work<br>• Transfusion medicine laboratory work<br>• Electives posting (adult and paediatric haemato-oncology, national blood centre, genome centre, immunologi)<br>• Practical/slide sessions<br>• Research activities<br>• Attending conferences/ seminars<br>• Journal/case presentations<br>• Log book | 1. Continuous supervisor assessment<br>2. Dissertation submission and assessment<br>3. Professional examination II |

4 MODE OF TEACHING AND LEARNING

1. There will be mainly student-centered learning. The student is expected to learn primarily through in-service via an independent and self-directed manner through reading, bench work, patient management and consultation activities.
2. The formal teaching programme - seminars, case or journal presentations, discussion sessions, slide reviews, results interpretations, and practical skills.
3. Clinical postings / elective postings in other departments/units/centers (Adult haematology/oncology, Paediatric haematology/oncology, National blood centre, Genetic laboratory, Others)
4. Routine and on-call duties of a laboratory haematologist including slide reading and interpretation, test/result interpretation, validation and consultation.

5. Plan, undertake and write up a research project which is to be submitted by the end of the third year.
6. Attend and participate actively in all regular Clinical Pathologic Conferences (CPC), slide reviews and journal club presentations of the department.
7. Attend relevant scientific meeting conducted by professional bodies/universities.
8. Involve in teaching and learning of undergraduate students.

## 5 Supervision and progress reports

The medical school will appoint a qualified haematologist to be a supervisor for each candidate. The supervisor is responsible for the progress report of the candidate.

## 6. Examination and assessment

Assessment during the course is divided into 2 parts - Continuous assessment and Professional examination

### 6.1 Stage 1 assessment

6.1.1 Continuous assessment - Supervisor report, case report, end posting assessment

6.1.2 Professional examination I

a. Theory papers - 50% (MCQ = 70% and Essay = 30%)

b. Practical papers - 50%

### 6.2 Stage 2 assessment

6.2.1 Continuous assessment - Supervisor report, log book, dissertation project

6.2.2 Professional examination I

a. Theory papers - 45%

b. Practical papers - 45%

- OSPE (90%)
  - Morphology (40%)
  - Haemostasis/miscellaneous (20%)
  - Transfusion (30%)
- Clinical Case (10%)

c. Viva Voce - 10%

6.3 Repeat examination

Failing the professional examination, the candidate may appear in the examination after 6 months or 1 year upon approval of the University senate.

7. Entrance criteria

Candidates who wish to pursue Master of Pathology need to

a. have a valid medical Degree from a university recognized by Malaysian Medical Council (MMC).
b. be registered with the MMC.
c. complete at least 3 years of medical service.
d. pass the entrance examination and/or
e. pass an interview.

All candidates must pass the entrance examination before he or she can be eligible for the interview for selection into the programme

For foreign candidates, requirements a-e above are applied, plus

a. Possess a Temporary Practicing Certificate issued by the MMC before starting practice.
b. Undergo clinical or laboratory attachment at a minimum of 3 months before joining the programme with satisfactory supervisor report.
c. Proof of proficiency in the English language. Candidates must obtain a minimum score of 6.0 in IELTS or 550 in TOEFL (obtained within 2 years prior to date of enrolment)

8. Duration of training

The minimum duration of training is four (4) years with a maximum of seven (7) years.

9. Curriculum and syllabus

Syllabus that will be used is attached (appendix I & II). However, the syllabus will be updated from time to time in view of the progress in this field of specialty.

10. Academic and teaching staffs

10.1 All academic staffs at the School of Medical Sciences will be involved in teaching activities. This is particularly in the stage I where the major input of basic sciences and practical aspects.

10.2 Stage II be particularly involved haematologist in university and training centre. A minimum of 2 trainers / lecturer will be required at each training centre.

11. Administrative committee

The Haematology department will be responsible in organizing and monitoring the program, preparing teaching schedule and organizing seminars pertaining to the program.

12. Administrative of Examination

The Medical School will coordinate and execute all examination. The result will be discussed at the Examination Board before approval by the Medical School Board and the Post-Graduate University Board.

**Appendix I Syllabus for Stage 1**

| | Curriculum and training | | Assessment |
|---|---|---|---|
| | **Haematology** | **Transfusion Medicine** | |
| 1. **Theoretical aspects** | a. Haemopoiesis and normal haemostasis<br>b. Red cells disorders:<br>- Anaemias: Nutritional anaemias, anaemia of chronic disease and aplastic anaemia<br>- Thalassaemia and common haemoglobinopathies<br>- Haemolytic anaemias<br>c. White cell disorders:<br>- Benign: Infections, leukaemoid reaction<br>- Acute Leukaemias, chronic leukaemias, multiple myeloma, myeloproliferative neoplasms, myelodysplastic syndrome, and lymphoproliferative disorders.<br>d. Bleeding disorders caused by vascular, platelet abnormalities and coagulation disorders<br>e. Thrombophilia<br>f. Basic genetic concept in haematology<br>g. Basic principles of quality assurance in haematology | a. ABO, Rh and other clinically important blood group systems<br>b. Compatibility testing<br>c. Haemolytic disease of the foetus and newborn<br>d. Preparation, storage and use of blood components<br>e. Complications of blood transfusion<br>f. Donor management<br>g. Basic principles of quality assurance in transfusion medicine | 1. Continuous assessment<br>2. Professional examination I |
| **2. Practical aspects** | a. Automated full blood cell count<br>b. Full blood picture<br>c. Perform a manual differential count<br>d. Bone marrow examination<br>e. Reticulocyte count<br>f. ESR estimation<br>g. G6PD screening<br>h. Hb analysis<br>i. Routine coagulation screen – PT, APTT, Mixing tests, TT, FDP, D-Dimer, Fibrinogen, bleeding time<br>j. Special coagulation tests factor assay, inhibitor, thrombophilia | a. ABO, Rhesus grouping<br>b. Antibody screen, antibody identification, antihuman globulin test<br>c. Cross matching<br>d. Component preparation and storage | |

**Appendix II Syllabus for Stage 2**

| | Curriculum and training | | Assessment |
|---|---|---|---|
| | **Haematology:** | **Transfusion Medicine:** | |
| **1. Theoretical aspects** | a. Haemopoiesis and its clinical relevance<br>**b. Red cells disorders:**<br>- Anaemias: Nutritional anaemias, anaemia of chronic disease and aplastic anaemia<br>- Haemolytic anaemias<br>- Thalassaemia and haemoglobinopathies.<br>- Congenital anaemias<br>**c. White cell disorders:**<br>- Benign – Infections, leukaemoid reaction, storage disease, congenital anomalies of WBC<br>- Leukaemias, multiple myeloma, myeloproliferative neoplasms, myelodysplastic syndrome and lymphoproliferative neoplasm<br>- Bone marrow failure and infiltration<br>d. **Bleeding disorders-** acquired and inherited bleeding disorders caused by vascular and platelet abnormalities, coagulation disorders<br>e. **Thrombophilia -** acquired and inherited disorders<br>f. Genetic aspect of haematological disease<br>g. Haematological changes in systemic diseases<br>h. Paediatric haematological disorders<br>i. Quality assurance in haematology | a. Donor and recipient management<br>b. Type, preparation, storage and clinical use of blood components<br>c. ABO, Rh and other clinically important blood group systems and antibody<br>d. Blood group discrepancies<br>e. Compatibility testing and management of blood incompatibility<br>f. Blood transfusion in special groups<br>g. Near misses, transfusion errors, complications of blood transfusion<br>h. Haemolytic disease of the newborn<br>i. Stem cell transplantation<br>j. Genetic aspect of transfusion medicine<br>k. Transfusion microbiology<br>l. Quality assurance in blood transfusion | 1. Continuous supervisor assessment<br>2. Professional examination 2 |

| | | | |
|---|---|---|---|
| **2. Practical aspects** | **Routine Haematology tests and procedures**:<br>Full blood picture,<br>Reticulocyte count,<br>Automated cell counting,<br>ESR<br><br>**Bone marrow aspirate and trephine biopsies staining techniques**<br>Bone Marrow staining (<br>Cytochemical staining<br>Immunohistochemistry<br><br>**Special Haematology investigations:**<br>Haemoglobin analysis<br>Staining for inclusion bodies<br>Sickle cell screen<br>OFT, Ham's test<br>G6PD screen and assay<br>Kleihauer test<br>Urine for haemosiderin<br>Serum and red cell folate<br>Serum B12, Serum ferritin<br>Flow cytometry<br>CSF cytospin<br>Serum and urine protein electrophoresis, immune fixation and serum immunoglobulin<br><br>**Haemostasis and Thrombosis**<br>Routine coagulation test (PT/INR, aPTT), Serum fibrinogen, thrombin time. D-dimer, Coagulation factor assay, Inhibitor screening and assay, Platelet function testing, von Willebrand assay<br>Thrombophilia work-up<br><br>**Genetic tests:**<br>Cytogenetics – karyotyping, FISH, PCR based techniques<br><br>**Laboratory Management**<br><br>**Quality Management activities**<br>Quality assurance scheme<br>Laboratory accreditation | Donor selection, counseling and management<br><br>Component processing<br><br>Blood grouping<br>Blood Compatibility testing,<br>Antibody screening and identification<br><br>Antiglobulin test<br><br>Specialized immunohaematology tests<br>Antibody titration<br>Apheresis technique<br>Platelet Antibodies testing<br><br>Blood Screening and confirmation tests (Hepatitis B, C, HIV tests,VDRL)<br><br>Stem cell collection, processing and cryopreservation<br>HLA typing<br>CD34 enumeration<br><br>**Laboratory Management**<br><br>**Quality Management activities**<br>Quality assurance scheme<br>Laboratory accreditation | |

| | | |
|---|---|---|
| **3.** Research aspect | Research methodology (basic & intermediate statistic, scientific writing and thesis writing).<br>Protocol preparation and presentation.<br>Ethical application.<br>Dissertation submission | Dissertation assessment |