MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
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Curriculum for

Doctor of Medicine
Immuno Haematology and Blood Transfusion

Amended upto AC-48/2023, Dated 12/12/2023

Amended History

1. Approved as per BOM– 32/2013, Resolution No.5.2.2, Dated 29/10/2013.
2. Amended as per BOM- 43/2015, [Resolution No. 3.3(i)]; Dated 06/11/2015.
3. Amended as per BOM- 48/2017, [Resolution No. 5.25]; Dated 24/01/2017.
4. Amended as per BOM-51/2017, [Resolution No. 1.3.7.11], [Resolution No.1.3.23]; Dated 28/08/2017.
5. Amended as per BOM-55/2018, [Resolution No. 4.13], [Resolution No. 4.5.4.2], Dated 27/11/2018.
6. Amended as per BOM-57/2019, [Resolution No. 3.1.4.2], Dated 26/04/2019.
7. Amended as per BOM- 59/2019, [Resolution No. 3.1.2.8], Dated 11/11/2019.
8. **Approved as per AC-48/2023, [Resolution No. 5.18, Dated 12/12/2023.**
9. **Approved as per AC-48/2023, [Resolution No. 5.19, Dated 12/12/2023.**

MAHATMA GANDHI MISSION

M.G.M. MEDICAL COLLEGE & HOSPITAL, KAMOTHE
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CURRICULUM FOR POSTGRADUATE COURSE M.D. (IMMUNOHAEMATOLOGY & BLOOD TRANSFUSION)

The aim of this course is to train the students of Medicine in the field of Immunohaematology & Blood Transfusion (IH & BT). Knowledge and practical skills shall be acquired by the candidates in the field.

GOAL:

The goal of postgraduate medical education in Immunohaematology & Blood Transfusion shall be to produce competent specialist.

(i) Who shall recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national transfusion policy;

(ii) Who shall have mastered most of the competencies, retaining to the speciality that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.

(iii) Who shall be aware of contemporary advances and developments in the discipline of IH & BT.

(iv) Who shall have acquired a spirit of scientific inquiry and oriented to the principles of research methodology and epidemiology

(v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

(vi) Organize health teams / transfusion camps to provide care during natural or man-made calamities

OBJECTIVES:

At the end of the course a candidate must be able to

(i) Understand and explain about the scientific basis of blood transfusion.

(ii) Understand the processes of blood collection, processing and component preparation.

(iii) Understand and explain the basis of pre transfusion testing.

(iv) Should be able to explain and diagnose the adverse effects of blood transfusion.

(v) Should be able to perform apheresis technique independently.

(vi) Should be able to carry out the antenatal and neonatal transfusion practice.

(vii) Should be able to plan, perform and report specific research projects.

(viii) Should be able to give advice on haemotherapy including stem cell transplantation and solve the immunohaematological discrepancies in blood transfusion.

COURSE CONTENT (SYLLABUS)

Duration of course:

The minimum period of training shall be three calendar years and the candidates can be admitted to this training after their full registration with the Medical Council. No exemption shall be given from this period of training of three years either for doing housemanship or for any other experience or diploma.

Training program:
The candidates joining the course must work as full time residents during the whole period of their postgraduate training. They will be required to attend a minimum of 80% of training period. Candidate shall be given full time responsibility and assignments and their participation in all facets of the educational process assured. Postgraduate students must maintain a record book of the work carried out by them and the training undergone by them during the period of training. These record books shall be checked and assessed by the faculty.

Teaching /learning methods:
Learning in M. D. (Immunohaematology & Blood Transfusion) will essentially be self-learning. Following teaching-learning methods shall be followed-

Group teaching sessions:
- **Journal review**
- **Subject seminar presentation**
- **Group discussion**
- **Clinical case presentations pertaining to transfusion therapy.**

· Presentation of the findings of an exercise on any of the sub-specialties
· Participation in CME programs and conferences

Hands on experience (practical training)

Practical training shall be imparted by posting the students in various sub-specialties (sections) as detailed in the intrinsic and extrinsic rotation. Student shall be actively involved in day to day working of all the sections. He/she will be trained under the guidance of teachers in all the aspects of practice of transfusion therapy and basic blood banking techniques including blood collection, processing, storage of blood products, component preparation, pre transfusion testing, apheresis, screening of blood products and haemotherapy, Including stem cell transplantation.

SUGGESTED SCHEDULE OF ROTATION:

Intrinsic rotation:

The candidates will be rotated through various sections of the department as under:

A) Blood donor management — **6 months**

Donor recruitment & motivation
Blood donor selection
Phlebotomy
Post donation care of donor
Outdoor blood donation camps

B) Component preparation, Apheresis & Quality Management — **6 months**

Preparation of various blood components
PRBC, FFP, PC, Cryo, Leuco – poor
Irradiation of blood components
Storage & quality control
Apheresis
Donor apheresis
Therapeutic plasma exchange

C) Transfusion transmitted infection screening — **5 months**

Screening of various markers
HIV, HCV, HBsAg, Syphilis Methodology
ELISA, Spot, Rapid, Automated analyzer
Molecular techniques

D) Immunohematology — **6 months**

Diagnosis & Transfusion support in

AIHA
PNH
Transfusion reaction
Antenatal serology
Multi – transfused patients
Secretor status
Minor red cell antigen typing
Antibody screening

E) Pre transfusion testing & Cross matching 6 months
ABO grouping & Rh typing
Du testing, genotyping
Irregular antibody screening & identification
Cross – matching

F) Quality control / computers / records 6 weeks

G) PBSCT, Umbilical cord stem cells, Bone marrow stem cells 1 month
Harvest
CD 34 counts
Cryopreservation

TOTAL= 31 ½ months

Training in allied departments 3 months

A) Dept of Pathology (Haematology division) 1 month
Complete haemogram
Reading of peripheral smear
Coagulation work up

B) Dept of Virology 2 weeks
Isolation of lymphocytes
CD4 / CD8 counts
Special molecular techniques

C) Dept of Microbiology 2 weeks
Bacterial culture

Grams staining

D) Dept of Anesthesiology **2 weeks**
Intra-operative haemodilution
Operation of cell saver
Intra operative transfusion

E) Dept of Clinical Haematology & BMT **2 weeks**

F) Institute of Immunohaematology, Mumbai **1 month**
HLA typing
Immunophenotyping incl flowcytometry
Immunofluoresence

G) Advanced Immunohematology, NIH, Mumbai **2 weeks**
Advanced Immunohematology and coagulation studies

TOTAL= 4 ½ months

GRAND TOTAL: 36 months

Emergency duty:
Student shall be posted for managing emergency transfusion services in the department. He/she will deal with all the emergency investigations in transfusion medicine.

Training in research methodology:
Training in research methodology shall be imparted by planning of a research project by the student under the guidance of a recognized guide to be executed and submitted in the form of a dissertation. The dissertation is aimed at training the candidate in research methods and techniques. It will include identification of a research question, formulation of a hypothesis, search and review of relevant literature, getting acquainted with recent advances, designing of research study, collection of data, critical analysis of the results and drawing conclusions. The topic shall be communicated to the university within six months of registration and at least 12 months should be spent on the research project. The dissertation shall be completed and submitted by the student six months before appearing for the final university examination.

Teaching experience:
Student shall be actively involved in the teaching of undergraduate students /paramedical staff. He/she will be trained in teaching methods and use of audiovisual aids.

BROAD AREAS OF STUDY:

I. HISTORY OF TRANSFUSION MEDICINE

1.1. Scientific landmarks in its development
1.2. Impact of world wars on its development
1.3. Development of PVC bags

II. SCIENTIFIC BASIS OF TRANSFUSION

A. Biochemistry & Physiology of elements of blood

2.0 Process of cell production and life span
2.1 Red cells
2.2 White blood cells
2.3 Platelets
3.0 Red cells
3.1 Haemoglobin structure & function
3.2 Metabolic pathways
3.3 Membrane structure & function
4.0 White cells
4.1 Structure, function & kinetics
5.0 Platelets
5.1 Structure, function & kinetics
6.0 Physiology of Haemostasis
6.1 Role of platelets
6.2 Coagulation pathways
6.3 Fibrinolysis
7.0 Hemodynamics of blood flow & volume
8.0 Iron metabolism
9.0 Bilirubin metabolism
10. Immunology
10.0 Principles of Basic Immunology
10.1 Antigen, Antibody, Complement, Immunoglobulin
10.2 Antigen/antibody reaction
10.3 Lymphocytes in Humoral &

Cellular immunity
11.0 Role of Hybridoma technology in Immunology
12.0 Immunology of transplantation
13.0 HLA & genetic control of immune response

1. Genetics
14.0 Principles of basic genetics
15.0 Genetics of Blood groups
15.1 Phenotypes & genotypes
15.2 Principles of blood group inheritance
15.3 Population genetics of blood groups

III ANTIGEN SYSTEMS IN FORMED ELEMENTS OF BLOOD
16.0 Red cell antigens
17.0 Leucocyte antigens
18.0 Platelet antigens

IV BLOOD COLLECTION, PROCESSING,

COMPONENT PREPARATION:
1. Management of blood donation
19.0 Donor recruitment
19.1. Voluntary blood donation system
19.2. Categories of blood donors
19.3. Education & awareness of prospective donors
20.0 Acceptability criteria of blood donor
21.0 Care of blood donors
21.1 Pre-donation
21.2 Mid-donation
21.3 Post-donation
21.4 Prevention & management of complications of blood donation
22.0. Blood collection
22.1. Anticoagulants & preservatives
22.2.1 Procedure
22.2.2 Blood donation camps

2. Blood Components
23.0. Components
23.1 Types

23.2 Methods of preparation
23.3 Indications, dosage & administration
23.4 Leuco-depletion
23.4.1. Various Methods
23.4.2. Quality Control
24.0 Storage of blood & components
24.1. Whole blood
24.2. Red cell concentrate
24.3. Plasma
24.4. Granulocyte
24.5. Cryoprecipitate
24.6. Stem cells
24.6.1. Peripheral blood stem cells
24.6.2. Cord blood stem cells
25. 0. Plasma fractionation

V PRE-TRANSFUSION TESTING
26.0 Compatibility testing
26.1 ABO grouping & Rh typing
26.2. Antibody screening
26.3. Methods of cross matching
26.4. Newer methods of cross matching
26.4.1. Solid phase
26.4.2. Gel technology
27.0 Screening for Transfusion Transmitted Infections
27.1. Methodology
27.2 Nucleic acid amplification techniques
27.3 Newer emerging pathogens
27.3.1.1 Prions
27.3.1.2 C J disease
27.3.1.3 Lyme disease
27.3.1.4 Others
28.0 Selection of blood, components & plasma products for transfusion

VI ADVERSE EFFECTS OF BLOOD TRANSFUSION
29.0 Clinical presentation, pathophysiology, investigations, management
29.1. Haemolytic transfusion reaction
29.2. Non haemolytic transfusion Reaction
30.0. Transfusion Transmitted Infections
31.0. Transfusion Associated- Graft versus Host Disease (TA-GVHD)

32.0. Transfusion Related Acute Lung Injury (TRALI)
33.0 Others
33.1. Haemosiderosis
33.2. Volume overload

VII APHERESIS
34.0. Technology of apheresis and various machines
35.0 Haemapheresis (platelets, granulocytes, plasma)
35.1. Donor selection
35.2. Procedure
35.3. Complications
36.0 Therapeutic apheresis
36.1 Indications, procedure & Complications
36.2 Plasma exchange, red cell Exchange
36.3 Newer methods of Immunoadsorption

VIII AUTOLOGOUS TRANSFUSION
37.0. Basic principles, indications, contra-indications
37.1. Pre-deposit
37.2. Haemodilution
37.3. Intra-operative blood salvage including equipment
37.4. Directed donation

IX ANTENATAL & NEONATAL TRANSFUSION PRACTICE
38.0 Pathophysiology, diagnosis & management 1
38.1. Rh incompatibility
38.2. ABO & other blood group incompatibility
39.0 Exchange transfusion
39.1. Indications, methodology & complications
39.2. Intrauterine transfusion
40.0. Neonatal transfusion practice

X IMMUNOHEMATOLOGY
41.0 Classification, diagnosis and management
41.1 Immune haemolytic anaemia
41.2 Immune thrombocytopenia
41.3 Immune neutropenia
42.0. Immunohaematological problems in multi-transfused patients

XI HEMOTHERAPY

43.0. Pathophysiology, diagnosis and management of anaemia
43.1 Anaemia
43.2 Iron deficiency anaemia
43.3 Megaloblastic anaemia
43.4 Aplastic anaemia
43.5 Haemolytic anaemia including fragmentation syndrome
43.6 Anaemia of chronic diseases – liver disease, uremia, thyroid disease
44.0. Haemoglobinopathies
44.1 Thalassaemia
44.2 Sickle cell anaemia
44.3 Other haemoglobinopathies
45.0. Pathophysiology, diagnosis and management of haemostatic disorders
45.1 Haemophilia
45.2 Von willebrands disease
45.3 Platelet disorders
45.4 Qualitative disorders
45.5 Quantitative disorders
45.6 DIC
46.0. Pathophysiology, diagnosis and transfusion support in acute blood loss
46.1 Shock
46.2 Massive transfusion
47.0. Transfusion support in cardiac surgery
48.0 Classification & transfusion support in Oncology
48.1 Leukaemia
48.2 Lymphoma
48.3 Marrow failure

XII TRANSPLANTATION
46.0 Transfusion support in transplantation
48.1 Peripheral blood stem cell transplantation
46.1.1 Harvesting
46.1.2 Cryopreservation
46.1.3 CD34 counting
48.2 Bone marrow transplantation
48.2.1 Processing
48.2.2 Harvesting
48.2.3 Immunohaematological problems in ABO mismatched BMT
48.3. Transfusion support in specialized conditions
48.3.1. Renal transplantation
48.3.2. Liver transplantation

48.3.3. Umbilical cord blood transplantation
48.3.3.1. Collection
48.3.3.2. Processing
48.3.3.3. HLA typing & cross matching
49.0 Irradiation of blood products
49.1. Indications, dosage, adverse effects 1
50.0 Tissue banking

XIII BLOOD SUBSTITUTE & HEMOOOIETIC AGENTS

51.0 Crystalloids & colloids
52.0 Oxygen carrying compounds
53.0 Haemopoietic growth factors
54.0 Albumin
55.0

XIV MEDICOLEGAL CONSIDERATIONS IN TRANSFUSION

55.0 Ethical & legal considerations pertaining to transfusion practice
56.0 Identification of blood stains
57.0 Paternity testing
58.0 Donor notification and counselling
59.0 Look back programme
60.0 Drugs & Cosmetics act, Accreditation

XV TOTAL QUALITY MANAGEMENT

61.0 Development of Standard Operating Procedures (SOP) manual
62.0 Quality control
62.1. Reagents
62.2. Instruments
62.3. Personnel
62.4. Blood & Components
63.0 Quality assurance
63.1. Internal quality control
63.2. External quality control
64.0 Medical audit
65.0 Hospital transfusion committee
66.0 Good manufacturing practice (GMP)
67.0 Turnaround time
68.0 ISO 9000

XVI ORGANISATION & MANAGEMENT OF TRANSFUSION SERVICES

69.0 Organisation & function of blood services & hospital transfusion practice

69.1. Donor recruitment & motivation

69.2 Operation of blood mobile units

69.3 Development of transfusion services

69.4 Inventory control

69.5 Development of forms, labels, records etc.

69.6 Reports & Returns

70.0 National Blood Transfusion Policy

XVII BLOOD SAFETY

71.0 Sterilization

72.0 Disposal of bio-hazardous material

XVIII MODERN BIOLOGICAL TECHNIQUES

73.0 Principles, methods, relevance in transfusion medicine

73.1 Western blot

73.2 Polymerase chain reaction

73.2.1 SSCP

73.2.2 SSOP

73.3 Dot blot hybridization

XIX AUTOMATION & COMPUTERIZATION

74.0 Automated blood grouping & processing

75.0 Instrumentation & use of bar codes

76.0 Use of computers in blood banking including Implementation of blood banking software

RECOMMENDED MINIMUM TEXT BOOKS AND JOURNALS

Books:

1. Mollison P.L, Blood transfusion in clinical medicine, published by Oxford, ELBS & Blackwell Scientific Publication.
2. Saran R.K., Transfusion medicine technical manual, published by WHO.
3. Jeffrey McCullough, Transfusion Medicine, published by McGraw-Hill Professional
4. Paul D. Mintz, Transfusion Therapy: Clinical Principles and Practice, publilshed by AABB.
5. Christopher D. Hillyer, Leslie E. Silberstein, Paul M. Ness, Blood Banking and Transfusion Medicine: Basic Principles and Practice, published by Churchill Livingstone.
6. Sally V. Rudmann, Textbook of Blood Banking and Transfusion Medicine, published by Saunders.
7. Denise M, Harmening, Modern Blood Banking and Transfusion Practices, published by Jaypee Brothers.
8. Mary Louise Turgeon, Fundamentals of Immunohematology, Theroy and Technique, published by Williams & Wilkins.
9. Lawrence D. Petx, Scott N. Swisher, steven Kleinman,et al. Clinical Practice of Transfusion Medicine, published by Churchill Livingstone.
10. Technical manual of American Association of Blood Banks, published by AABB.
11. Michael F. Murphy, Derwood H, Pamphilion, Practical Transfusion Medicine, published by Blackwell Publishing.
12. Bruce D. Spiess, Richard K. Spence, Aryeh Shander, Perioperative Transfusion Medicine, published by lIppincott Williams & Wilkins.
13. Robert M. Winslow, Blood Substitutes. Published by Academic Press.
14. Kerry Atkinson, Richard Champlin, Jerome Ritz, Willem E. Fibbe, et al. Clinical Bone marrow and Blood stem cell transplantation, published by Cambridge University Press.
15. Hal E. Broxmeyer, Cellular Characteristics of Cord Blood and Cord Blood Transplantation, publishsed by AABB Press.
16. Harold B. Anstall, Paul M. Urie, A manual of Hemotherapy, published by John Wiley & Sons.
17. A.B.Dutta, Blood Banking and Transfusion, published by CBS Publishers & Distributeres.
18. Gundu HR Rao, Ted Eastlund, Latha Jagannathan, Handblook of Blood Banking & Transfusion Medicine, published by Jaypee Brothers.
19. Toby L Simon, Walter N Dzik, Edward L Snyder et al. Rossi's Principles of Transfusion Medicine, published by Lippincott Williams & Wilkins.

20. **The clinical Use of Blood Handbook**, Published by WHO.
21. **Eva D Quinley, Immunohematology**: Principles and Practice, published by **Lippincott Williams & Wilkins.**
22. **Mark E. Brecher, Larry C. Lasky,** Linda A. Issitt, Hematopoietic Progenitor Cells: **Processing, Standards and Practice,** published by S Karger Pub.

Journals:

1. Transfusion, published by Blackwell Synergy.
2. Vox Sanguinis, published by Blackwell Synergy .
3. Transfusion Medicine, published by Blackwell Publishing.
4. Stem Cells, published by AlphaMed Press.
5. Immunohematology, published by American Red Cross.
6. Current Issues in Transfusion Medicine, published by The University of Texas M. D. Anderson Cancer Center.
7. Journal of Clinical Apheresis, published by Wiley InterScience.
8. Bone marrow transplantation, published by Nature publishing group.
9. Blood, published by American Society of Haematology.

I) THEORY EXAMINATION: (TOTAL 400 Marks)

a) PAPER – I (Duration – 3 hours) 100marks

Topics covered
General and Basic Immunohaematology and Blood Transfusion
including History of Transfusion Medicine and Scientific basis of Transfusion and Hemotherapy

Q.No.	Nature of Questions	Division of Marks	Total Marks
1.	Long Answer Question	1X25	25 Marks
2.	Long Answer Question	1X25	25 Marks
3.	Attempt any 5 SAQs out of Six (a), (b), (c), (d), (e), (f)	5X10	50 Marks

b) PAPER – II (Duration – 3 hours) 100marks

Topics covered
Systemic Immunohematology and Blood Transfusion including Antigen systems, Blood collection/processing/Component preparation, Pre-Transfusion testing, Adverse effects of Blood Transfusion, Apheresis, Autologous Transfusion, Antenatal and Neonatal Transfusion practice, Immunohematology.

Q.No.	Nature of Questions	Division of Marks	Total Marks
1.	Long Answer Question	1X25	25 Marks
2.	Long Answer Question	1X25	25 Marks
3.	Attempt any 5 SAQs out of Six (a), (b), (c), (d), (e), (f)	5X10	50 Marks

c) PAPER – III (Duration – 3 hours) 100marks

Topics covered
Newer concepts of Immunohaematology and Blood Transfusion including Stem Cell Transplantation, Blood Substitutes & Haemopoietic agents, Total Quality Management, Modern Biological techniques and Automation & Computerisation, Medicolegal Considerations in Transfusion Medicine, Organisation and Management of Transfusion Services, Blood Safety

Q.No.	Nature of Questions	Division of Marks	Total Marks
1.	Long Answer Question	1X25	25 Marks
2.	Long Answer Question	1X25	25 Marks
3.	Attempt any 5 SAQs out of Six (a), (b), (c), (d), (e), (f)	5X10	50 Marks

d) PAPER – IV (Duration – 3 hours) 100marks

Topics covered
Recent advances in Immunohaematology and Blood Transfusion.

Q.No.	Nature of Questions	Division of Marks	Total Marks
1.	Long Answer Question	1X25	25 Marks
2.	Long Answer Question	1X25	25 Marks
3.	Attempt any 5 SAQs out of Six (a), (b), (c), (d), (e), (f)	5X10	50 Marks

II) PRACTICAL EXAMINATION: (Total 200 Marks)

Duration – 1 days (if candidates are more than 6 , then the days of practical examination should be increased proportionately)

1. Long Immunohaematology exercise: (One) – Total 100 marks

Shall include following.

Antenatal serology, Alloantibody & Autoantibnody detection & identification,

Transfusion reaction work-up, Massive transfusion and their management.

This will be followed by viva-voce.

2. Short exercises (Two of 50 marks each) – Total 100 marks

Shall consist of the following:

a) Operation of Blood Transfusion Services (Donor management, inventory, apheresis. Transfusion Transmitted Infections Screening)

b) Short exercise (Reagents, Blood group discrepancy, Component Preparation, Quality Control,)

Both exercises will be followed by viva-voce.

3. Clinical cases (Two of 40 marks each): Total 80 marks

Haemotherapy exercises and administrative exercises

4. **SPOTS – Total 20 marks**

5. **Grand Viva – Total 100 marks**

Student will be examined by all the examiners together, about students' subject knowledge, comprehension, analytical approach, expression and interpretation of data, and will include discussion related to dissertation.

Note:
The Thesis/ Dissertation evaluation or discussion should be deleted from the marking components of Practical Examination

III) INTERNAL ASSESSMENT OF THE CANDIDATE
Periodic internal assessment of the candidate by the department.

Final marking scheme for MD examination in Immunohaematology & Blood Transfusion

Heads of Passing	Maximum Marks	Minimum marks for passing
Theory	400	200
Practical and viva-voce	400	200
Total Marks	**800**	**400**

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POST GRADUATE UNIVERSITY EXAMINATION- MODEL TEST PAPERS

SUBJECT: **MD IHBT** DURATION: **3 hours**

PAPER : **PAPER I** MARKS : **100**

INSTRUCTION:

1. All questions are compulsory except wherever option given.
2. Answer must be specific to the question.
3. Give neat, labelled and schematic diagram wherever applicable.
4. Mobile phones, pagers, Bluetooth or any other such communication devices are not allowed in the Examination premises and in all adjacent area.

Section-A

Long answer questions **2x25=50 marks**

1. Discuss anaemia of chronic disease.
2. Immunology of transplantation.

Section –B

Short answer questions (Attempt any FIVE out of SIX) **5x10=50 marks**

1. Development of PVC bags
2. Pathophysiology of DIC
3. Platelet antigens
4. Principle of blood group inheritance
5. Pathophysiology of shock
6. Von-Willebrands disease

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POST GRADUATE UNIVERSITY EXAMINATION- MODEL TEST PAPERS

SUBJECT: **MD IHBT** DURATION: **3 hours**

PAPER : **PAPER II** MARKS : **100**

INSTRUCTION:

1. All questions are compulsory except wherever option given.
2. Answer must be specific to the question.
3. Give neat, labelled and schematic diagram wherever applicable.
4. Mobile phones, pagers, Bluetooth or any other such communication devices are not allowed in the Examination premises and in all adjacent area.

Section-A

Long answer questions **2x25=50 marks**

1. Enumerate components of blood. Write in detail methods of preparation, preservation and its role in day to day practice.
2. Discuss transfusion management in trauma disaster.

Section –B

Short answer questions (Attempt any FIVE out of SIX) **5x10=50 marks**

1. Plasma fractionation
2. Transfusion transmitted infections
3. Donor selection in apheresis
4. Intra-operative blood salvage including equipments
5. Immune thrmobocytopenia
6. Newer method if immunoadsorption

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POST GRADUATE UNIVERSITY EXAMINATION- MODEL TEST PAPERS

SUBJECT: **MD IHBT** DURATION: **3 hours**

PAPER : **PAPER III** MARKS : **100**

INSTRUCTION:

1. All questions are compulsory except wherever option given.
2. Answer must be specific to the question.
3. Give neat, labelled and schematic diagram wherever applicable.
4. Mobile phones, pagers, Bluetooth or any other such communication devices are not allowed in the Examination premises and in all adjacent area.

Section-A

Long answer questions **2x25=50 marks**

1. Discuss immunohematological problems in ABO mismatch BMT.
2. Discuss organisation, function of blood transfusion service & hospital transfusion practice.

Section –B

Short answer questions (Attempt any FIVE out of SIX) **5x10=50 marks**

1. National Blood Transfusion policy
2. Disposal of bio-hazardous material
3. Crystalloids and colloids
4. Cryopreservation
5. HLA typing & crossmatching
6. Donor notification and counselling

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POST GRADUATE UNIVERSITY EXAMINATION- MODEL TEST PAPERS

SUBJECT: **MD IHBT** DURATION: **3 hours**

PAPER : **PAPER IV** MARKS : **100**

INSTRUCTION:

1. All questions are compulsory except wherever option given.
2. Answer must be specific to the question
3. Give neat, labelled and schematic diagram wherever applicable.
4. Mobile phones, pagers, Bluetooth or any other such communication devices are not allowed in the Examination premises and in all adjacent area.

Section-A

Long answer questions **2x25=50 marks**

1. Discuss principle of flow cytometry and its application in transfusion medicine
2. Pathophysiology of transfusion associated graft versus host disease

Section –B

Short answer questions (Attempt any FIVE out of SIX) **5x10=50 marks**

1. Pathogen inactivation
2. Electronic crossmatch and its feasibility in India
3. Chemilumniscence technology in transfusion medicine
4. Multi component collection
5. Intrauterine transfusion
6. Stealth RBC

C2 Dermatology Section (Marks 10)

Question 1 – long question (Marks 4)
Question 2 – Short answer question attempt any 2 (Marks 6)
a.
b.
c.

Resolution No. 3.3(f): Resolved to adopt the change in internal assessment pattern of Community Medicine **(Annexure-XI)** for the batch of Students entering into 2nd MBBS from August 2016 onwards.

Resolution No. 3.3(g): Resolved to start Certificate Course and Fellowship in Critical Care Medicine **(Annexure-XII)** at MGM Medical College, Navi Mumbai from academic year 2016-17. Therefore, Dean, MGM Medical College, Navi Mumbai is requested to work on the feasibility and other regulatory norms to start this course.

Resolution No. 3.3(h): Resolved to start Certificate Course and Fellowship in Sleep Medicine **(Annexure-XXVIII)** at MGM Medical College, Navi Mumbai from academic year 2016-17. Therefore, Dean, MGM Medical College, Navi Mumbai is requested to work on the feasibility and other regulatory norms to start this course.

Resolution No. 3.3(i): Resolved to approve the Examination pattern for MD in Immuno Haematology & Biood Transfusion **(Annexure-XIII)** with immediate effect.

3.4 Surgery and Allied :

Resolution No. 3.4(a): Resolved that :

(i) Topic of Polytrauma and its management be included in the Orthopedic UG syllabus in consultation with Surgery Department for the batch of Students entering into 3rd MBBS (Part-II) from February 2016 onwards.

(ii) Following Topics be excluded from the Orthopedic UG syllabus for the batch of Students entering into 3rd MBBS (Part-II) from February 2016 onwards :

a) Acute poliomyelitis

b) Fungal infection and Leprosy in orthopedic

c) Cerebral Palsy and rehabilitation

ANNEXURE-XIII

DEPARTMENT OF IHBT

THEORY PAPERS

PAPER 1- Basic applied aspects related to Transfusion Medicine

PAPER 2- Immunohematology , Immunogenetics, applied serology

PAPER 3- Blood donor organization, technology of components, clinical hematology

PAPER 4- Recent advances and technology

THEORY PAPER PATTERN

Maximum marks - 100 per paper

Maximum time – 3 hrs per paper

Long answer question – 2 x 20 = 40 marks

Short answer question – 6/7 x 10 = 60 marks

Total = 100 marks

Dr. Ujwala Maheshwari

HOD and Professor

Dept of IHBT

Resolution passed in BOM – 48/2017, dated 24/01/2017

Resolution No. 5.25: Resolved to institute 6 monthly progress Report for PG Students of all Courses from the batches admitted in 2016-17. **[Annexure-XVII of BOM-48/2017]**

ANNEXURE - XVII

MGM
Mahatma Gandhi Mission

Mahatma Gandhi Mission's Medical College and Hospital
Navi Mumbai

Six monthly Progress Report for Postgraduate Students

PART A

Name of the PG student: _____

Department: _____

Admitted in (Month and Year): _____

Name of the PG guide: _____

Report for the period: _____ to _____

Attendance: _____ days (____%)

PART B

Grading as per performance

Grade	Percentage
A	80% and above
B	65% to 79%
C	50% to 64%
D	Below 50%

1. OPD work:
2. Ward work:
3. Lab work:
4. OT work:
5. ICU work:
6. Teaching assignments:

PART C

Progress of Thesis

PART D

Activities from serial No. 1 to 5 should be rated on a scale of 0 to 10.

1. **Case Presentations**

Sr. No.	Topic	Date	Guide	Marks

2. **Microteaching**

Sr. No.	Topic	Date	Guide	Marks

3. **Recent Advances**

Sr. No.	Topic	Date	Guide	Marks

4. Seminars

Sr. No.	Topic	Date	Guide	Marks

5. Journal Clubs

Sr. No.	Journal	Title of Paper	Date	Guide	Marks

6. Marks obtained in tests

Sr. No.	Date	Theory / Practical	Marks obtained

7. Any other academic activity conducted:

_____

_____

_____

_____

_____

PART E

1. Papers presented

Sr. No.	Title of Paper	Authors	Event	Date

2. Posters presented

Sr. No.	Title of Poster	Authors	Event	Date

3. Publications

(Note: Mention only those publications that are published or are accepted for publication during the said period only)

Sr. No.	Title of Paper	Authors	Journal	Year/Vol/ Issue	Page Nos	Indexed/ Non-Indexed	Status

Certificate by the PG Guide

This is to certify that Dr._____, has an attendance of _____% , during the period _____to_____.
His /Her performance during the said period has been **satisfactory/ average / unsatisfactory.**

Overall Grading:_____

Date:_____

Name and Signature of PG guide:

Certificate by the Head of Department

This is to certify that the performance of Dr._____, during the period _____to_____, has been **satisfactory/ average / unsatisfactory.**

Overall Grading:_____

Date:_____

Name and Signature of HOD:

Final Remarks

Satisfactory / Average / Unsatisfactory

Director (Academics) **Dean**

Date:

Resolution No. 1.3.7.11 (i) of BOM-51/2017: Resolved that the following Bioethics topics in PG Curriculum are to be included for PG students of all specialization and a sensitization of these topics can be done during PG Induction programme:

- Concept of Autonomy
- Informed Consent
- Confidentiality
- Communication Skills
- Patient rights
- Withholding / Withdrawing life-saving treatment
- Palliative Care
- Issues related to Organ Transplantation
- Surgical Research and Surgical Innovation
- Hospital Ethics Committee
- Doctor-Patient relationship

All PG.
& 30 copies

Resolution No. 1.3.23 **of BOM-51/2017:** Resolved to implement a Structured Induction programme (07 days) for PG students. [Annexure-XLIV]

Item No-12

MGM INSTITUTE OF HEALTH SCIENCES
Navi Mumbai

Induction Program for newly admitted Postgraduate students

Day 1	• Address by Dean, Medical Suptd, Director (Academics) • Pre-test • Communication Skills • Universal Safety Precautions • Biomedical Waste Management • Infection Control Policy
Day 2	• Emergency services • Laboratory services • Blood Bank services • Medicolegal issues • Prescription writing • Adverse Drug Reaction • Handling surgical specimens
Day 3	• Principles of Ethics • Professionalism • Research Ethics • Informed Consent • Confidentiality • Doctor-Patient relationship
Day 4 Day 5 Day 6	• Research Methodology • Synopsis writing • Dissertation writing • Statistics
Day 7	• ATLS • Post-test

The Induction Program will be conducted in the first week of June.
Timing: 9.30 am to 3.30 pm

(Prof. Dr. Siddharth P. Dubhashi)
Director (Academics)

Resolution No. 4.5.4.2 of BOM-55/2018: Resolved to have 10 short notes out of 11 (10 marks each) in all the papers in university examination for PG courses including superspeciality. To be implemented from batch appearing in April/May 2019 examination onwards for MD/MS/Diploma and August/September 2019 examination onwards for superspeciality.

Resolution No. 4.13 of BOM-55/2018: Resolved as follows:-

(i) Slow learners must be re-designated as potential learners.

(ii) Students scoring less than 35% marks in a particular subjects/course in the 1st formative exam are to be listed as potential learners. These learners must be constantly encouraged to perform better with the help of various remedial measures.

(iii) Students scoring more than 75% marks in a particular subjects/course in the 1st formative exam are to be listed as advanced learners. These learners must be constantly encouraged to participate in various scholarly activities.

Resolution No. 3.1.4.2 of BOM-57/2019:

i. Resolved to include "Gender Sensitization" into UG (from new batch 2019-2020) and PG (from existing batches) curricula. **[Annexure-21]**

ii. Resolved to align the module of "Gender Sensitization" with MCI CBME pattern for MBBS students.

iii. Resolved that Dr. Swati Shiradkar, Prof., Dept. of OBGY., MGM Medical College, Aurangabad will coordinate this activity at both campuses.

Annexure - 21

Gender sensitization for UG (2nd , 3rd , 8th semesters) and PG (3 hours)

INCLUSION OF " GENDER SENSATIZATION" IN CURRICULUM

Introduction :

The health care provider should have a healthy gender attitude, so that discrimination, stigmatization, bias while providing health care will be avoided. The health care provider should also be aware of certain medico legal issues related with sex & gender.

Society particularly youth & adolescents need medically accurate, culturally & agewise appropriate knowledge about sex, gender & sexuality. So we can train the trainers for the same. It is need of the hour to prevent sexual harassment & abuse .

To fulfill these objectives, some suggestions are there for approval of BOS.

Outline

1)For undergraduates :- Three sessions of two hours each, one in 2nd term, one in 3rd term & one in 8th term.

2)For Faculties and postgraduates :- One session of two hrs .

3)For those want to be trainers or interested for their ownself, value added course, which is optional about sex, gender, sexuality & related issues.

Responsibility

ICC of MGM, MCHA , with necessary support from IQAC & respective departments.

Details of undergraduate sessions

1)First session in 2nd term

Aim – To make Students aware about the concept of sexuality & gender**.**

To check accuracy of knowledge they have,

To make them comfortable with their own gender identify & related issues.

To make them aware about ICC & it is functioning.

Mode – Brain storming , Interactive power point presentation experience sharing.

Duration – Around two hours

Evaluation – Feedback from participants.

2)Second session in 3rd / 4th term

Aim – To ensure healthy gender attitude in these students as now they start interacting with patients.

To ensure that the maintain dignity privacy while interacting with patients and relatives, particularly gender related.

To make them aware about importance of confidentiality related with gender issues.

To encourage them to note gender related issues affecting health care & seek solutions.

Mode – focused group discussions on case studies, Role plays & discussion.

Duration – Around two hours.

Evaluation – Feedback from participants.

Third session in 8th term.

Aim – To understand effect of gender attitudes on health care in various subjects.

To develop healthy gender attitude while dealing with these issues.

Mode – Suggested PBL by departments individually. (In collaboration with ICC till faculty sensitization is complete)

Evaluation – Feedback

****

FOR POSTGRADUATES

Session of 2-3 hrs preferably in induction program.

Aim – To introduce medically accurate concept of gender, sex, gender role & sex role.

To ensure healthy gender attitude at workplace.

To understand gender associated concepts on health related issues & avoid such bias wile providing health care.

To make them aware about ICC & it's functioning.

Mode – Interactive PPT

Role plays & discussion

Duration – 2 to 3 hrs

Evaluation – Feedback.

FOR FACULTIES

Session of 2 hours may be during combined activities.

Aim – To ensure clarity of concept abut gender & sex.

To discuss effect of these concept on health related issues.

To identify such gender & sex related issues in indivual subject specialties.

To discuss methodology like PBL for under graduate students when whey are in 7^{th}-8^{th} semester.

Mode – Role play

Focused group discussion

Case studies

Evaluation – Feed back.

******

Resolution No.3.1.2.8 of BOM-59/2019: The detailed mandatory allied posting schedule for MD Immunohematology and Blood Transfusion (IHBT) which in accordance with Competency Based Medical Education guidelines for PG is approved. This is to be effective from Academic Year 2019-20 onwards. **[Annexure-11]**

~~**Annexure Item 11**~~ **Annexure-11**

Item 11: Change in Mandatory allied posting schedule for MD Immunohematology and Blood Transfusion (IHBT)

Training in allied departments:

Students should be sent for training for 8 months in allied laboratory and clinical departments, as below:

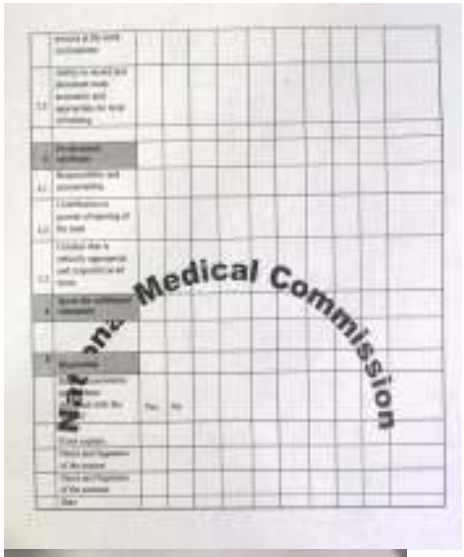
Existing	**Proposed**
Hematology– 1mth	Haematology: 2 months
Bone Marrow Transplantation -2 weeks	Coagulation Laboratory: 1months
Department of Microbiology -2 Weeks	HLA Laboratory: 1 month
Virology –2 weeks	Flow cytometry Lab:15 days
Department of Anesthesia -2 weeks	Microbiology laboratory:1 month
HLA typing & flow cytometry -1 month	Molecular Biology Lab: 1month
Advanced Immunohematology -2 weeks	Clinical departments :6 weeks (Paediatrics, neonatal, medicine,ICU, Anaesthesia)
Total -4 $_{1/2}$ months	Total – 8 months

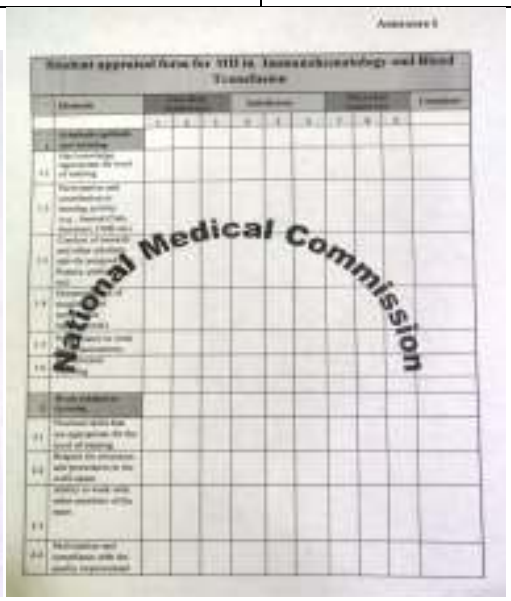
Resolved to adopt MD IHBT revised curriculum proposed by NMC dated 01-11-2022 with Ref no. D11011/1/22/AC/Guidelines/20 in MD IHBT for Theory & Practical along with the same changes to be incorporated in the logbook in MD IHBT from admission batch 2023 onwards. [ANNEXURE-27A, 27B, 27E & 27 F]

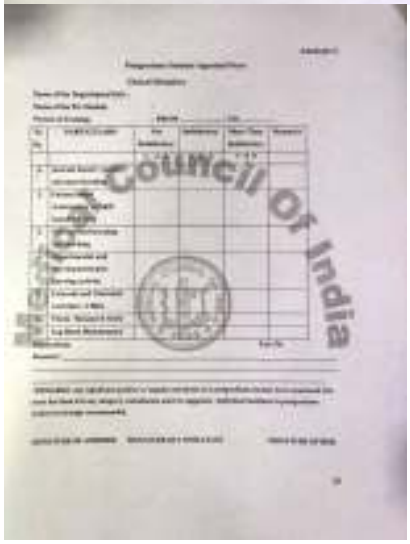
Annexure-27A of AC-48/2023

Comparison between old and revised NMC curriculum for MD IHBT programme.

Sr. No	Headings	Old NMC curriculum	Revised NMC curriculum
1	Duration of Posting	35.5 months	36.5 months
2	District residency Programme	Not existed	One month DRP posting
3	Practical Exam	6 Lab/Clinical skill cases 6 Hemotherapy cases	4 Clinical skill cases 4 Hemotherapy & Administrative cases
4	Appraisal Form	Annexure attached	Annexure attached







Annexure I

Student appraisal form for MD in Immunohematology and Blood Transfusion

	Elements	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Has knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc)										
1.4	Documentation of acquisition of competence (eg: log book)										
1.5	Performance in work based assessments										
1.6	Self-directed Learning										
2	**Work related to training**										
2.1	Practical skills that are appropriate for the level of training										
2.2	Respect for processes and procedures in the work space										
2.3	Ability to work with other members of the team										
2.4	Participation and compliance with the quality improvement										

	process at the work environment										
2.5	Ability to record and document work accurately and appropriate for level of training										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethically appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment patter been discussed with the trainee?	Yes	No								
	If not explain.										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

Resolution No. 5.19 of Academic Council (AC-48*2023):
(i) Resolved to approved the changes/modification to be applicable from academic year or batch 2022 onwards.
(ii) Adopt MD IHBT revised curriculum proposed by NMC dated 01-11-2022 with Ref no. D11011/1/22/AC/Guidelines/20 for practical marksheet in MD IHBT [ANNEXURE-28B & 28C]
(iii) Duration of Practical Exam for Two Days from admission batch 2020 onwards.

Annexure-28B of AC-48/2023

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

MARKLIST FOR PRACTICAL AND VIVA- VOCE EXAMINATION

Department Of Immunohematology and Blood Transfusion

Subject: Immunohematology & Blood Transfusion

DISTRIBUTION OF PRACTICAL MARKS

Exam centre:_____ **Course/ Exam : MD IHBT**

Date of examination:_____

Seat no.	Hemotherapy Exercise (04x30=120)				Clinical Case (04x40=160)				Ten spots (10x2=20)	Practical / Clinical Total (300)	Grand Viva & Thesis (100)	Grand Total (400)
	01	02	03	04	01	02	03	04				

Sr. No.	NAME OF EXAMINERS	COLLEGE	SIGNATURE WITH DATE
1			
2			
3			
4			

Duration of Praction Exam for Two Days from admission batch 2020 onwards.

M.G.M.MEDICAL COLLEGE & HOSPITAL, KAMOTHE
MGMIHS (Deemed University)

MARKLIST FOR PRACTICAL AND VIVA

CENTRE:-
……
COURSE/EXAM :--PG – MD **SUBJECT:-**
IMMUNOHAEMATOLOGY &
DATE:- / /20 **BLOOD TRANSFUSION**

DISTRIBUTION OF PRACTICAL MARKS

Note:-Scratching or overwriting not allowed

A	B	C	D	E	F	H
Seat No	**Ten Spots (10x2=20)**	**Two Clinical Cases (40x2=80)**	**Two Short Exercise: Marks 50x2 =100**	**One Long Exercise (ONE): Marks 100**	**Grand Viva and Log Book,Thesis Marks: 100**	**Practical Total=100 Max-100 Marks Min- 50 Marks**
	20	**80**	**100**	**100**	**100**	**400**

NAME OF EXAMINERS	COLLEGE	SIGNATURE WITH DATE
1)		
2)		
3)		
4)		

District Residency Programme (DRP) for IHBT residents to be started for one month from batch 2021.

Annexure-27B of AC-48/2023

NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

D 11011/1/22/AC/Guidelines/20 **Date: 01-11-2022**

GUIDELINES FOR COMPETENCY BASEDPOSTGRADUATE TRAINING PROGRAMME FOR

M.D. IMMUNOHEMATOLOGY

AND

BLOOD TRANSFUSION

Apprenticeship/Rotation in:

Posting in various sections of Blood Centre for MD in Immunohematology and Blood Transfusion		
Title	**Content of training activities**	**Learning objective**
Orientation [1 month]	Brief orientation to computer system, Blood bank activities, teachingprogram	Be conversant with computer system & operation of blood bank activities.
Blood donation [3 months]	Donor recruitment & motivation, donor selection. Phlebotomy, post donation care of donor, outdoor blood donation.	Should be able to select the donor, perform phlebotomy with aseptic precautions, and manage donor reactions.
Apheresis – donor and therapeutic apheresis procedures [2 months]	Access evaluation, donor suitability, selection of machine, product manipulation, QC of product, donor observation for adverse effects and its management indications, contra-indications, replacement fluids, frequency, monitoring of TPE.	Should be able to perform the procedure independently, obtain quality product and manage any adverse effects. Should be able to select proper patient, machine, plan TPE, select replacement fluids and monitor the patient.
Component preparation & QC [5 months]	Preparation of blood components. Product manipulation such as Leucocyte removal or Irradiation. Storage & quality control.	Should be able to understand factors affecting quality of components.
Immuno-haematology [4 months]	Diagnosis & transfusion support in AIHA,PNH Evaluation of transfusion reaction. Investigations in antenatal serology. ABO-Rh typing, antibody screening, identification, evaluation of positive DAT	Should be able to interpret results of immune hematological tests. Should be able to provide consultation to physicians regarding transfusion management.
Pre-transfusion testing & cross match [4 months]	Investigation of difficult cross match, formal consultation on transfusion support in complex cases, checking indications & dosage for blood components, emergent issue of blood, transfusion in special cases such as massive transfusion, organ transplantation, platelet refractoriness.	Should be able to provide consultation on transfusion therapy. Should be able to resolve difficult & complex cross matching problems. Ensure appropriate and judicial use of blood and components.

Transfusion transmitted infection screening [4 months]	Screening for various markers such as HIV,HCV, HBs Ag, Syphilis. Methodology such as Elisa, spot, rapid, automated analyzer NAT techniques such as PCR, TMA. Laboratory safety.	Should be able to understand blood screening principles and disposal of reactive units. Should be able to validate ELISA, maintain QC.
Quality control/ records [1 month]	Quality control of components, equipment, reagents. Quality assurance. Development of documents, SOPs,Regulatory compliance.	Should be able to understand QC principles, recognize common management & regulatory issues, identify management strategies.

Peripheral blood stem cell transplantation (PBSCT) [1 month]	Processing, storage, thawing, infusion of PBSC. Immunohematological monitoring of ABO mismatch transplants, Transfusion support – irradiation, CMV issues.	Describe common procedures and basic concepts related to PBSC processing and cellularproduct therapies.
Note: The student should be posted for one month at the district hospital as per NMC guidelines		
Posting in other Laboratory sections for MD in Immunohematology and Blood Transfusion		
Section	**Skills**	
Haematology: 3months	Complete hemogram Work up of : • hemolytic anemias • Reading peripheral smear • Bone marrow aspiration	
Coagulation Laboratory: 2 months	Coagulation tests – screening tests and special tests -procedure, interpretation, trouble shooting	
HLA Laboratory: 1 month	HLA typing CDC crossmatch Flow cytometry crossmatch	
Flow cytometry Lab: 1 month	Isolation of lymphocytes, CD4/ CD8 / CD 34 counts using flow cytometry, Immunofluorescence	
Microbiology laboratory:1 month	ELISA, Western blot, PCR Bacteriology: Basic stains, Blood culture - aerobic, anaerobic, fungal	
Molecular Biology Lab: 1month	Basics of molecular testing PCR NAT testing	

Clinical Department subjects: **6weeks** (Pediatrics, neonatal, medicine, ICU, Anaesthesia)	Transfusion support for thalassaemia, haemophilia, leukemia, solid organ transplantation Platelet transfusion therapy and its monitoring Neonatal exchange transfusion Bed side management of transfusion reactions Intraoperative hemodilution, Use of Cell saver, Intraoperative Blood salvage

MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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