

A detailed microscopic view of various blood cells, including numerous red blood cells (erythrocytes) and several white blood cells (leukocytes) with distinct nuclei, set against a dark background. The cells are scattered across the lower-left portion of the cover.

Haematology Postgraduate Training in Malaysia

GUIDE FOR APPLICANTS

VERSION 1, 2022

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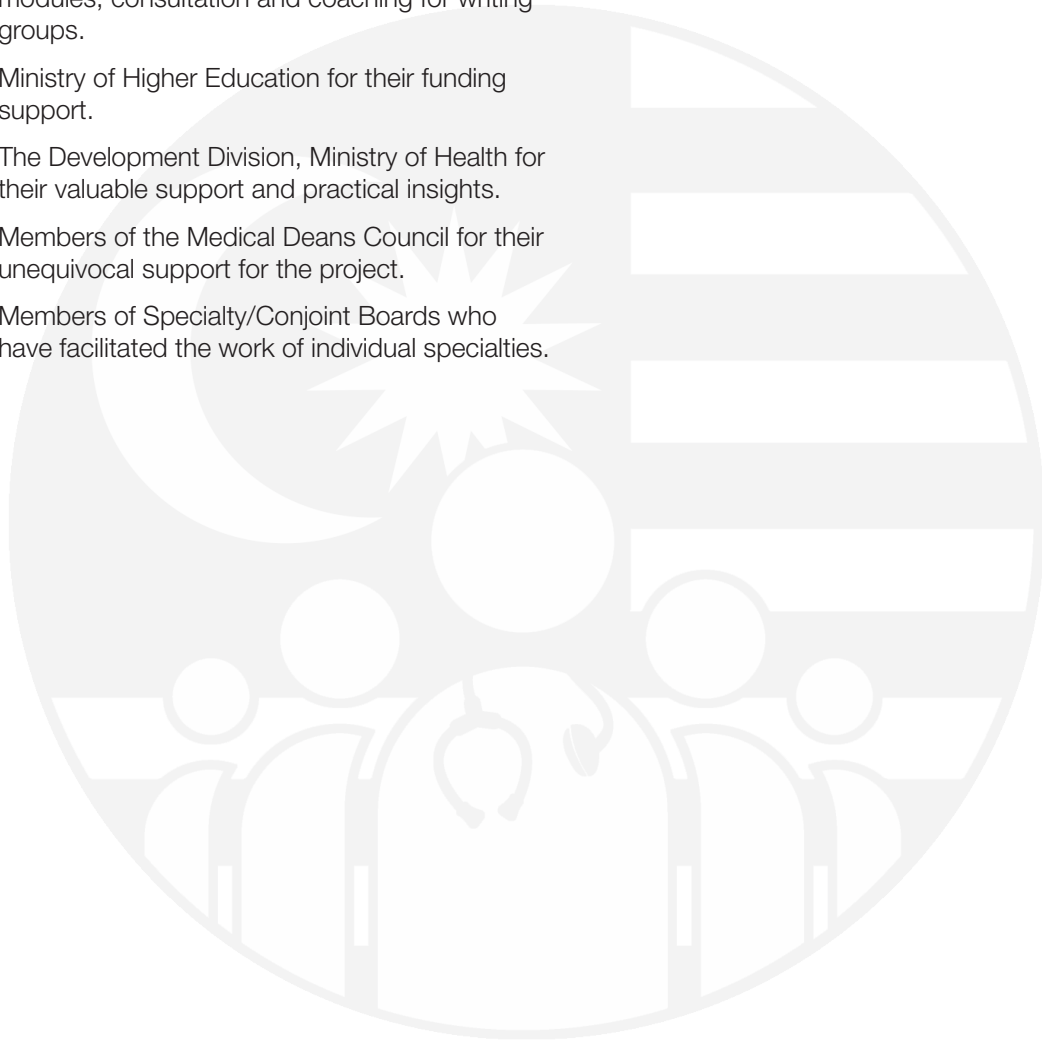


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Preface

What is this Document

This document is intended to serve as a guide for prospective applicants by providing the following information:

1. Overview of the Haematology postgraduate specialty
2. Outline of the Haematology postgraduate training programme in Malaysia
3. Entry requirements
4. Application and entry process

The National Postgraduate Medical Curricula for Pathology

The National Postgraduate Medical Curricula for Pathology are part of the National Postgraduate Medical Curriculum (NPMC) Project which encompasses the development and delivery of the curricula for the training of all clinical medical specialists in Malaysia. It is to ensure that the training of medical specialists addresses the needs of the Nation and meets the standards of the National Specialist Register.

Development of the Curricula for Pathology is the joint effort of different institutional members of the Jawatankuasa Bersama Sarjana Perubatan – Patologi (JBSP-Patologi) which is the National Conjoint Specialty Committee overseeing Pathology, appointed by Jawatankuasa Bersama Ijazah Lanjutan Perubatan (JBILP). JBSP-Patologi comprises of members from all the universities offering the Master of Pathology programmes, the Ministry of Health (MOH) and College of Pathologists, Academy of Medicine Malaysia (CPath-AMM), and has collaboratively established a common training and examination system for the Master of Pathology programmes since 1995. It therefore draws upon a wealth of experience and goodwill in the drafting of these National Postgraduate Medical Curricula for Pathology. In particular, it took direction and guidance from the most recent Master of Pathology Curriculum Review Workshop held at the University of

Malaya in August 2019. Arising from this, it was agreed that, going forward, the training of mono-discipline pathology specialists will be consolidated, and separate curricula will be developed for the disciplines of Anatomical Pathology, Haematology, Chemical Pathology, Medical Microbiology, Forensic Pathology and Medical Genetics.

The Curriculum for Haematology

The National Postgraduate Medical Curriculum for Haematology, aims to be applicable for all postgraduate programmes, however named, for the training of laboratory haematologists in Malaysia. It serves as the guide for all University programmes (e.g. Master of Pathology), and the training centres involved in the delivery of these programmes. It is envisaged that training through parallel pathways will be developed, and will utilise, incorporate and echo the principles and philosophy of the Haematology training embodied in this document.

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Introduction

Purpose of this Guide

The purpose of this guide is to inform prospective applicants seeking a career in Haematology. It summarises the key aspects of the Haematology curriculum (entry requirements, process, training structure, assessments, some documentation and exit criteria), and provides a guide as to how to prepare and proceed with the application.

What is Haematology?

Pathology, which comes from the Greek words “pathos (suffering)” and “logos (study)”, literally translates to the study of suffering. When applied to modern medicine, pathology is the study of disease at structural (organ), cellular (tissues and cells) and molecular (genes and proteins) levels and provides understanding of the manifestations and complications of disease, on which therapeutic decisions are based. Thus, Pathology has aptly been described as the “foundation of medicine” and “the science behind the cure.” In Malaysia, as in many countries adopting the Western practice of Medicine, the field of Pathology has evolved into various specialties, such as Anatomical Pathology (study of disease in tissues and cells), Forensic Pathology (determination of cause and manner of death for legal purposes), Haematology (study of blood disorders), Chemical Pathology (study of the biochemical basis of disease), Medical Microbiology (study of disease due to infective agents) and more recently Medical Immunology (study of the immunological basis of disease) and Medical Genetics (study of the genetic basis of diseases and heritable conditions).

Haematology is the branch of medicine that study the cause, prognosis, treatment and monitoring of diseases related to blood and blood disorders. It involves diagnosing diseases that interfere with the production of blood and its components such as red blood cells, haemoglobin, white blood cells, platelets, blood proteins, and coagulation factors. Such

diseases may include red cells disorders such as anaemia, membrane disorders, thalassemia/hemoglobinopathies or nutritional deficiency anaemia, blood related malignancies such as leukaemia, multiple myeloma or lymphoma, bone marrow failure or myeloproliferative disease and bleeding disorders which includes haemophilia, thrombophilia as well as disease related to transfusion and stem cells transplantation.

The Role of a Haematologist

Haematologists perform a wide range of laboratory tests to produce and interpret results, assisting clinicians in their diagnosis and treatment of disease. They support many hospital departments including A&E, intensive care, operating theatres, special care units and oncology and work closely with other health professionals and colleagues. Some Haematologists are also involved in transfusion medicine. They also undertake research into diseases such as haematological malignancy. By gaining an understanding of diseases they also research therapies to help improve the survival rates of patients.

Apart from performing diagnostic duties, Haematologist also works closely with scientific officers and technical staff in monitoring and supervising the management of the laboratory which includes asset management, maintenance of laboratory equipment, laboratory safety, internal and external quality assurance.

Size of the Specialty

As of March 2022, there are a total of 892 pathologists registered on the NSR of which 215 are listed under Haematology. Some pathologists are registered for both General Pathology and their respective specialty therefore there is an overlap in numbers. The projected number of Haematologists required by 2030 for MOH, the main stakeholder, is 243. This number may change with the country's increased need for new hospitals. Furthermore, the increase in the numbers of teaching hospitals, private hospitals and laboratories and Ministry of Defence hospitals will also increase

the demand for Haematologists. In recent years, the evaluation of new technology, particularly the use of molecular biology techniques in diagnostic tests and the development of new tests, has significantly expanded the scope and pivotal roles of Haematologists, further contributing to the increased demand. There is a major shortfall of Haematologists in Malaysia, especially when compared to countries such as Australia and the United Kingdom.

Unique Features of Haematology

Haematologists provide clinical expertise in the rational choice, interpretation and the potential limitations of haematological diagnostic testing, tests such as Hb analysis, coagulation tests and bone marrow examination. They provide guidance to clinicians about pre-transfusion testing, selecting appropriate and safe blood products for transfusion and clinical advice regarding transfusion complications. Haematologists are also involved in the management of patients by providing timely, accurate diagnostic assessments and recommending additional studies when needed.

They advise and work with scientific staff with regard to laboratory procedures and manage the haematology laboratory, being mindful of the need for appropriate and cost-effective investigations, quality assurance and safety.

Within haematology, there is the opportunity to develop special interests in a further wide variety of clinical and laboratory areas (e.g. haemoglobinopathies, haemostasis and thrombosis, transfusion medicine, malignant haematology, transplantation) which will suit a wide variety of individuals.

Why Choose Haematology as a Career?

As a Haematologist you will be amongst the few who will be immersed in / have the opportunity for:

- a close collaboration with many clinical disciplines in your daily work
- a fast-developing field of medicine with rapidly progressing knowledge that

integrates laboratory and clinical medicine

- use of cutting-edge and fast developing technologies
- learning many new skills including audits, quality management, financing
- research on the vast amount of archived case material in Haematology

A Haematologist's day is primarily dedicated to clinical liaison, which includes advising clinicians on the right tests to investigate a specific disease, how to interpret the results and follow up, and how analytical interference may affect the results. Their pertinent role is at the laboratory interface, between the analytical and clinical aspects. While the test analysis in Haematology may seem largely automated, Haematologists play key roles and offer insights that computers cannot in the validation and interpretation of test results.

It might be challenging to fully define a Haematologist's role because this specialty encompasses such a wide range of clinical and investigative domains. The daily experience is frequently unpredictable, and one never knows what clinical issue will come up. Because of this, it is a discipline that continues to offer challenges and intrigue. Additionally, Haematology establishes a foundation for a further career in a large range of subspecialties while retaining a sound fundamental basis.

1. The Haematology Training Programme

Training Pathways

Currently the training for the specialty of Haematology in Malaysia is almost exclusively through the Master of Pathology (MPath) programmes for Haematology. These are currently offered by 5 training Universities and governed by the Ministry of Higher Education-based Jawatankuasa Bersama Sarjana Perubatan – Patologi [JBSP-Patologi] so as to ensure uniformity in training and assessments. Currently, they are FOUR (4) year, full time, fully-supervised programmes, designated here as the Ministry of Higher Education (MOHE), pathway. Alternative (parallel) pathways of training (such as for the FRCPPath or FRCPA) have not been formalised with institutional training providers, although individual arrangements may be made on an adhoc basis. Notably, the Master of Pathology degree is accepted by the Royal College of Pathologists of Australasia as giving exemption from the Part 1 RCPA examination. Therefore this document will focus on the MPath programmes (MOHE pathway).

Training is available only to medically-qualified practitioners. They should preferably be in the early stage of their medical careers after having acquired clinical experience that will allow them to appreciate the relevance of Haematology within the wider medical specialist services. Clinical experience is equally important entry criterion than actual hands-on experience in Haematology.

Stages of Training for the Master of Pathology (Haematology) Programme

Stage 1 is ONE (1) year in duration. In summary, the trainee will start by attending an Orientation programme, and during Stage 1, one-month Foundation posting rotations to each of the other major specialties of Pathology, namely: Anatomic Pathology, Medical Microbiology and Chemical Pathology, to familiarise themselves with the workings of

these other Pathology specialities. The trainee will undergo supervised competency-based training in Haematology for the remainder of Stage 1. At the end of Stage 1, the trainee who has satisfactorily completed training will sit for an examination in Haematology (Part 1 Examination).

Stage 2 is THREE (3) years in duration during which the trainee will undergo supervised competency-based training in Haematology with the aim of progression to Level 5 competence. Some subspeciality areas will be introduced at this stage such as adult and paediatric haematology, transfusion medicine, haemopoietic stem cell transplant, molecular genetics, advanced haemostasis and immunology. Competency based training is supplemented by lectures, seminars, conferences and discussions. Trainees are expected to read widely, not only the literature of Haematology itself but also related subjects such as biochemistry, genetics, molecular biology and statistics. All trainees are also required to attend intensive as well as other relevant courses and continuous professional development activities.

In Stage 2, the trainee will also be introduced to research methodology, data analysis and writing a research report/dissertation. With the guidance of the supervisors (academic/ clinical/ research), the trainee will plan and undertake a research project and write up a research report/dissertation. To facilitate understanding of research methodology, all training universities will conduct a research methodology course and all trainees are required to attend the course.

After satisfactory completion of training in Stage 2, the trainee sits the Final (exit) examination.

2. Entry Requirements

Applicants generally fall into the following groups:

1. Ministry of Health (MOH) sponsored candidates
2. Non-MOH, government sponsored (e.g. Ministry of Defence)
3. Other sponsored trainees (e.g. sponsored by University or private institutions)
4. Private – self funded trainees
5. International - non-Malaysian foreign trainees who may be self-funded or sponsored by a variety of agencies or government.

Essential Criteria

Candidates who wish to pursue post-graduate training in Haematology have to fulfil the following requirements:

Component	Entry Requirement	Evidence
Medical Degree registrable with Malaysian Medical Council (MMC)	Mandatory	Original certificate
Full registration with MMC	Mandatory	Certificate of registration
Clinical Experience	Mandatory: 3 years of clinical experience after attainment of the basic medical degree, comprising of: a: satisfactory completion of housemanship, and b: post-housemanship clinical experience of at least 1 year duration	Authorised service record
Valid APC	Mandatory	Certificate
Clinical Skills and Knowledge as per Entry ELA	Mandatory	Demonstrate relevant knowledge and skills during entrance evaluation. Letters of reference
Entrance Evaluation	Mandatory	Satisfactory performance
<i>Additional requirements for International Candidates</i>		
Good Standing	Mandatory	Letter of Good Standing from Medical Council of country of current practice
TPC or APC from MMC	Mandatory	Certificate

Component	Entry Requirement	Evidence
Clinical or laboratory attachment for a minimum of 3 months before joining the pathology training programme	Mandatory	Satisfactory supervisor's report
Proficiency in written and spoken English language (if basic degree is from an institution of higher learning where the medium of instruction for that degree is not the English language)	Mandatory	TOEFL or other relevant transcripts which meets requirements of training university

Important:

1. Any falsification of documents will result in the application being rejected and the applicant will be reported to the MMC.
2. Any adverse reports such as an investigation by the MMC must be declared to the Selection Committee.

Expected Pre-Entrance Basic Knowledge and Experience

Basic Knowledge

Trainees entering Haematology training are expected to have at least 3 years of clinical experience after the attainment of their basic medical degree, with at least minimum basic knowledge on:

- Anatomy, physiology and biochemistry of the haemopoietic system
- Applied pathophysiology of the haemopoietic system
- Basic human genetics

Entry Essential Learning Activities (Entry ELAs)

Entry ELAs are activities that prospective trainees should be able to perform in a trustworthy manner by the time they enter postgraduate training in Haematology. The Entry ELAs have been selected to represent the typical day-to-day work in Haematology. They indicate the knowledge, skills and attitudes that are essential for all candidates to demonstrate. They also serve as learning opportunities for

prospective trainees when they are tasked to undertake the activities and then receive feedback regarding their performance.

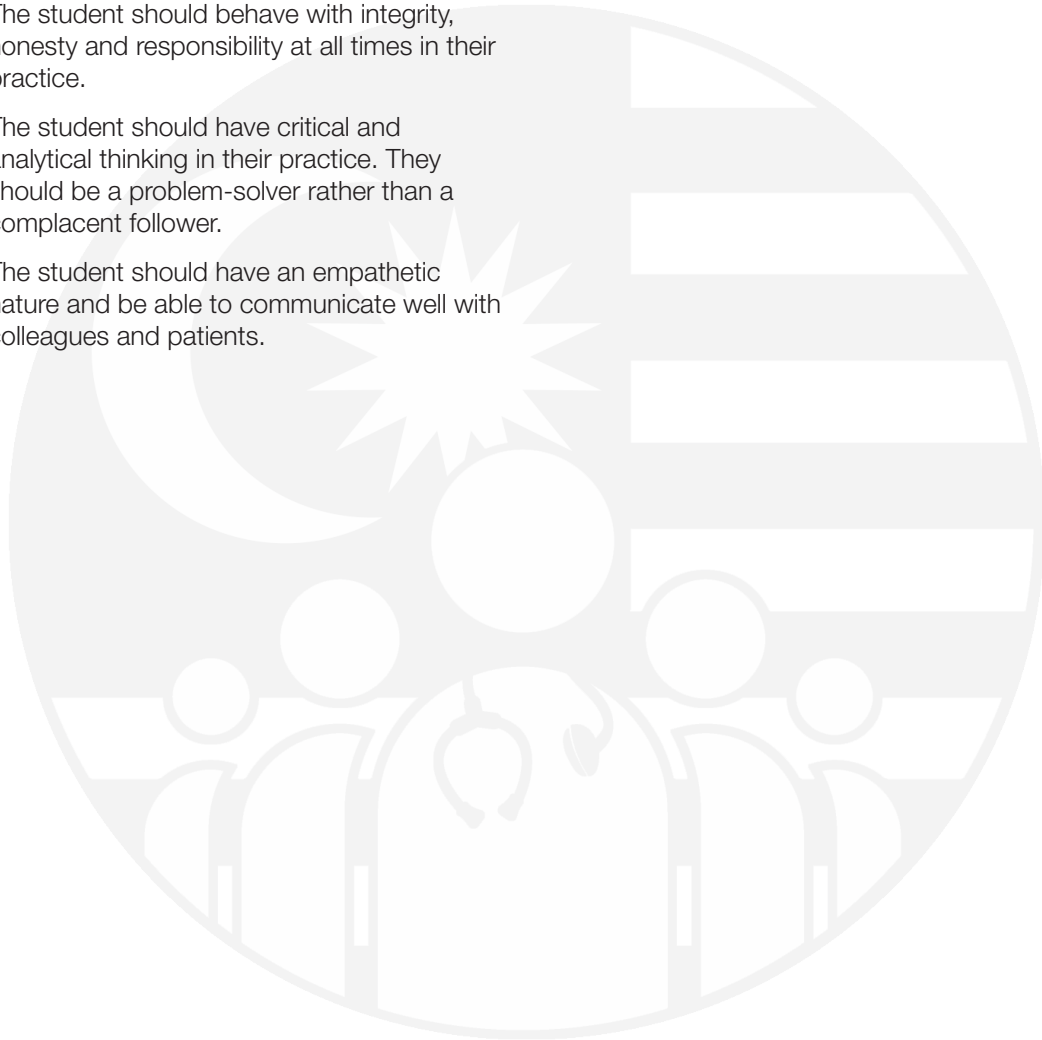
The objective of each ELA is to identify and describe key areas in three domains – knowledge, skills and attitudes (KSA), that collectively determine whether a clinical task has been completed successfully. To this end, they also illustrate some examples of positive and negative behaviours of relevance and attention for the given clinical task. For entry assessment, candidates are expected to demonstrate some basic clinical competency in the following three Entry ELAs for Haematology, the detailed list of Entry ELAs can be found in Appendix 2.

ELA 1	Request for coagulation tests
ELA 2	Investigation of anaemia
ELA 3	Blood/ Blood Component Transfusion Request Procedure

*The list of entry ELAs is not exhaustive and may be updated according to programme requirements.

Personal Qualities

- The student should be committed to self-learning and have the aptitude for searching online pathology education resources.
- The student should be committed to continued professional development and life-long learning. They should have the aptitude for group fora, professional discourse, and participation in live and virtual seminars/webinars and conferences.
- The student should behave with integrity, honesty and responsibility at all times in their practice.
- The student should have critical and analytical thinking in their practice. They should be a problem-solver rather than a complacent follower.
- The student should have an empathetic nature and be able to communicate well with colleagues and patients.



3. Entry Process

Overview

Candidates apply online either to the university of their choice (non-MOH candidates), or through the Ministry of Health of Malaysia (MOH sponsored candidates). Candidates who have shown evidence of satisfactory experience, adequacy in knowledge and aptitude are shortlisted and can be called for an interview, following which they are informed by the relevant university of their success or otherwise.

Ministry of Health Sponsored Candidates

To be eligible for sponsorship from Ministry of Health (MOH), candidates must be currently serving in the MOH and free from any disciplinary action by any health regulatory bodies. An updated evidence of clinical service in the MOH is to be produced along with the evidence of satisfactory job performance (i.e. achieving a minimum of 85% in their Annual Appraisal Report for three successive years).

Applications for MPath programme will be advertised in mainstream newspapers and the MOH website in July each year. Ministry's candidates are advised to refer to the Training Management Division (Bahagian Pengurusan Latihan – BPL, e-hlp.moh.gov.my) of the MOH for updated information on application for all Masters Specialty training programmes. The entry quota for candidates from the MOH is the highest, comprising of 80-90% of the total intake each year.

Other Candidates

For other candidates e.g. Non-MOH candidates, Private / Overseas candidates, applications should be made directly to individual universities offering the MPath programme through the university's website at any time throughout the year. Candidates may apply to more than one university. Sponsorship into the MPath programme will have to fulfil the requirements of the sponsoring employer of the applicant.

Application Processing

Applications are processed by the respective organisations and candidates are informed of their success in the shortlisting process by the MOH and/or University. If successfully shortlisted candidates are to be interviewed, they will be informed of their interview arrangements by the MOH and/or University.

Essential Criteria

Event	Process
Document compilation	Applicants must compile the following documents for presentation: <ul style="list-style-type: none"> • Sijil Pelajaran Malaysia (SPM) or its equivalent and any other pre-university certificates as evidence of education level • Basic Medical degree • Certificate of registration with the Malaysian Medical Council • Curriculum vitae with details of work experience • Evidence of previous training records
Application	
MOH-sponsored candidates	Applications can be made online at http://ehlp.moh.gov.my Applications for pre-entrance evaluation are available at http://apps.mpm.edu.my/medex/public/register
Non-MOH sponsored candidates	Applications can be made online at the postgraduate studies web link of the respective universities
Entrance Evaluation	An entrance evaluation which can take the form of an entrance examination e.g. MedEx (Appendix 3) and/ or interview
Shortlisting	MOH-sponsored candidates and non-MOH sponsored candidates, on satisfactory performance at the Entrance Evaluation will be shortlisted by their respective sponsors (if relevant) and list of potential candidates presented to the various training universities
Outcome	The various universities will select the candidates for training based on the number of training positions available. Successful MOH-sponsored candidates will be informed by the Training Division of MOH while the respective universities will inform the outcome to other non-MOH sponsored candidates.
On Successful Entry	
Orientation	Successful candidates will attend an Orientation Programme at the respective training universities at the commencement of the academic year

Induction Process

The Orientation/Induction process is a set of steps put in place to orientate the trainee to the institution, curriculum and training requirements. Each university is responsible for the organisation and conduct of the programme for its own candidates.

The Induction programme covers the following aspects:

- Registration process
- Payment of fees
- Details of the programme of study to be followed
- Learning opportunities that will be provided
- Assessments used and their purpose
- Location of training centres
- The duties of a trainee
- Guidelines and protocols in the workplace
- Support provided in the workplace
- Role of trainers

- Continuous Professional Development (CPD) requirements
- Attendance during training
- Disciplinary processes
- Processes to report concerns about training
- Systems for supporting a trainee in difficulty

Attendance and participation in the Induction programme is compulsory. Failure to attend the Induction programme will result in the trainee not being able to commence training.



4. Syllabus

Overview

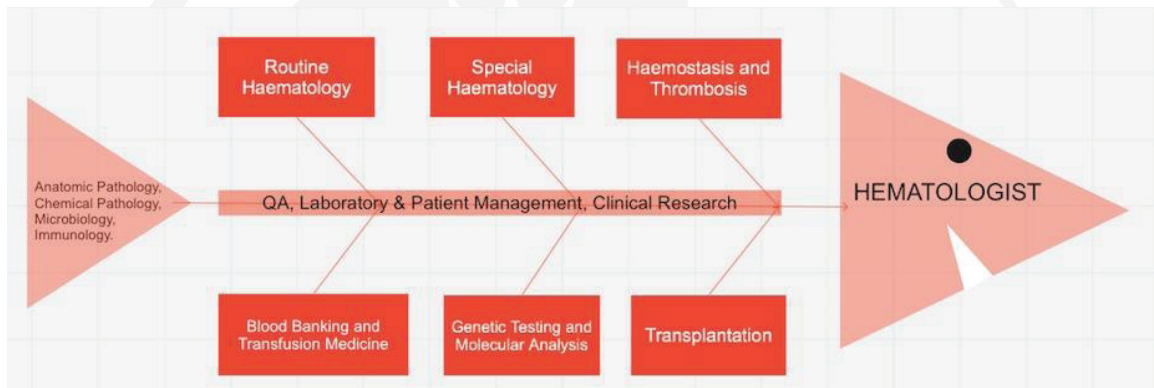
The syllabus defines what will be taught and learned throughout the training programme in Malaysia. It outlines the domains and competency levels to be achieved during each stage of the training programme. It details the generic and specialty-specific breadth of knowledge, skills and attitudes that a trainee needs to attain and apply to patient care.

The syllabus provides a framework for the:

1. structure of the training programme.

2. competencies expected in the domains of knowledge, skills and professional behaviours.
3. expected levels of competency at different stages of training.

Trainees in Haematology will encounter a wide range of disease or conditions related to haematology. To reflect this, the topics and relationships between the domains in the syllabus are described in the Haematology Training diagram as below.



The Haematology Training Diagram, depicting the interaction of various components in the training of a Haematologist.

Training Structure

This is a fully-supervised 4-year programme structured as TWO (2) Stages, offered by local Universities accredited to provide the programme.

Stage 1 (year 1), of the programme focuses on foundational knowledge and practical skills in Haematology. This must be sound enough as the basis on which to build on, prior to entry into the more patient-centred and practice-focused training of Stage 2. To assess that the required level has been achieved, there is a formal Part I examination at the end of Stage 1.

Stage 2 (years 2, 3 and 4), of the programme focuses on the spiral acquisition of specialised knowledge and practical skills in Haematology through the handling of increasingly complex clinical cases. Concurrent with this is the development of professional behaviours, conduct and character to achieve the competence level required of a specialist Haematologist. There is a formal Final examination at the end of Stage 2 that serves as the exit assessment.

Competency Indicators

The competence levels, which reflect a combination of knowledge and skills achievements, are as below. At each level, knowledge would precede and usually exceed skills but should always be appropriate and adequate to support skills competence. The syllabus is designed such that the trainee undergoes a spiral progression of competence achievement in Haematology and is expected to progressively acquire a range of knowledge, skills and values during the 4-year period of training. This progression starts at Level 1, up to Level 5 when the trainee who has satisfactorily completed training is ready to present themselves for the Final Exit examination.

The competence levels are shown below. These reflect a combination of knowledge and skills achievements. At each level, knowledge would precede and usually exceed skills but should always be appropriate and adequate to support skills competence.

Level	Description
1	Observer status only
2	Assistant status
3	Able to perform/interpret under close and direct supervision
4	Able to perform/interpret under indirect supervision
5	Able to perform/interpret unsupervised

It is expected that the trainee will retain and build on what has been achieved earlier as they reach the new targets set at the next stage.

Knowledge and Skills Syllabus

The syllabus broadly covers THREE (3) major focus areas (clinical, technical and management

aspects of Haematology) in which the trainee must progress in both knowledge and skills throughout the training programme.

Focus Area	Topics
Clinical aspects	<ul style="list-style-type: none"> • Pathophysiology of diseases. • Interpretation of laboratory test results relating to assay methodology and patient's clinical condition. • Selection of appropriate tests for investigation of more complex disorders. • Provision of interpretative comments to written reports crucial to clinical management. • Basic knowledge and understanding of other Pathology specialties as required.
Technical aspects	<ul style="list-style-type: none"> • Principles and Applications of Analytical Techniques in Haematology: <ul style="list-style-type: none"> » Common Laboratory Techniques » Specialised Laboratory Techniques • Factors affecting Laboratory Processes in Haematology: <ul style="list-style-type: none"> » Pre-Analytical » Analytical » Post-Analytical
Management aspects	<ul style="list-style-type: none"> • Organisation of Laboratory Services • Personnel Management • Facilities and Safety • Resourcing and Finances • Purchasing and Inventory • Laboratory Information System (LIS) • Risk Management • Laboratory Quality Management System (QMS) • Laboratory Accreditation

Learning Outcomes

Stage 1

1. To apply basic theoretical knowledge in the selection, interpretation and reporting of laboratory investigations of common haematological disorders.
2. To apply basic theoretical knowledge in the selection, interpretation and reporting of routine transfusion medicine procedures.
3. To work collaboratively with physicians in solving common problems associated with transfusion.
4. To apply a holistic understanding of the involvement of Chemical Pathology, Medical Microbiology and Anatomical Pathology in relation to Haematology.
5. To apply standard operating procedures in laboratory management including laboratory organisation, quality assurance, and laboratory safety.

Stage 2

1. To acquire the appropriate competencies in the selection and utilisation of routine and special haematological tests.
2. To acquire competency in interpretation and reporting of results in order to optimise patient care.
3. To apply the appropriate competencies in developing and undertaking research.
4. To acquire the appropriate competencies in the management of laboratory services i.e., haematology and transfusion medicine, including implementation of quality assurance system.
5. To demonstrate professional conduct as a Haematologist.

The knowledge and skills syllabi will support the development of the trainee in the various modalities of Haematology throughout the training programme.

A summary description of the Syllabus is shown in Appendix 5.

Professional Behaviours

Professionalism is 'placing the interests of the patient above those of the specialist, setting and maintaining standards of competence and integrity, and providing expert advice to society on matters of health'. Therefore, the highest standards of professional behaviour must be instilled in and practised by all trainees.

Domains	Positive behaviours
Responsibility	<ul style="list-style-type: none"> • Punctuality • Conscientiousness • Industriousness • Accurate documentation
Relationships with and respect for patients	<ul style="list-style-type: none"> • Maintenance of patient confidentiality • Appropriate behaviour • Respect of boundaries • Respect of cultural differences • Effective communication • Courtesy in all interactions
Probity and honesty	<ul style="list-style-type: none"> • Ethical decision-making based on best evidence • Transparency • Integrity
Self-awareness and capacity for reflection	<ul style="list-style-type: none"> • Constructive attitude to feedback • Willingness to learn from experiences of self and others • Regular audit of outcomes

Domains	Positive behaviours
Collaboration and working with colleagues	<ul style="list-style-type: none"> • Teamwork and collaboration • Effective communication • Appropriate behaviour • Avoidance of negative behaviours, such as bullying and harassment • Respect of diversity and boundaries • Promotion of a positive workplace culture

References:

1. ABIM Foundation, ACPeASIM Foundation, European Federation of Internal Medicine. Medical professionalism in the new millennium: a physicians' charter. *Lancet* 2002; 359:520e2
2. Rogers W, Ballantyne A. Towards a practical definition of professional behaviour. *J Med Ethics*. 2010 Apr; 36(4):250-4. doi: 10.1136/jme.2009.035121

Research Syllabus

Haematologists must be trained in applying the principles of evidence-based medicine in clinical practice in order to offer the best available care to their patients, while accounting for local resources and cultural expectations.

The postgraduate training syllabus includes the requirement for completion of a research project leading to a research report. Trainees are also exposed to journal clubs, symposia and scientific conferences, to improve and expand their understanding of research principles.

The research syllabus consists of the following:

<p>Clinical research design</p> <ol style="list-style-type: none"> 1. Understanding the value of clinical research 2. Formulating the research question <ul style="list-style-type: none"> » literature review » tools for managing your references 3. Choosing the right study design for the research question 4. Assessing feasibility 5. Ethics approval - considerations and the application process 6. Funding – sourcing, application and increasing their chances of success
<p>Statistics and other methods of data analysis</p> <ol style="list-style-type: none"> 1. Quantitative methods 2. Qualitative methods 3. Sample size and power calculation 4. Sampling methods

Good clinical practice

1. Defining Good Clinical Practice
2. Collaborators' roles in clinical research
 - » investigator-initiated studies
 - » sponsor-initiated studies
3. Institutional research boards (IRB) and institutional ethics committees (IEC)
4. Protocol deviations
5. Informed consent
6. Safety management

Scientific writing

1. Principles of scientific writing
2. Converting data into a manuscript
3. Plagiarism, and how to use plagiarism checkers
4. Choosing a journal
5. Journal formats
6. Writing an abstract
7. Writing a cover letter

Research presentation skills

1. Designing slide presentations and posters
2. Capturing an audience - verbal and non-verbal skills
3. Defending your work
4. Concluding strongly

5. Assessment Tools

Introduction

This section outlines the assessment methods and modalities, their utility, and timing in Haematology training. Formative and summative assessments are carried out to assess all domains in which the modern Haematologist is expected to be competent. Assessments serve the following key functions:

1. To track the trainee's achievement of the required competencies, facilitate the provision of feedback, and identify opportunities for improvement.
2. To ascertain if the trainee has met the learning requirements and competencies expected from a placement/rotation as a precursor to progressing to the next placement and/or stage of training.

Training Placements for Stages 1 and 2

Stage 1

1. A one-month Foundation posting rotation to each of the other major specialties of Pathology, namely: Chemical Pathology, Medical Microbiology and Anatomical Pathology, to familiarise themselves with the workings of these other specialties of Pathology.
2. Failure to obtain a "Satisfactory" grade in a trainee placement will result in the trainee having to repeat the training placement.
3. Trainees must obtain a "Satisfactory" grade for the placement immediately preceding the date of the Part I examination. Failure to obtain a "Satisfactory" grade for this placement will disqualify the trainee from the Part I examination. Failure to sit for the Part I examination for this reason may be considered a failed attempt at the examination.
4. The trainee will undergo supervised competency-based training in Haematology for the remainder of Stage 1.

Stage 2

1. The trainee will undergo supervised competency-based training in Haematology with the aim of progressing to Level 5 competence. Some subspecialty areas will be introduced at this stage, including adult and paediatric haematology, haemopoietic stem cell transplant, molecular genetics, advanced haemostasis and immunology.
2. Trainees are also required to complete and submit a research report SIX (6) months prior to the Final examination.
3. A satisfactory completion of a research project is evidenced by a pass assessment of a research report. A pass re-evaluation after remedial action can replace an unsatisfactory/failed initial evaluation.

Trainees are required to pass the Final (exit) examination to complete the training programme.

Formative Assessments

Formative assessments in Haematology training will be largely workplace-based assessments (WBAs). This is the appraisal of the trainee's professional skills and attitudes that evidences their actual performance in the workplace. These are for the continuous provision of feedback and identification of areas for improvement, and are carried out throughout the training programme. The assessment tools for WBAs include Directly Observed Practical Skills (DOPS), Case-Based Discussions (CBD), Evaluation of Clinical Events (ECE) as well as Multi-Source Feedback (MSF).

The table below provides a brief description of WBAs:

WBA		Description
DOPS	Directly Observed Practical Skills	The emphasis of DOPS assessments is provision of feedback that supports the development of competency and proficiency. The assessment typically takes 15-20 minutes, with an additional 5 minutes for feedback.
CBD	Case-Based Discussions	CBD provide the trainer the means of reviewing a trainee's practice or their thoughts about practice. It enables trainers to explore the thinking of their trainee, share understanding, and develop professional thinking. Each assessment should typically take 15-20 minutes with an allowance of an additional 5-10 minutes for feedback provision by the assessor.
ECE	Evaluation of Clinical Events	A tool used for assessing the trainee in the performance of their duties in complex tasks, often involving teamworking or interacting with other professional staff.
MSF	Multi-Source Feedback	Feedback provision from wide range of staff in multiple roles who have had engagement with the trainee.

Assessment Objectives and Tools for Assessment

	Assessment Objective	Tools
1	Demonstrate the trainee's achievement of knowledge and skills	DOPS, CBD, SA-1&2
2	Identify and ensure the candidates' suitability for continued training in Haematology	SA-1, MSF
3	Provide the trainee with feedback about progress	DOPS, ECE, CBD, MSF
4	Ensure the trainee is ready to progress to next stage of training	DOPS, ECE, CBD, MSF
5	Ensure the trainee at the end of the training program can practice as an independent general Haematologist.	DOPS, ECE, CBD, MSF, SA-2
6	Demonstrate the development of the skill for research	ECE, MSF
7	Demonstrate management skills for running the laboratory	CBD
8	Demonstrate familiarity with laboratory accreditation	CBD
9	Demonstrate the ability to act professionally at all times	ECE, MSF

Summary of the Assessment Strategy for all Haematology Trainees:

Element	Details	End of attachment	End of year	End of training	Comments
Portfolio	Record of professional learning, WBAs, supervisor reports, reflections, and development activities	N/A	Satisfactory completion of the year (at Annual Review)	Satisfactory completion of training (at Annual Review)	The Portfolio is a record of all training activities and forms an integral part of the evidence to demonstrate professional development. Subsequently used for NSR registration.
Research / Audit	Evidence of project management	N/A	Conducted throughout years 2-4. Progress to be demonstrated	Submitted as part of the evidence for completion of training	Application of the scientific approach including formulating an idea, literature reviewing, interpretation and analysis OR an audit / a quality improvement exercise.
Workplace-based assessments	DOPS ECE CBD MSF	Minimum 1 DOPS every 3 months Minimum 1 CBD and 1 ECE every 4 months	Minimum 4 DOPS every year (years 2-4) Minimum 3 CBDs and 3 ECEs every year 1 MSF for every year (but more frequently if needed)	Minimum 12 DOPS Minimum 9 CBDs and 9 ECEs Minimum 4 MSF Evidence of 1 consultation to clinician in managing / resolving a case	WBAs provide an opportunity for feedback and reflection. They will also be used as part of the evidence for the end of year / training Portfolio review.
Educational and Clinical Supervisor Reports	Summary of progress through postings and learning sessions	Satisfactory completion of attachment			Part of the Portfolio
Courses, Workshops and Conferences	Developing knowledge and skills				Part of the Portfolio

Summative Assessments

There are 2 major summative assessments (SA) i.e. Part 1 Examination (SA-1) and the Final (exit) examination (SA-2). The trainee who has satisfactorily completed training will sit for an examination in Haematology (Part 1 Examination) at the end of Stage 1 (end of Year 1). After satisfactory completion of training in Stage 2 (end of Year 4), the trainee sits the Final (exit) examination.

Although the trainee is normally expected to pass the Part 1 Examination after ONE (1) year of training, the trainee who has failed the Part 1 examination at the first attempt is permitted TWO re-sits of the examination at 6 monthly intervals in Year 2. Similarly, the trainee is normally expected to pass the Final exit examination after 4 years of training. The trainee who has failed the Final exit examination at the first attempt is permitted re-sits which are subject to successful completion within a maximum of SEVEN (7) years for the whole training programme.

Maintenance of Trainee Portfolio

The Trainee Portfolio is a compilation of training / learning events and formative assessments activities throughout training. The Trainee Portfolio should contain the following documents:

- Learning agreements
- Procedure logbook
- **ALL** WBAs
- All research report progress evaluations
- End of Posting evaluation reports
- Proof of attendance of CPD activities

Research Report Progress Evaluations

Research report progress is evaluated SIX (6) monthly. This meeting is attended by trainees in Stage 2 of training, supervisors, and programme coordinators. This exercise aims to identify potential problems and allows for the provision of feedback and suggestions to

overcome problems identified. Each evaluation is recorded in a research report progress evaluation form. This form must be kept in the Trainee Portfolio with a copy provided to the office of the programme administrators.

Trainees are required to submit the completed research report SIX (6) months before the Final (exit) Examination. A satisfactory completion of a research project is evidenced by a pass assessment of a research report. A pass re-evaluation after remedial action can replace an unsatisfactory/failed initial evaluation.

6. Appendices

Appendix 1: List of Training Centres Accredited for Haematology Training

by the National Conjoint Specialty Committee – Pathology (as of 31 December 2020)

University centres

Pusat Perubatan Universiti Malaya
Pusat Perubatan Universiti Kebangsaan Malaysia
Hospital Universiti Sains Malaysia

Ministry of Health

Hospital Kuala Lumpur
Hospital Sultanah Aminah, Johor
Hospital Tengku Ampuan Afzan, Kuantan
Hospital Sultanah Nur Zahirah, Kuala Terengganu
Hospital Raja Perempuan Zainab II, Kota Bharu
Hospital Queen Elizabeth, Kota Kinabalu
Hospital Sultanah Bahiyah, Alor Setar
Hospital Pulau Pinang
Hospital Raja Permaisuri Bainun, Ipoh
Hospital Selayang
Hospital Tuanku Ja'afar, Seremban
Hospital Melaka
Hospital Umum Sarawak
Hospital Serdang
Hospital Tengku Ampuan Rahimah, Klang

Private centres

Ramsay Sime Darby Med Centre, Selangor

Appendix 2: Entry Level ELAs

All items on the tables below are examples, and they do not constitute an exhaustive list in any aspect.

Entry Essential Learning Activity 1		
Activity	Request for coagulation tests	
Description (if necessary)	All items on the table below are examples, they do not constitute an exhaustive list in any aspect	
Knowledge <u>Know</u> , Facts, Information	Skill <u>Do</u> , Practical, Psychomotor, Techniques	Attitudes + Values <u>Feel</u> , behaviours displaying underlying values or emotions
Able to select the appropriate test (PT & APTT) based on clinical indication	Ensures proper collection, correct amount, labelling and transportation of specimen	Explains to the patient the reason for drawing blood sample
Able to explain the basic principles and scientific basis for the coagulation test of choice	Complete all the relevant details in the request form (e.g. patient identification, time of blood collection, etc.)	Know where and when to ask for help, support and supervision
Able to select the appropriate collection tubes, order of draw, sample collection, transportation		
Behavioural Markers		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	Negative Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	Negative Passive Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forgets to do
Able to describe the process and sequence of specimen reception and rejection, screening, and labelling	Requesting blood test NOT indicated for the patient	Incomplete request form
Ensuring the sample volume is adequate, collected in the correct tube and transported to the laboratory in a timely manner	Not following 'order of draw'	Ordering unnecessary investigations
Ensuring the mandatory use of two unique identifiers for patient identification for blood sampling	Delayed delivery of specimen	
	Improper sample storage and transport	
Assessment/Evidence		
Medical Specialist Pre-Entrance Examination (MedEx)		
Interview for the Master of Pathology Programmes		

Entry Essential Learning Activity 2		
Activity	Investigation of anaemia	
Description (if necessary)		
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge <u>Know</u> , Facts, Information	Skill <u>Do</u> , Practical, Psychomotor, Techniques	Attitudes + Values <u>Feel</u> , behaviours displaying underlying values or emotions
Able to describe the causes and pathophysiology of anaemia Able to describe the clinical manifestations and complications of anaemia Able to select appropriate laboratory investigations of anaemia	Able to evaluate the signs and symptoms of anaemia Able to perform good phlebotomy technique Able to order indicated laboratory investigations	Able to discuss on the severity and management with attending physicians Know where and when to ask for help, support and supervision
Behavioural Markers		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	Negative Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	Negative Passive Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forgets to do
Able to request the indicated tests for the investigation of anaemia Able to interpret laboratory results and suggest appropriate treatment	Not able to request the appropriate test indicated for the patient Unable to review and interpret laboratory results Fails to highlight and act on abnormal laboratory findings	Did not complete the request form adequately Failed to review laboratory results
Assessment/Evidence		
Medical Specialist Pre-Entrance Examination (MedEx) Interview for the Master of Pathology Programmes		

Entry Essential Learning Activity 3		
Activity	Blood/ Blood Component Transfusion Request Procedure	
Description (if necessary)		
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge <i>Know</i> , Facts, Information	Skill <i>Do</i> , Practical, Psychomotor, Techniques	Attitudes + Values <i>Feel</i> , behaviours displaying underlying values or emotions
<p>Able to describe the indications for transfusion of blood/ blood component</p> <p>Able to describe the processes involved in blood/ blood component transfusion at the bedside</p> <p>Able to describe the complications of blood transfusion</p>	<p>Able to request appropriately using the blood transfusion request form (e.g. GSH or GXM)</p> <p>Able to perform the complete checklist of procedure for blood transfusion process</p> <p>Able to implement positive patient identification by using two unique identifiers during transfusion process</p>	<p>Able to explain to the patient the need of the process of blood transfusion</p> <p>Take full responsibility in handling the blood and blood transfusion process safely</p> <p>Maintain patient confidentiality</p> <p>Able to discuss professionally with physicians on various blood products that are requested for transfusion</p>
Behavioural Markers		
Positive	Negative	Negative Passive
Things that should be done, correct techniques or practices, things a trainee might do right	Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forgets to do
<p>Able to ensure that the correct blood type/ blood product is requested for the patient</p> <p>Able to issue correct blood/ blood component to the correct patient</p> <p>Able to administer blood/ blood components using safe and accurate practices</p>	<p>Using improper storage and transportation of blood/ blood components</p> <p>Failure to follow the correct procedures during the transfusion process</p> <p>Not ensuring correct blood/ blood component is provided for transfusion</p>	<p>Incomplete request form</p> <p>Causing occurrence of 'near miss'</p> <p>(Near miss is defined as an error or deviation from standard procedures or policies discovered before the patient receives a transfusion that may lead to transfusion error)</p>
Assessment/Evidence		
<p>Medical Specialist Pre-Entrance Examination (MedEx)</p> <p>Interview for the Master of Pathology Programmes</p>		

Appendix 3: The Medical Specialist Pre-Entrance Examination (MedEx) – Pathology component

The salient features of the Pathology entrance examination are:

- a. TWO True-False Multiple Choice Question papers. Each paper consists of 60 questions, each with 5 responses. The first paper relates to the understanding of basic anatomical pathology, forensic pathology, microbiology and immunology. The second paper relates to the understanding of basic haematology, chemical pathology and genetics.
- b. Marking system: A computerised marking system is used. There will be a minus mark of -0.5 marks for a wrong answer. The minimum mark allocated on each question is 0 (no carryover of negative marks).
- c. The pass mark is 50% and the candidate will be called for an interview. Candidates who obtain a mark between 45 -49% may be considered for interview.

Please refer to the MedEx website for updates on the examination: <https://bit.ly/3mEL2Ut>

Appendix 4: References to Haematology Trainee Guides

1. Master of Pathology Guide to Trainees and Trainers, Revised October 2016. National Conjoint Specialty Committee - Pathology.
2. The Royal College of Pathologists of Australasia Trainee Handbook 2021 for Haematology <https://bit.ly/3UE2Rjd>

Appendix 5: Summary Knowledge and Skills Syllabi in Haematology

Summary of Knowledge and Skills Syllabus Haematology	
Haematology	
Topic	Knowledge Content
Red cell disorders	Anaemias – nutritional, haemolytic, bone marrow failure Thalassaemia and haemoglobinopathies
White cell disorders	Benign disorders Acute leukaemia and chronic leukaemias Multiple myeloma Myelodysplastic syndromes Bone marrow failure
Haemostatic disorders	Vascular and platelet abnormalities Bleeding and thrombotic disorders
Specialised haematology	Haematological changes in systemic diseases (renal, liver, thyroid, connective tissue, malignancy, and chronic infection) Paediatric haematological disorders (TAM, HDN, MDS, inherited BM failure) Special haemostasis (thrombophilia, inhibitors) Genetic aspect of haematological disease
Transfusion medicine	Donor procurement Blood component Transfusion therapy ABO, Rh and other clinically important blood group systems Transfusion microbiology
Specialised transfusion medicine	Stem cell transplantation Genetic aspect of transfusion medicine Extended immunohaematology test
Laboratory management and safety	Understanding general principles of laboratory safety
Principles of the haematology and blood transfusion tests	Staining method (Romanowsky, MGG, supra vital, cytochemical, Perls) Immunophenotyping, electrophoresis, chromatography, agglutination Automation
Skills Content	
Pre-examination of specimen	Understand the principles of specimen reception and rejection, screening, and labelling

Summary of Knowledge and Skills Syllabus Haematology	
Haematology	
Routine Haematology	<ul style="list-style-type: none"> Full blood picture Reticulocyte count Automated full blood count ESR Coagulation tests
Special haematology	<ul style="list-style-type: none"> Haemoglobin analysis Haemolytic workup Coagulation test Platelet function testing Immunophenotyping
Bone marrow examination	<ul style="list-style-type: none"> Bone marrow aspiration and biopsy Cytochemical staining Immunohistochemistry
Blood banking & Transfusion Medicine	<ul style="list-style-type: none"> ABO, Rh grouping Crossmatching Antibody screening/identification Coomb test Blood component preparation Donor counselling & management Transplantation
Blood banking & Transfusion Medicine	<ul style="list-style-type: none"> ABO, Rh grouping Crossmatching Antibody screening/identification Coomb test Blood component preparation Donor counselling & management Transplantation
Genetic testing in Haematology	<ul style="list-style-type: none"> Cytogenetics – karyotyping, FISH PCR based techniques
Quality management	<ul style="list-style-type: none"> Quality management in haematology/blood transfusion Laboratory accreditation
Laboratory information system (LIS)	<ul style="list-style-type: none"> Understanding the concept and usage of LIS Able to enter records into the LIS

Summary of Knowledge and Skills Syllabus Haematology	
Foundation Anatomic Pathology	
Content	Knowledge Content
Basic understanding	Cell degeneration and necrosis Inflammation and repair Adaptive mechanisms Haemodynamic disorders Growth and differentiation disorders Neoplasia Nutritional disorders Disorders related to environment Inborn errors of metabolism Genetic disorders Growth abnormalities
Systemic Pathology	Bone marrow, lymph nodes, liver, spleen, skin, gastrointestinal organ, genitourinary organ, endocrine glands, breast, brain disease
Practical understanding of use of anatomical pathology techniques and tests	Proper use of the light microscope Histopathology – macroscopic and microscopic examination, specimen fixation, trimming and sampling of surgical specimens, tissue processing and microtomy, H&E staining, frozen section preparation Basic molecular pathology Autopsy

Summary of Knowledge and Skills Syllabus Haematology	
Foundation Medical Microbiology	
Content	Knowledge Content
Basic understanding	<p>Basic concepts of laboratory safety</p> <p>Basic knowledge on:</p> <ul style="list-style-type: none"> • Bacteriology (e.g. transfusion transmitted infection) • Virology (e.g. HIV infection, transfusion transmitted infection) • Mycology (e.g. opportunistic infection) • Parasitology (e.g. malaria, hookworm infestation, filariasis) <p>Basic concept of emerging infectious diseases (e.g. Covid 19)</p> <p>Basic knowledge on antimicrobial agents and multidrug-resistant organisms</p> <p>Basic principles of infection prevention and control</p>
Practical understanding of use of microbiology techniques and tests	<p>Gram stain, acid fast stain, India ink stain</p> <p>Culture, isolation, identification and antimicrobial sensitivity test for common bacterial pathogens</p> <p>Rapid serological test (dipstick/ICT/Latex agglutination/RPR/TPPA)</p> <p>Enzyme/chemiluminescence immunoassay (MEIA, ELISA)</p> <p>Immunofluorescence tests</p> <p>Immunoblot tests</p> <p>Viral culture and identification</p> <p>Culture, isolation and identification of fungi</p> <p>Identification of common parasites in clinical specimens</p> <p>Molecular methods in Medical Microbiology</p>

Summary of Knowledge and Skills Syllabus Haematology	
Foundation Chemical Pathology	
Content	Knowledge Content
Basic understanding	Biological variability Chemical Pathology of gastrointestinal tract hepatobiliary system renal system, cardiovascular System Acid Base Imbalance Water and Electrolytes Proteins Lipid Diabetes Mellitus and abnormalities in glucose metabolism Endocrinology – pituitary, thyroid, adrenal, reproductive system Calcium, magnesium, phosphate and metabolic bone disorders Biochemistry of haematological disorders Clinical Enzymology Toxicology Cancer markers
Practical understanding of use of Chemical Pathology techniques and tests	Basic laboratory techniques Factors influencing laboratory results Laboratory Instrumentation Automated Analysers Spectrometric methods Osmometry Electrometric methods Electrophoresis Chromatography Molecular methods in Chemical Pathology

Glossary of Terms

CBD	Case-based discussion
CPath-AMM	College of Pathologists, Academy of Medicine Malaysia
DOPS	Directly observed practical skills
ECE	Evaluation of clinical events
FRCPA	Fellow of the Royal College of Pathologists of Australasia
JBILP	Jawatankuasa Bersama Ijazah Lanjutan Perubatan
JBSP	Jawatankuasa Bersama Sarjana Perubatan
MMC	Malaysian Medical Council
MOH	Ministry of Health Malaysia
MOHE	Ministry of Higher Education
MPath	Master of Pathology
MSF	Multi-source feedback
NPMC	National Postgraduate Medical Curriculum
NSR	National Specialist Register
SA	Summative assessment
SPM	Sijil Pelajaran Malaysia
UiTM	Universiti Teknologi MARA
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UPM	Universiti Putra Malaysia
USM	Universiti Sains Malaysia

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