MINISTRY OF HEALTH MALAYSIA

Academy of Medicine of Malaysia

Malaysian Society of Haematology

TRAINEE HANDBOOK FOR CLINICAL HAEMATOLOGY

SPECIALTY BOARD OF CLINICAL HAEMATOLOGY 2025

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INTRODUCTION

The Clinical Haematology Programme for trainee is set up by the Haematology Subspecialty Training Board, a subcommittee of the MSH.

Head of Training Committee

Tan Sen Mui	Hospital Ampang

Training Committee Member

Gan Gin Gin	Universiti Malaya Medical Centre
S Fadilah Abdul Wahid	Hospital Canselor Tuanku Muhriz Universiti Kebangsaan Malaysia
Goh Ai Sim	Hospital Pulau Pinang
Abu Dzarr Abdullah	Hospital Universiti Sains Malaysia
Mandy Yap Yee Yee	Hospital Ampang

We would like to acknowledge the invaluable contributions of all senior consultants from public hospitals, universities, and private medical centers toward this program. A special note of gratitude goes to the late Dr. Visalachy Purushotaman, whose vision and dedication led to the creation of this training program book.

All trainees are advised to follow the prescribed formats and ensure the completion of the logbook. The logbook, training syllabus, relevant forms (including training registration, research proposal, and supervisor reports), and additional information are available for download on the society's website at www.haematology.org.my.

Please note that the training program will be reviewed periodically.

PREREQUISITE FOR TRAINING

The trainee must fulfill the following:

- Obtained Master of Internal Medicine or MRCP or Other equivalent Postgraduate Internal Medicine Medical Degree
- Completed a minimum of 3 years of Internal Medicine Training post-housemanship
- Registered with either Haematology Fellowship Programme in the Ministry of Health and/or Haematology Subspecialty Training Programme, Malaysian Society of Haematology

COMPONENTS:

The components of clinical/laboratory posting will include:

- Ward
- Outpatient Clinics
- Day care
- Referrals
- Stem cell transplant
- Laboratory: 6 months (including 6-8 weeks of blood transfusion services)

Participation in:

a. Journal Club – minimum of 15 review articles
b. Mortality Reviews – minimum of 10 cases
c. Topic Discussion – minimum of 15 cases

Research:

At least one research paper or article published, either in a local or international journal.

TRAINING PERIOD

Training period is 3 years inclusive of clinical and laboratory section. The official commencement date of the training will be the day the trainee begins their formal training at a recognized center. However, the trainees must register with the Haematology Subspecialty Training Committee, MSH within one month of their start date.

NATIONAL BOARD CERTIFICATION

1. All trainees must register with the Clinical Haematology Training Committee upon entering a recognized center. It is strongly recommended that registration be completed within one month of entry. (Forms are available on the website.)

2. Trainees must identify their main supervisor and submit the relevant forms upon registration.

3. All trainees should receive a briefing from their supervisor/trainers before the start of the training.

4. The trainer or supervisor will conduct regular assessments and interviews with the trainees at least twice a year.

5. The assessment will consist of two parts. Part 1 will be a written test, while Part 2 will be an exit viva examination. The MSH Examination Committee will organize these assessments. Part 1 will take place annually, during the first half of the year, while Part 2 will be held twice a year.

6. Trainees may choose to sit for the Part 1 written examination at any time during their training period.

7. The Part 2 assessment should take place within 6 months to one year after the completion of training. Trainees must have passed Part 1 before sitting for Part 2. Any exceptions to this rule must be approved by the Training Committee, MSH.

LIST OF ACCREDITED CENTRES FOR TRAINING
(Subject to review periodically)

1. Hospital Ampang - 3 years
2. Universiti Malaya Medical Centre - 3 years
3. Universiti Kebangsaan Malaysia Medical Centre - 3 years
4. Hospital Universiti Sains Malaysia – 2.5 years
5. Hosp Kota Bharu, Kelantan – 1 year
6. Hospital Pulau Pinang - 3 years
7. Hospital Queen Elizabeth - 2 years
8. Hospital Kuching, Sarawak - 2 years
9. Hospital Sultanah Aminah, Johor Baru - 2 years
10. Hospital Sultanah Bahiyah, Alor Setar - 1 year
11. Hospital Tengku Ampuan Rahimah, Klang - 1 year
12. Hospital Tengku Ampuan Afzan, Kuantan - 1 year
13. Hospital Ipoh - 1 year
14. Hospital Tunku Jaafar Seremban - 1 year
15. Hospital Kuala Lumpur – Laboratory
16. Institute for Medical Research – Laboratory
17. Pusat Darah Negara – Transfusion
18. Sime Darby Medical Centre – 1 year
19. Sunway Medical Centre -1 year

CRITERIA FOR THE SPECIALIST REGISTER

List of qualifications recognised by the Training Committee of Haematology:

1. MMED or MRCP or FRACP, or a recognized equivalent postgraduate degree in internal medicine, with subsequent minimum of 3 years of experience in Clinical Haematology, including six months in Laboratory Haematology

2. FRCPA certification, along with a minimum of 3 years of experience in Clinical Haematology

3. Master of Internal Medicine, MRCP, or FRACP with further qualification such as MRCPATH, FRCPA or FRCPATH

SUPERVISION

Each trainee will be assigned a supervisor who has a minimum of 3 years of experience practicing as a Haematologist. A supervisor will be responsible for no more than two trainees at any given time. In addition to teaching and mentoring, the supervisor's duties include monitoring the trainee's progress and submitting annual progress reports to the Training Committee.

Assessment

1. Logbook

The trainee is required to maintain a logbook from the beginning of the training program, ensuring regular entries. The logbook must be made available for review by the supervisor at regular intervals.

2. Supervisor's Report

The supervisor is required to submit a progress report on the trainee's development annually and/or upon completion of a specific posting. A separate supervisor report must be submitted if the training is conducted at a different institution.

CERTIFICATE OF SPECIALIST TRAINING IN HAEMATOLOGY

To trainee shall receive her / his certificate of training if she / he completes and satisfies the following:

a) **Assessment of Logbook, Research Project and Supervisors Reports**

The trainee's performance must be certified as satisfactory by the training center before proceeding to the Part 2 Exit Examination. The research project must be submitted at least 4 to 6 weeks prior to the Part 2 exit examination for review. If the trainee has had an original article published in a peer-reviewed journal during the three-year training period, they may be exempted from submitting the research project before the part 2 examination, subject to approval.

b) **Part 1 examination**

It will be a written assessment. There will be 2 parts. The first part will be 50 questions of one correct answer. The second part will be 5-10 questions of OSCE or data interpretations. Passing mark will be 60%.
The candidate can opt to sit for this section at any time during their training. The candidate must pass this section before proceeding to Part 2 Exit Examination.

c) **Part 2 Exit Examination**

- The format comprises clinical and laboratory sessions. Candidate will be assessed in the fields of general haematology, malignant haematology, haemostasis, thrombosis, clinical transfusion, laboratory haematology, emergency management and stem cell transplantation

- Each session will comprise 2 stations. Assessment is performed by 2 assessors per station; one of whom can be from the trainee's institution

- The duration of each station of oral examination will last 20 minutes

- The exam format may include slides review and data interpretations

- Criteria for passing the examination are as follows:

No	Clinical session		Result (Clinical)	Laboratory Session		Result (Laboratory)
	Station 1	Station 2		Station 1	Station 2	
1	Pass	Pass	Pass	Pass	Pass	Pass
2	Borderline	Pass	Borderline	Borderline	Pass	Borderline
3	Pass	Borderline	Borderline	Pass	Borderline	Borderline
4	Borderline	Borderline	Fail	Borderline	Borderline	Fail
5	Fail	Pass	Fail	Fail	Pass	Fail
6	Pass	Fail	Fail	Pass	Fail	Fail
7	Fail	Fail	Fail	Fail	Fail	Fail

No	Overall Clinical Session	Overall Laboratory Session	Overall Result
1	Pass	Pass	Pass
2	Borderline	Pass	Borderline**
3	Pass	Borderline	Borderline**
4	Borderline	Borderline	Fail
5	Pass	Fail	Fail
6	Fail	Pass	Fail
7	Fail	Fail	Fail

**Candidates who score a borderline result will be given an additional viva station on the same day. However, if the candidate fails or again achieves only a borderline result in this additional station, the overall result will be a fail.

d) **National Specialist Registration**

Upon completion of training and successfully passing the Part 2 examination, the candidate must undergo one year of supervised clinical work to become eligible for National Specialist Registration.

CORE CLINICAL PROCEDURAL SKILLS ON COMPLETION OF TRAINING IN HAEMATOLOGY

No	Procedures	Minimum number to perform during training
1.	Bone marrow aspiration	50
2.	Trephine Biopsy	50
3.	Lumbar Puncture	20
4	Intrathecal Chemotherapy	20

RECOMMENDED SYLLABUS / CURRICULUM FOR CLINICAL HAEMATOLOGY TRAINING

1. GENERAL SCOPE

A) Anaemias
B) Bone marrow failures
C) Blood transfusion
D) Bleeding disorders- Inherited & acquired
E) Thromboembolism
F) Infections in neutropenic/immuno-compromised patients
G) Lymphomas
H) Chronic Myeloid Leukemia (CML)
I) Myeloproliferative neoplasms (excluding CML)
J) Chronic lymphocytic leukaemias
K) Leukaemias/myelodysplastic syndrome
L) Plasma cell disorders and paraproteinaemias
M) Haematopoietic stem cell transplantation
N) Tumorigenesis, and the principles of chemotherapy & radiotherapy

2. LEVEL OF COMPETENCY

The following definitions are used for levels of knowledge:

Part 1 Standard expected of trainee after passing Part 1 written exam

Part 2 Standard expected of a clinical haematologist

Example of assessment for level of competency and skills expected:

a) Acute myeloid leukaemia

LEVEL	COMPETENCY	Example: acute myeloid leukemia
1	Knows of / No specific knowledge	Heard of acute myeloid leukaemia but have little knowledge on it.
2	Knows basic concepts	Knows acute myeloid leukaemia but cannot make a diagnosis and uncertain on the features.
3	Knows generally.	Diagnoses and recognises acute myeloid leukaemia
4	Knows specific diagnosis, subtypes and treatment options	Able to generate differential diagnosis and initiate treatment for the disease and complications related to it.
5	Knows specifically and broadly	Confidently and correctly identify the diagnosis, initiate treatment accordingly and be able to manage rare and severe complications and the complexity of the disease.

LEVEL	SKILL	**Example:** Perform bone marrow examination
1	No experience / no ability	Never seen or observed
2	Has observed or assisted	Seen a bone marrow aspirate and trephine biopsy
3	Able to perform with supervision	Able to perform bone marrow aspirate and trephine biopsy with supervision.
4	Can perform independently but needs assistance with complications.	Able to perform bone marrow aspirate and trephine biopsy independently but need assistance when there are complications post biopsy.
5	Performs independently and able to manage complications/complexity	Independently able to perform bone marrow aspirate and trephine biopsy and manage the complication post procedure and its complexity.

3. COMPONENTS

ANAEMIA		
I. KNOWLEDGE	**Part 1**	**Part 2**
Basic Concepts a. The normal physiology of erythropoiesis	5	5
b. Iron, B12 and Folate physiology	5	5
c. The synthesis and breakdown of haemoglobin	5	5
Clinical and lab features of common anaemias a. Iron, B12 and folate deficiencies	4	5
b. The haemolytic anaemias (immune, non-immune)	4	5
c. Anaemia associated with systemic disease	4	5
d. Haemoglobinopathy and thalassaemia	4	5
Clinical Skills Assessment of anaemic patient (History & Examination)	4	5
II. Investigation and Interpretations		
Investigation strategy (use of MCV, retics and PBF)	5	5
Further investigation to define precise cause: e.g. Haemolytic screening, Iron studies, Folate, Vit B_{12} level, Haemoglobin electrophoresis, Coombs' test	5	5
III. Management		
Oral Haematinic therapy (Fe, B12, Folic acid)	5	5
Incorporate Patient Blood Management a. Optimising Erythropoeisis b. Minimising blood loss c. Harnessing tolerance to anaemia		
Parenteral iron therapy-total body iron deficit replacement Management and monitoring	4	5
Immunosuppressive therapy for immune haemolysis	4	5
Appropriate transfusion therapy for anaemia	4	5
Comprehensive care for sickle cell disease and thalassaemia (including genetic counseling, monitoring tests, and iron chelation)	4	5
Use of erythropoiesis-stimulating agents	4	5
Management of thrombotic micro-angiopathy	4	5

BONE MARROW FAILURE		
KNOWLEDGE	**Part 1**	**Part 2**
Basic Concepts . The normal physiology of haematopoeisis	5	5
b. Bone marrow microenvironment	5	5
c. The homeostasis of erythropoiesis, granulopoiesis and megakaryopoiesis	5	5
Clinical and lab features . Signs & Symptoms	4	5
b. Recognizing the difference between acquired & inherited bone marrow failure	4	5
c. Causes of acquired bone marrow failure	4	5
d. Should have sound knowledge on Aplastic Anaemia, Paroxysmal Nocturnal Haemoglobinuria (PNH), Fanconi Anaemia, Dyskeratosis Congenita etc	4	5
Clinical Skills Assessment of bone marrow failure patient (History & Examination) Must be able to understand very severe aplastic anaemia is haematological emergency	4	5
Investigation and Interpretations		
Investigation strategy Criteria to diagnose aplastic anaemia	5	5
Urgent bone marrow biopsy Urgent HLA-typing of siblings Diagnosis of PNH Diagnosis of Fanconi Anaemia	5	5
Management		
Eligibility for allogenic stem cell transplant	5	5
Discuss ATG based treatment	5	5
Monitoring of Cyclosporin treatment	4	5
Discuss about complement inhibitor and management such as pneumococcal vaccination	4	5
Management of thrombosis complication of PNH and supportive treatment.	4	5
Role of Thrombopoietin Agonist such as Eltrombopag in aplastic anaemia	4	5
Prevention and management of infection, including invasive fungal infection	5	5

BLOOD TRANSFUSION

KNOWLEDGE	Part 1	Part 2
Basic Concepts . The ABO and Rh groups. Minor RBC antigens. . Lab procedures for issue of red cells (ABO & Rh typing, antibody screen, antibody identification, crossmatch)	5	5
Blood components and products . Red cells, Platelets, Plasma, Cryoprecipitate, Cryosupernatant, Granulocyte. . Special Requirements (apheresis, irradiated, leucodepleted, CMV negative, Kell antigen negative or washed products)	4	5
Investigations and Interpretations		
Evidence-based indications for red cell transfusion		
Evidence-based indications for platelet / plasma / cryoprecipitate transfusion	5	5
Requesting / administering a blood / component transfusion Bedside checks, positive patient identification, informed consent, sample labelling.	4	5
Interpretation of blood group discrepancy, positive antibody screen, how to identify antibody/antibodies. Autoadsorption, alloadsorption, elution, red cell phenotype versus red cell genotype.	5	5
Management		
Management of acute adverse reactions Acute Hemolytic Transfusion Reactions, Febrile Non-haemolytic Transfusion Reaction, allergic/anaphylaxis, bacterial contamination, Transfusion Associated Circulatory Overload, Transfusion Associated Acute Lung Injury & Transfusion Related Acute Brain Injury.		
Management of massive haemorrhage	4	5
Management of coagulopathy (e.g. liver failure, DIVC)	4	5
Management of platelet refractoriness	4	5
Provision of most compatible blood and blood products for major ABO mismatch, minor ABO mismatch & bidirectional ABO allogeneic stem cell transplant.	4	5

BLEEDING DISORDERS		
I. Knowledge	**Part 1**	**Part 2**
Basic Concepts a. Primary haemostasis (vascular endothelium and platelets) b. Secondary haemostasis (coagulation factors) c. Fibrinolysis	5	5
Bleeding disorders: congenital a. Haemophilia A and B b. Von Willebrand disease c. Rare coagulation factors deficiency d. Inherited platelet function disorders	4	5
Bleeding disorders: acquired a. Thrombocytopenia: immune and non-immune b. Coagulopathies (vit K deficiency, liver failure, DIVC) c. Acquired haemophilia	4	5
Clinical Skills Assessment of a patient with a possible bleeding disorder a. History and physical examination b. ISTH* Bleeding Assessment Tool c. Genetic counseling for congenital disorders	5	5
II. Investigation		
Requesting appropriate laboratory investigation and its interpretation a. Screening & 'mixing' tests b. Factor assays, Inhibitor assay,VWF assays c. Platelet function tests	4	5
III. Management		
Management of bleeding; prophylaxis of procedures a. Use of blood components (esp. FFP and cryoprecipitate) b. Use of Factor concentrates & PCC, rFVIIa and newer agents (EHL - extended half-life factors and non-factor replacement) c. Use of DDAVP d. Use of anti-fibrinolytics (e.g. tranexamic acid) e. Use of local fibrin glue etc.	4	5
Management of Immune thrombocytopaenia	4	5
Management of chemo-induced thrombocytopaenia	5	5
Management of vitamin K deficiency	5	5
Management of generalized coagulopathy a. Liver disease b. DIVC	4	5

THROMBOEMBOLISM		
I. Knowledge	**Part 1**	**Part 2**
Basic Concepts a. Natural anticoagulants and fibrinolysis b. Acquired risk factors for venous thromboembolism c. Inherited venous thrombophilia	5	5
Clinical Skills Assessment of a patient with a possible thrombosis a. Clinical assessment (history and examination) b. Diagnostic algorithms / pathways for DVT and PE c. Basic investigations (ECG, SaO_2, CXR etc)	5	5
II. Investigation		
Requesting appropriate laboratory investigation a. Role of D-dimer & pre-test clinical probability scores b. Definitive investigations for VTE: e.g. Doppler ultrasound, CT-PA, V/Q scan c. Appropriate testing for inherited thrombophilia such as lupus anticoagulant, beta-2-glycoprotein, anticardiolipin antibody, anti-thrombin III, protein C & protein S. (indication, timing, effect on management)	4	5
III. Management		
Management of venous thromboembolism a. Heparins: unfractionated and Low Molecular Weight Heparin. b. Warfarin, including drug interactions c. Direct-acting oral anticoagulants d. Role of IVC filters e. Role of fibrinolytic agents f. Decision-making about duration of anticoagulation (provoked versus unprovoked). g. Management of bleeding in patients on anticoagulation h. Peri-operative management of anticoagulation i. Other complications of anticoagulation, e.g. HITT j. Management of VTE in pregnancy	4	5
Management of arterial thromboembolism a. Role of antiplatelet & anticoagulant in general. b. Management of antiphospholipid syndrome. c. Management of mesenteric ischemia. d. Management of thrombosis in unusual sites. e. Management of arterial thromboembolism in pregnancy.	4	5

INFECTIONS IN NEUTROPENIC / IMMUNOCOMPROMISED PATIENTS		
I. Knowledge	**Part 1**	**Part 2**
Basic Concepts a. Causes of Neutropenia b. Hypogammaglobulinemia / immunoparesis c. Immunosupressants d. Different classes of chemotherapy	4	5
Clinical Skills Assessment of an immunocompromised patient with fever a. History b. Physical examination to identify signs of septic shock and source of infection c. Drug history	5	5
II. Investigation and Interpretations		
Requesting appropriate laboratory investigation a. FBC / blood culture / urine culture b. Radioimaging such as CXR, CT scan c. CRP/Pro-calcitonin / galactomannan and other relevant biomarkers	5	5
III. Management		
Management of febrile neutropenia/infection in immunocompromised patients a. Broad spectrum antimicrobials b. Fluid management c. Inotropic support d. Use of granulocyte colony stimulating factor e. Use of immunoglobulin	4	5

LYMPHOMAS		
Knowledge	**Part 1**	**Part 2**
Concepts		
Pathophysiology of lymphomagenesis	3	5
The different subtypes of lymphomas including WHO classification (Non-Hodgkins Lymphoma - B cell and T cell & Hodgkins lymphomas)	4	5
Role of immunophenotyping, FISH and molecular tests in diagnosis	3	5
NGS in lymphoma	3	4
Clinical presentation of different types of lymphomas	5	5
Relevant investigations required for diagnosis of lymphomas for staging, prognostication and detection of complications	4	5
Different treatment options available for lymphomas including chemotherapy, radiotherapy	4	5
Role of immunotherapy	4	5
Indications of stem cell transplantation in lymphomas	3	5
Assessment		
Take accurate medical history	5	5
Expected clinical manifestations	5	5
Complications of lymphomas	4	5
Complications from treatment	4	5
Investigations and interpretation		
Blood: Full blood counts, renal function test, calcium, liver function test, uric acid, phosphate, LDH, ESR, PBF Radiology: CT scan, PET scan Marrow biopsy Tissue biopsy	4	5
Management		
Control/ manage the complications of lymphomas	4	5
Control/minimize treatment related complications	4	5
Treatment of lymphoma	4	5
Prognosis	4	5
Skills		
Interpretation of blood and marrow reports	4	5
Interpretation of imaging reports	4	5
Interpretation of tissue biopsy reports	4	5
Formulate a complete management plan according to the staging and types of lymphomas	3	5
Assess the suitability of stem cell transplantation	3	5
Successfully manage patients undergoing stem cell transplantation and recognise complications of stem cell transplantation	3	5

CHRONIC MYELOID LEUKEMIA		
I. Knowledge	**Part 1**	**Part 2**
Concepts		
The genetic mutations associated with CML	4	5
Risk of transformation to leukemias	4	5
Tyrosine Kinase Domain mutations	3	4
Clinical manifestations and complications	4	5
Choices of therapies	4	5
Options of stem cell transplantation	4	5
Assessment		
Expected clinical manifestations	5	5
Understanding of the complications that can arise	5	5
Role of stem cell transplantation	3	5
II. Investigations and interpretation		
Blood and blood film	4	5
Specific cytogenetic and molecular genetic testing	4	5
Specific molecular transcript mutation testing	3	5
Bone marrow biopsy report interpretation	4	5
Assess the indication for stem cell transplantation	3	5
III. Management		
Understanding the therapeutic goals	4	5
Formulate specific management plan	3	5
Role of targeted therapies (Tyrosine kinase inhibitors & others)	4	5
Different generation of tyrosine kinase inhibitors	4	5
Definitions of different types of response (haematological, cytogenetic and molecular)	4	5
Goal and milestones of response	4	5
Management of complications	4	5
Assess the suitability of stem cell transplantation in only specific patient population Successfully manage patients undergoing stem cell transplantation and recognise complications of stem cell transplantation	4	5
Management of CML in pregnancy	4	5
Assess the suitability for Treatment Free Remission and subsequent monitoring and management	3	5
IV. Skills		
Perform physical examination and elicit clinical signs and complications	5	5
Bone marrow biopsy	4	5

MYELOPROLIFERATIVE NEOPLASM		
Knowledge	**Part 1**	**Part 2**
Concepts		
WHO classification of MPNs	3	5
The genetic mutations associated with MPNs	3	5
Risk of transformation to leukemias	4	5
Clinical manifestations and complications	4	5
Choices of therapies	4	5
Options of stem cell transplantation	3	5
Assessment		
Expected clinical manifestations	5	5
Understanding of the complications that can arise	5	5
Role of stem cell transplantation	3	5
II. Investigations and interpretation		
Blood investigations to diagnose (and to exclude secondary causes) and management, including EPO, ABGs etc.	4	5
Specific genetic mutation testing (e.g. JAK2 V617F, CALR, MPL, TET2)	3	5
Bone marrow biopsy report interpretation	4	5
Role of radioimaging	3	5
Assess the indication for stem cell transplantation	3	5
III. Management		
Understanding the therapeutic goals	4	5
Formulate specific management plan for each different MPNs according to patients needs	3	5
Management of complications (thrombosis, bleeding and transformation to leukemias)	4	5
Role of targeted therapies	3	5
Assess the suitability of stem cell transplantation in only specific patient population Successfully manage patients undergoing stem cell transplantation and recognise complications of stem cell transplantation	3	5
IV. Skills		
Perform physical examination and elicit clinical signs and complications	5	5
Treat the complications	5	5
Bone marrow biopsy	4	5
Venesection	5	5

CHRONIC LYMPHOCYTIC LEUKEMIA		
I. Knowledge	**Part 1**	**Part 2**
Concepts		
Pathogenesis of CLL	4	5
Risk stratifications in CLL	4	5
Clinical history and presentation	5	5
Common complications including Richter transformation, autoimmune hemolytic anemia/thrombocytopenia	5	5
Indications for treatment	4	5
Role of chemotherapy and radiotherapy	4	5
Novel therapy - immunotherapies, small molecules inhibitors	4	5
Role of stem cell transplantation	3	5
Assessment		
clinical manifestations	5	5
Common complications	5	5
Risk assessment including staging criteria	4	5
II. Investigations and interpretation		
Blood- interpretation of FBC, PBF, flow cytometry Specific investigation for complications	4	5
Interpretation of marrow findings and cytogenetic Interpretation of molecular genetic testing	4	5
Radioimaging	5	5
III. Management		
Formulate a management plan	4	5
Management of common complications	5	5
Prognosis	4	5
Role for stem cell transplantation	4	5
IV. Skills		
Perform physical examination	5	5
Recognize and treat complication of disease	5	5
Elicit relevant signs	5	5
Interpret FBC and PBF	4	5
Perform marrow biopsy	4	5
Interprete flow cytometry	3	4
Prescribe appropriate treatment for acute complications	5	5

ACUTE LEUKEMIAS / MYELODYSPLASTIC SYNDROME		
I. Knowledge	**Part 1**	**Part 2**
Concepts		
Different types of acute leukemias – WHO classifications	5	5
Pathogenesis of acute leukemias	4	5
Understanding the pathophysiology of APML including genetic mutations	4	5
Genetic mutations associated with non APML acute leukemias (AML/ALL)	4	5
Understanding the basics principle of cytogenetic, FISH and flow cytometry	4	5
Understanding the role of minimal residual disease	4	5
Clinical history and presentation	5	5
Common complications	5	5
Role of chemotherapy and radiotherapy	4	5
Role of stem cell transplantation	4	5
Understanding of novel therapy e.g. targeted therapy , specific inhibitors, monoclonal antibodies, cellular therapy	3	5
Assessment		
clinical manifestations	5	5
Common complications	5	5
II. Investigations and interpretation		
Blood- interpretation of FBC, PBF, coagulation profile	5	5
Specific investigation for complications (CSF)	5	5
Interpretation of marrow findings, cytogenetic , molecular genetic	4	5
Interpretation of flow cytometry result	3	4
III. Management		
Formulate a management plan including intensive chemotherapy, best supportive therapy, stem cell transplantation	3	5
Management common complications e.g neutropenia sepsis, bleeding, tumor lysis syndrome, hyperleukocytosis	5	5
Assess suitability for stem cell transplantation	3	5
Successfully manage patients undergoing stem cell transplantation and recognise complications of stem cell transplantation	3	5
IV. Skills		
Perform physical examination	5	5
Recognize and treat complication of disease	4	5
Interpret FBC and PBF	4	5
Perform marrow biopsy	5	5
Prescribe appropriate treatment for acute complications	5	5
Intrathecal chemotherapy administration	5	5

PLASMA CELL DISORDERS		
Knowledge	**Part 1**	**Part 2**
Concepts		
Pathophysiology of paraproteinemia	3	5
The spectrum of plasma cell disorders	4	5
Other causes of paraproteinemia such as lymphoma, Waldestrom's macroglobulinemia, AL Amyloidosis etc.	4	5
Clinical presentation of plasma cell disorders and paraproteinemia	5	5
Relevant investigations required for diagnosis, for staging, prognostication and detection of complications	5	5
Understanding the role of minimal residual disease	3	5
Different treatment options available for plasma cell disorders including immunomodulatory therapies, monoclonal antibodies, chemotherapy, radiotherapy, autologous haematopoietic cell transplantation	4	5
Management of complications of plasma cell disorders/paraproteinemia such as plasmapheresis, surgical intervention	4	5
Assessment		
Take accurate medical history	5	5
Expected clinical manifestations	5	5
Complications from treatment	5	5
Investigations and interpretation		
Blood: Full blood counts, renal function test, calcium, liver function test, uric acid, phosphate, LDH, ESR, PBF, protein electrophoresis, SFLC, B2M Radiology: CT scan, MRI, PET scan Marrow biopsy Tissue biopsy	4	5
Management		
Control/ manage the complications of plasma cell disorders	5	5
Control/minimize treatment related complications	5	5
Treatment of plasma cell disorders	4	5
Prognosis	4	5
Skills		
Interpretation of blood and marrow findings/imaging	5	5
Formulate a complete management plan according to the staging and types of plasma cell disorders	4	5

HAEMATOPOIETIC STEM CELL TRANSPLANTATION & CELLULAR THERAPY		
Knowledge	**Part 1**	**Part 2**
Concepts		
Principle of haematopoietic stem cell transplantation including autologous and allogeneic HSCT	3	5
Principle of CAR-T & BiTES therapy	3	5
Indications of HSCT	4	5
Indications of CAR-T & BiTES therapy	4	5
Complications of HSCT including immunocompromised status, infections, graft versus host disease, organ toxicity, infertility, secondary malignancies	4	5
Complications of CAR-T & BiTES therapy particularly CRS, ICAN, infection	4	5
Assessment		
Take accurate medical history	5	5
Physical assessment before HSCT / cellular therapy	5	5
Investigations before HCT including lung function test, echocardiography, infection screening, FBC, RFT, LFT	5	5
Counselling before HSCT / cellular therapy	4	5
I. Investigations and interpretation		
Blood: Full blood counts, renal function test, liver function test, viral screening Lungs function test, echocardiography	4	5
II. Management		
Control/ manage the complications of HSCT including immediate, early and late complications	4	5
Management of immediate infusion reaction (IIR), cytokine release syndrome (CRS), immune effector cell-associated neurotoxicity syndrome (ICANS)	4	5
III. Skills		
Proper counselling before HSCT / cellular therapy	4	5
Interpretation of investigations	5	5
Formulate a complete management plan according to the side effects/complications of HCT	4	5

TUMORIGENESIS, PRINCIPLE OF CHEMOTHERAPY & RADIOTHERAPY		
Knowledge	Part 1	Part 2
Concepts		
1. Demonstrate an understanding on B-cell, T-cell, and myeloid lineage ontogeny and their relationship with hematologic neoplasm.	4	5
2. Demonstrate an understanding on cell cycle control in normal and malignant hematopoiesis	4	5
3. Demonstrate an understanding on the inherited and acquired genetic basis of tumorigenesis including; mechanism of DNA repair, proto-oncogenes, tumor suppressor genes, gain and loss of function, types of genetic lesion and driver mutation.	4	5
4. Demonstrate an understanding on microbial influence on cancer initiation and progression	4	5
5. Demonstrate an understanding on the principles behind intercellular (cytokines, growth factors, chemokines, B-cell receptor, T-cell receptor and immune checkpoint) and intracellular signalling (i.e not limited to tyrosine kinase, PI3K/AKT/mTOR, MAPK/ERK, JAK/STAT pathways) and their role in tumorigenesis and targeted therapy	4	5
6. Demonstrate an understanding on metabolic reprogramming in cancer	4	5
7. Demonstrate an understanding on the principles of chemotherapy: Classification of chemotherapeutic agents, pharmacodynamics and pharmacokinetics, mechanism of actions, mechanism of resistance and side effects and toxicities	4	5
8. Demonstrate an understanding on the principles of radiation physics, radiobiology, and radiation toxicities	4	5
9. Demonstrate an understanding in the indication of radiotherapy in haematological malignancy	4	5
10. Demonstrate an understanding in supportive care in cancer management i.e mucositis, chemotherapy induced nausea and vomiting, central venous access and management of extravasation.	5	5
Investigations and interpretation		
1. Demonstrate the ability to select appropriate tissue or cellular samples and order relevant diagnostic, prognostic, or predictive tests, with	4	5

an understanding of their clinical significance in the diagnosis, risk stratification, and management of haematological malignancies.		
2. Demonstrate the ability to order and interpret appropriate investigations to assess patient fitness for chemotherapy, including evaluation of organ function, performance status, and comorbidities.	4	5
3. Demonstrate the ability to accurately interpret diagnostic, prognostic, and therapeutic test results, and apply this information to guide the clinical management of patients with haematological malignancies	4	5
Management		
1. Demonstrate the ability to select and initiate the most appropriate management strategies for oncological emergencies, taking into account the specific clinical scenario, drug availability, financial constraints, and evidence-based guidelines to optimize outcomes within resource-limited settings.	4	5
2. Demonstrate the ability to create and implement a comprehensive, evidence-based, long-term treatment plan for patients with haematological malignancies, incorporating chemotherapy, immunotherapy, radiotherapy, stem cell transplantation, or appropriate combinations thereof, in collaboration with interprofessional healthcare teams.	4	5
3. Demonstrate the ability to anticipate, recognize, and effectively manage both acute and long-term chemotherapy, radiotherapy or targeted therapy related complications through evidence-based supportive care measures and interprofessional collaboration.	4	5
4. Demonstrate the ability to provide appropriate counselling to patients and their families, supporting them in making informed and shared decisions about the most suitable treatment options.	4	5
5. Demonstrate the ability to communicate a new or worsening diagnosis of hematological malignancy with clarity, empathy, and sensitivity—applying evidence-based communication frameworks (e.g., SPIKES)—while addressing the patient's emotional and informational needs, and providing realistic expectations for treatment and outcomes.	4	5
Skills		
1. Demonstrate competence in obtaining a range of clinical specimens—spanning peripheral venous and central venous blood samples, bone marrow aspirates or biopsies, and cerebrospinal fluid via lumbar puncture or Ommaya reservoir—while maintaining strict aseptic technique, ensuring patient comfort and safety, and adhering to best practices for specimen handling and labeling.	4	5
2. Demonstrate the ability to prescribe and plan appropriate chemotherapy in accordance with established clinical protocols, safety guidelines, and infection control practices	4	5

3. Demonstrate the ability to perform central venous access procedures safely and effectively, where applicable, with strict adherence to aseptic techniques, anatomical landmarks, ultrasound guidance, and according to institutional protocols — including post-procedure care, catheter maintenance, and safe removal practices — to minimize complications and ensure patient safety	5	5
4. Demonstrate adherence to infection control and patient safety practices in immunocompromised patient	5	5

Guidelines for Research Project Development, Publication and Evaluation

1. Introduction

1.1. Aim of the Research Project

The research project aims to demonstrate the trainee's ability to conduct independent, scientifically sound research, contributing to their academic and professional development in clinical haematology. It equips trainees with essential skills in research methodology, data analysis, and scientific communication—key components of evidence-based medical practice.

This structured process ensures that trainees meet the required academic standards before completing their specialist training. With guidance from supervisors, statisticians, and the Specialty Board, trainees are supported in producing high-quality research manuscripts suitable for publication.

Submission of the research manuscript **4 to 6 weeks prior to the Exit Viva** examination is a requirement for eligibility to sit for the examination; however, any necessary revision or updates will not delay participation in the exam. The final (revised) manuscript must be submitted **within 6 months after passing the exam.**

The supervisor will ensure that all corrections have been made, after which the revised manuscript will be submitted to the Chairman of the Training Committee. In certain cases, the Chairman may need to forward the revised manuscript to the original reviewer for final approval prior to granting official acceptance.

1.2. Roles and Responsibilities

- **Supervisors:**
  - Provide mentorship and guidance throughout the research process.
  - Review and approve research proposals, manuscripts, and statistical analyses.
  - Ensure the research adheres to ethical standards and approved protocols.
- **Statistician:**

○ Involvement of a statistician in the research project is **highly recommended b**ut not mandatory

○ Offer expertise in research design, statistical methods, and data analysis.

○ Review the statistical analysis plan and provide consultation throughout the research.

○ Verify statistical accuracy in the final manuscript.

- **Specialty Board of Haematology:**

○ Evaluate research proposals for quality, relevance, and feasibility.

○ Assess submitted manuscripts to ensure they meet academic and professional standards.

○ Provide feedback and approve manuscripts for eligibility to sit for the Clinical Exit Exam.

2. Research Project Proposal Preparation, Submission and Approval

2.1. Research Proposal Preparation

Section	Description/Information
Project Identification	
Title of Project	The official name of the research project.
Trainee's Name	The full name of the trainee conducting the research.
Department	The department under which the research is being conducted.
Start Date	The date when the research officially begins.

Section	Description/Information
Expected Completion Date	The anticipated date when the research is expected to be completed.
Supervisor	The name of the primary supervisor overseeing the research.
Statistician (Name & Contact)	The statistician that provides data analysis support, including their name and contact details.
Other Investigators (if applicable)	Names of any additional researchers or collaborators contributing to the project.
Content of Research proposal	
	• **Background & Rationale** • Objectives • Inclusion/exclusion criteria • Methodology • Sample size • Statistical analysis : • Ethical consideration • Funding source (if any)

2.2. Key Requirements for Conducting Clinical Research in Malaysian Government Hospitals

Step	Requirement	Details
1. Ethical Approval	**Obtain ethics approval from MREC**	**Apply through the National Medical Research Register (NMRR). Approval is mandatory before starting any research.**

2. Registration with NMRR	**Register your research**	**- Create an account on NMRR** **- Submit your proposal** **- Await MREC review and approval**
4. Site & Institutional Permissions	**Get hospital-level approval**	**- Obtain permission from the hospital director** **- Get support letters from department heads** **- Comply with hospital-specific procedures/forms**
5. Investigator Requirements	**Meet PI qualifications**	**- GCP (Good Clinical Practice) certified** **- Valid certificate (usually renewed every 3 years)**
6. Patient Consent	**Obtain informed consent**	**Participants must provide informed, voluntary consent as per ethical and legal standards.**
7. Data Management & Confidentiality	**Handle data securely**	**- Ensure confidentiality** **- Secure storage of data** **- Anonymize participant records where applicable**

2.3 Research Workshop Requirement

- All trainees must attend a Research Workshop at some point during their service or postgraduate period to gain essential knowledge in statistical analysis, research design, and manuscript preparation.

- Workshop participation is mandatory before the proposal submission.

2.4 Research Proposal and Manuscript Submission Timeline (Gantt Chart) (Optional)

- The timeline provided below is only a suggestion, intended to guide candidates in planning their time effectively to ensure the timely completion of the research project and submission of the manuscript.

- The proposed timeline is subject to the supervisor's discretion, as well as the nature and feasibility of the research.

Activity	Duration	Timeline (tentative)
Research Workshop Attendance	1 Week	Year 1 to year 2, month 1
Proposal Preparation	3 Months	Year 2, Months 2–4
Proposal Review by Supervisors	2 Weeks	Year 2, Month 5
Proposal Submission to the Board	1 Month	Year 2, Month 6
Submit to Medical Research Committee (MREC)	2 months	Year 2, Month 7-8
Data Collection	6–12 Months	Year 2, Month 9–Year 3, Month 6
Data Analysis	3-6 Months	Year 3 (Months 1-6)
Manuscript Preparation	2 Months	Year 3, months 7-9
Manuscript Submission	1 Month	Year 3, by Month 10

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3. Data Collection and Data Analysis

3.1. Data Collection

- Clearly define the study population, inclusion/exclusion criteria, and sampling methods.
- Obtain ethics approval before commencing data collection.
- Follow approved study instruments (questionnaires, forms, manuals, etc.).

3.2. Data Analysis

- Consult with a statistician for statistical analysis planning and execution.
- Ensure raw data files are prepared in an accessible format (Excel, CSV, SPSS).
- Raw data must be submitted with the manuscript for originality verification.

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4. Preparation of Manuscript

4.1. Manuscript Format

- Manuscript must be prepared for submission to a peer-reviewed journal, not as a thesis.
- Follow **Uniform Requirements for Manuscripts Submitted to Biomedical Journals**.

4.2. Manuscript Structure

Section	Content Description
Title Page	Title, Authors, Affiliations, Corresponding Author details.
Abstract	Objectives, Methods, Results, Conclusion, Keywords. (≤ 300 -400 words)
Introduction	**Background and Rationale** ● Outline the clinical or scientific problem being addressed.

Section	Content Description
	● Summarize relevant literature to highlight gaps in current knowledge. ● Explain the significance of the study in the context of clinical haematology, especially local relevance. **Research Question and Objectives** ● Clearly state the primary research question or hypothesis. ● List the general and specific objectives of the study.
Materials & Methods	Study design and methodology, statistical analysis, ethical approval, consent process, data collection methods.
Results	The **Results** section should present the findings of the study clearly, logically, and without interpretation. It must include: 1. **Summary of Key Findings** ○ Begin with a brief overview of the most significant outcomes aligned with the research objectives. 2. **Data Presentation** ○ Use **tables, charts, and figures** to present data effectively. Each table/figure should be numbered (e.g., Table 1, Figure 2) and include a clear title and legend. ○ Ensure all abbreviations are defined in footnotes or legends. ○ Avoid repeating the same data in both tables and text. 3. **Statistical Results**

Section	Content Description
	○ Name of the stat tools used ○ Results of statistical tests (e.g., p-values, confidence intervals, effect sizes). ○ Highlight significant findings in relation to the hypothesis or objectives. ○ Comparative or Subgroup Analysis (if applicable)
Discussion	.The **Discussion** section should: ● Provide a clear **interpretation of the findings** in the context of existing literature. ● **Highlight new or significant findings** and their relevance. ● Discuss the **implications for clinical practice**, especially in the context of the **local healthcare system**. ● Address the **limitations** of the study and suggest **strategies to overcome these shortcomings**. ● Propose potential directions for **future research**, including modifications in study design or methodology.
Conclusion	The **Conclusion** should: ● Clearly **address the research question and objectives**. ● Summarize key findings succinctly. ● Emphasize the overall contribution of the study to the field of clinical haematology.
Acknowledgements	Acknowledge persons, institutions, and any assistance received during the study.

Section	Content Description
References	Follow journal's referencing style (e.g., Vancouver, APA).
Supplementary Materials	Supplementary materials should include **relevant supporting documents used in the research**, such as: ● Detailed laboratory procedures or protocols ● Validated questionnaires or survey forms ● Clinical scoring systems or evaluation tools ● Any other instruments or materials essential for data collection and interpretation These materials help ensure transparency, reproducibility, and completeness of the research process.
Raw Data Submission	Submit raw data files (soft copy) with the manuscript.

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5. Assessment and Evaluation

5.1. Manuscript Submission Requirement

Submission Criteria	Details
Manuscript Submission	Required for eligibility to sit for the **Part Two (Clinical/Exit) Exam.**
Submission Deadline	At least 4 to **6 weeks before the Part 2 Clinical (Exit) Exam.**
Approval Required	Manuscript must be approved by the

Submission Criteria	Details
	supervisor and all co-authors.
Late Submission Consequence	Trainees become **ineligible for assessment by the Specialty Board.**
Exemption	Trainees who have published an original article in a **peer-reviewed journal** during their three-year training may be **exempted**, subject to Specialty Board approval.

5.2. Assessment Criteria & Scoring System

Criteria	Description	Max Score
Title & Abstract	Clarity, relevance, structure.	10
Introduction	Background, objectives, hypothesis.	15
Materials & Methods	Design, ethics, statistics.	20
Results	Data presentation, coherence.	20
Discussion	Interpretation, limitations, conclusions.	15
References	Relevance, accuracy.	5
Manuscript Quality	Clarity, coherence, formatting.	10
Raw Data Submission	Provided and accessible.	5
Total Score		**100**

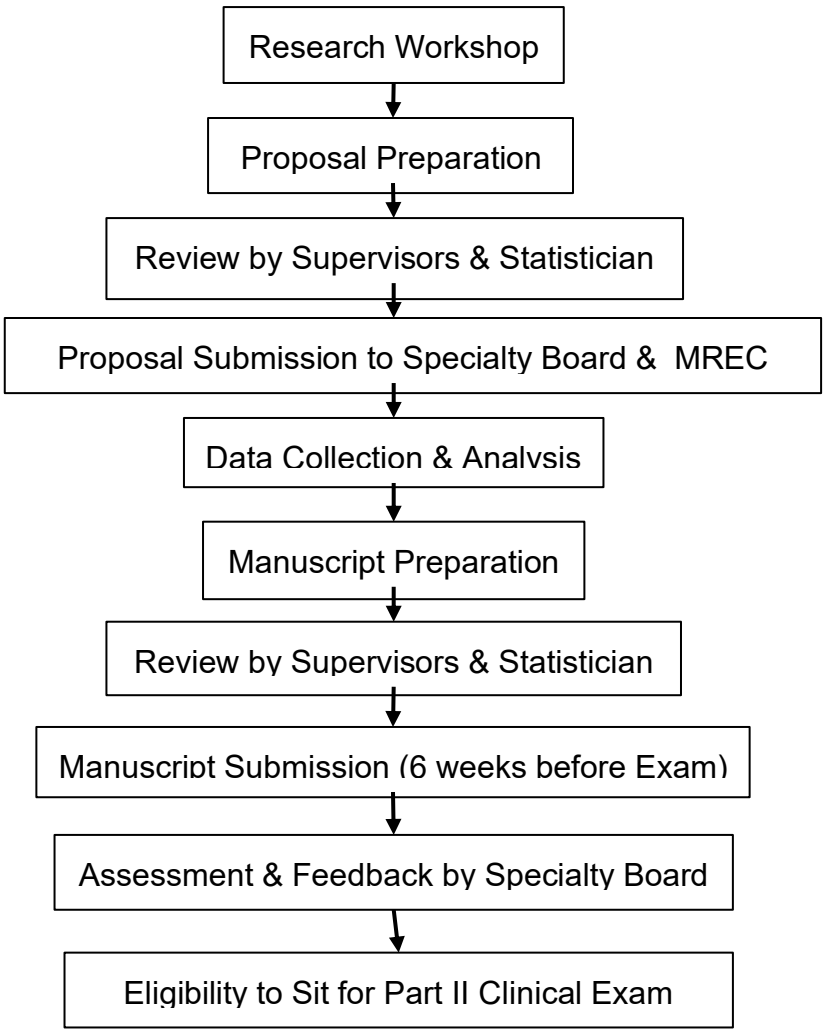
5.3. Evaluation Outcome

Score Range	Outcome	Recommendations
85 - 100	Excellent	Submit for publication in a peer reviewed journal

Score Range	Outcome	Recommendations
60 - 84	Satisfactory	If the manuscript requires minor revisions, the revised version may be reviewed by the supervisor. In cases where major revisions are needed, it is recommended—where possible—that the revised manuscript be reviewed by the original reviewer.
< 60	Unsatisfactory	

6. Research Project Process Flow Chart

- This flowchart outlines the key steps in the research process leading to eligibility for the Clinical Exam. The process begins with attending a research workshop, followed by proposal preparation. The proposal undergoes review by both supervisors and a statistician before being submitted to the specialty board and the MREC for approval.
- Once approved, data collection and analysis are conducted, followed by manuscript preparation. The manuscript is then reviewed by supervisors before submission, which must occur four to six weeks before the Clinical Exam.
- After submission, the Specialty Board assesses the manuscript and provides feedback. Based on the assessment, eligibility for the Clinical Exam is determined.


Research Workshop
Proposal Preparation
Review by Supervisors & Statistician
Proposal Submission to Specialty Board & MREC
Data Collection & Analysis
Manuscript Preparation
Review by Supervisors & Statistician
Manuscript Submission (6 weeks before Exam)
Assessment & Feedback by Specialty Board
Eligibility to Sit for Part II Clinical Exam

RESPONSIBILITIES OF THE TRAINEE

Values

There are values, which trainees must develop and possess right from the start of the programme.

While acknowledging that the trainees have specific learning needs, the trainee nevertheless must develop a sense of belonging to the unit they are attached to and to be committed as an integral part of the service team (to avoid the so called 'trainee' mentality), and function as an effective apprentice to the supervisor. Trainees should not perceive "service" load as an obstacle to their learning and must place patient care first in all his/her approaches, conscious of the aim to develop professional as well as managerial and leadership skills. Trainees must accept that they have an obligation to provide service to the nation while undergoing and after graduating from the programme.

Training Objectives

Trainees are responsible for their learning. Learning is defined as the process that results in a relatively permanent change in behaviour because of the acquisition of new knowledge, skills and attitudes. The supervisor's role is to facilitate and guide and not to spoon-feed.

Task:

Each trainee is expected to:

1. Provide holistic and comprehensive patient care appropriate to the level of training, with full commitment and appreciation of the patient as human beings with feelings, families, and other responsibilities
2. Appreciate cost of care by appropriately selecting investigations and treatment
3. Be directly responsible to the senior colleagues and consultant in patient care and other duties
4. Be aware and acknowledge the limitation in providing care and to seek and respect the guidance and consultation in the performance of duties from all members of the team
5. Develop effective interpersonal skills and mutual respect in the relationship with all members of the team

6. Participate actively in all activities of the unit (CPC journal club, morbidity/mortality conference, quality assurance)
7. Continue learning as self-directed learners who are stimulated by problems presented by patients
8. Satisfy course requirement according to schedule and to constantly assess his or her own progress with the supervisor every 2 - 4 weeks
9. Develop professional qualities of responsibility, trustworthiness, availability, caring etc as described in the supervisor evaluation form
10. The trainee must undertake to uplift the standard of haematology practice in the country

Reference Books:-

1. Post graduate haematology Hoffbrand V et al.
2. Practical Haematology by Dacie & Lewis
3. Wintrobe textbook
4. Williams Textbook of Haematology
5. Hoffman's Haematology: Basic Principles and Practices
6. EBMT Handbook: Hematopoietic Cell Transplantation and Cellular Therapies·

Reference Journals:-

1. British Journal of Haematology
2. Blood
3. New England Journal of Medicine
4. Haematologica
5. Journal of Thrombosis and Haemostasis