



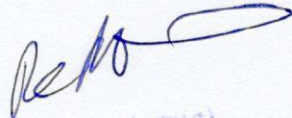
**SRIMANTA SANKARADEVA UNIVERSITY OF HEALTH
SCIENCES**

(A State University of Govt. of Assam)

**Syllabus/Curriculum
for
B.Sc. in Blood Banking Technology
(w.e.f. Academic Session 2023-24)**

Registrar (Academic)
SRIMANTA SANKARADEVA UNIVERSITY
OF HEALTH SCIENCES, ASSAM, INDIA

2 nd YEAR					
Semester-III					
Subject Code	Subjects	Contact Hours / Week			
		Theory	Practical	Clinical	Total
	Basic Hematology & Clinical Pathology	3			
practical	Basic Hematology & Clinical Pathology – PRACTICAL		2		
	Blood Banking and Blood Banking Organization	3			
practical	Blood Banking and Blood Bank Organization – PRACTICAL		2	2	
	Blood Donation & Donor Management	3			
practical	Blood Donation & Donor Management – PRACTICAL		2	4	
Total					


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2nd YEAR (Semester - III)
Subject: Basic Hematology & Clinical Pathology

SYLLABUS

Unit-I (3 hours)

General aspects of Hematology

- Origin, development, morphology, maturation and function of blood cells
- Fate and nomenclature of blood cell
- Introduction and development of WBC and Platelets
- Anticoagulants used in hematology laboratory.

Unit-II (6 hours)

RBC, WBC and Platelets Parameters

- Methods of evaluation of Total RBC count.
- Principles and methods of estimation of Haemoglobin.
- Principles and methods of determining PCV.
- Calculation and interpretation of red cell indices.
- ESR: Introduction, factors affecting ESR, principles and methods of determining ESR, conditions causing increase and decrease of ESR.
- Methods of estimation of total WBC count
- Method of estimation of total platelet count

Unit –III (6 hours)

Peripheral smear – Preparation, Staining, Counting and Interpretation

- Preparation of peripheral smear, thin smear, thick smear.
- Principle and methods of staining of blood smears and bone marrow smears.
- Romanowsky stains - Preparation, advantages and disadvantages.
- Description of morphology of normal and abnormal RBC
- Calculation of platelet and Total WBC count from **peripheral smear**
- Principles and methods of Differential WBC count .
- Identification of RBC, WBC, Platelet disorders from **peripheral smear**
- Identification of blood Parasites

UNIT-IV (12 hours)

Introduction to RBC, WBC and Platelet disorders

- Anaemia – definition, etiology classification and laboratory diagnosis.
- Other RBC disorders
- Hemolytic anaemia: Definition, causes, laboratory investigations.
- Hemoglobin types and Hb disorders.
- WBC Disorders-Etiology, types--Leukocytosis, Neutrophilia, Eosinophilia, Lymphocytosis, monocytosis, basophilia and leucopenias
- Leukemoid reaction
- Leukemia – definition, causes, classification, detection of leukemia.
- Multiple myeloma-Etiology, Lab diagnosis.

- Principles and methods of assessment of Blood coagulation disorders.-BT, CT, PT, APTT- Principles and Methods.
- Platelet Disorders -Thrombocytopenia, thrombocythemas, platelet function test, platelet count. Clot retraction test.
- Bone Marrow Examination: Methods, preparation of slide and Microscopic examination.

UNIT-V (3 hours)

Quality control in hematology Basics

- Quality control samples and its interpretation
- EQAS programme in hematology
- Quality control check
- Documentation and maintenance of records

Unit-VI (6 hours)

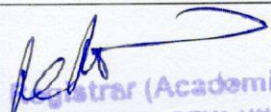
CLINICAL PATHOLOGY

Urine, Semen and Other Body fluids Examination

- Urine analysis: sample collection, Physical, Chemical and Microscopic examination of urine.
- Stool analysis: Physical, Chemical and Microscopic examination of stool, occult blood test.
- Body Fluids:
 - CSF examination : Physical and chemical tests and microscopy examination.
 - Semen Analysis: Physical and Microscopic examination.

2nd YEAR (Semester - III)

Subject: Basic Hematology & Clinical Pathology PRACTICAL


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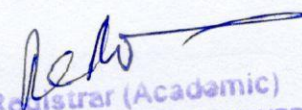
SYLLABUS

1. Methods of Collection of blood – finger prick, venous blood.
2. Identification of vacutainers and order of Blood draw
3. Hb estimation
4. RBC count, Total WBC count, Platelet count by various methods
5. Preparation of Leishman stain, staining of blood smears and Differential count of WBC.
6. Estimation of Erythrocyte sedimentation rate and packed cell volume by various methods .
7. Clot retraction test.
8. Reticulocyte count.
9. BT, CT, PT, APTT Estimation.
10. Methods of cleaning and sterilization of glass wares.
11. Urine Analysis- Physical, Chemical and Microscopic.
12. Body fluid examination. -Physical, Chemical and Microscopic.
13. Bone Marrow Examination

2nd YEAR (Semester - III)

Subject: Blood Banking & Blood Bank Organization

SYLLABUS


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UNIT-I (8 hours)

a) Introduction to blood bank

- Overview History of Transfusion Medicine
- Identify and relate the important features of the history of transfusion medicine
- Outline the scientific benchmarks in the evolution of transfusion medicine
- Explain how specific innovations affected transfusion medicine practice
- Recent trends in the practice of transfusion medicine
- History of development Transfusion Medicine in India

b) Organization /Structure of blood transfusion services in India.

- Regional blood transfusion centre.
- National Blood Transfusion centre
- State Blood Transfusion centre
- Blood banks and blood storage centers, Blood Bank premises and infrastructure
- Mandatory Technical Staffing pattern of blood bank and role, functions and responsibility of each Technical staff.
- Technical requirements: Accommodation and environmental conditions
- Blood bank management system
- Regulations for blood bank operation, Drugs and cosmetics Law
- National blood policy, standards in Blood Banking, licensing procedures, ethical aspects of blood transfusion

UNIT-II (12 hours)

a) Statutory regulators of Blood banking in India

- Drug controller of India, State, Director General Health services & NACO and other government bodies.
- Indian Drugs and cosmetic act and rules 1945 pertaining to Blood bank
- Indian & other Pharmacopeia pertaining to blood products
- Licensing norms, Inspections and Compliance
- Terminologies used in blood banking including blood donation.
- Legal aspects related to blood bank and role of NGO

b) Instruments, equipment's and Record maintenance in blood bank

- List of instruments and their uses , general care and protocol of use, quality control
- General care of instruments
- Principles of general care of instruments, methodology of cleaning of glassware
- Various records in blood bank , method of record maintenance
- Spill management

Work flow in blood bank :

- Criteria for blood donation
- Procedure of blood donation
- Blood collection and its storage
- Component separation and its storage
- Blood serological testing
- Issuing of blood components

- Transfusion reactions and its lab investigations
- Preservation & storage of blood for transfusion and storage effects
- Different blood components- their method of preparation, temperature of storage and shelf life.
- TTI, Biomedical waste management, Discard and Quality control.
- Reporting Formats and statistics

UNIT-III (12 hours)

a) Introduction, Blood collection and anticoagulants (3h)

- Preparation of donor, screening and collection of blood.
- Methods of blood collection
- Types of blood samples
- Precaution to be followed in collecting blood samples
- Methods of disposing both expiry, infected samples and sharps used
- Different vacutainers with color codes
- Advantages of Vacutainers
- Anticoagulants used in blood bank
- Mechanism and uses of various anticoagulants

b) Blood bank techniques (9h)

- Principles involved in Blood grouping. ABO system and the methods used.
- Rh system, Rh antigen. Principles and methods used
- Factors influencing the results of blood grouping.
- Other blood grouping systems
- Interpretation of blood grouping by various methods
- Compatibility test - Principles involved and the methods used
- Cross matching- Principles involved and the methods used
- Direct and indirect Coomb's test – Principles involved and the methods used.

UNIT-IV (2 hours)

Laboratory Management and Planning

- Reception and recording of specimen, maintenance of laboratory records

Maintenance and medico legal importance of records and specimens

2nd YEAR (Semester - III)

Subject: Blood Banking and Blood Banking Organization – PRACTICAL

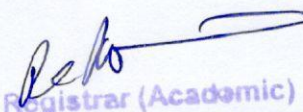
SYLLABUS

- 1) Sample receiving for grouping and crossmatching..
 - 2) Sample collection for donor screening.
 - 3) Blood grouping techniques, ABO & Rh system, Slide, and Tube method.
- Pre-transfusion workup
- 4) Cross matching
 - 5) Anti human globulin testing.
 - 6) Cleaning and care of general laboratory glassware and equipment
 - 7) Sterilization

2nd YEAR (Semester - III)

Subject: BLOOD DONATION & DONOR MANAGEMENT

SYLLABUS


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UNIT-I (10 hours)

Donor Motivation- Prerequisites for a continuous supply of safe blood

- Donor Motivation, Motivational Techniques, Social Awareness, Preparation of IEC Materials.
- Motivating factors for donation
- Types of blood donors, Donor selection, Donor questionnaire and interview: Eligibility and deferral criteria, medical interview and medical examination
- Pre donation Investigations -hemoglobin estimation & Blood grouping, Equipment's & Reagents used in screening, investigations.
- Managing deferred blood donors, technique for conversion of first time donor into regular voluntary donor, donor felicitation. Donor recruitment & Retention.
- Pre donation & Post donation donor counselling.
- Donor complication and management
- Therapeutic phlebotomy
- Donor feedback
- Donor records.
- Quality control measures in blood donors.
- Medico-legal Aspects, NACO & DGHS guidelines.
- Right to information, Donor Consent, reports, appreciation certificates
- Role of Blood Bank counsellors.

UNIT-II (6 hours)

Blood Donation requisites:

- Blood collection premises, equipment, their principles, and use
- Pre-donation counselling, Methods for Preparing Phlebotomy Site
- Test Tube Samples: Method of accurately relating product to donor sample, post donation care.
- Emergency medicines -Mandatory emergency medicines to be made available and their uses.
- Donor reactions and their management.
- Screening of blood units for mandatory tests, discarding infected units and discard record, post donation counseling.

UNIT-III (3 hours)

Blood Donation drive: Phases of outdoor VBD camps

- Awareness programs prior to blood donation drive.
- Camp site, staff requirement, management of camp, screening of donors
- Transportation of blood units from camp site to blood bank.

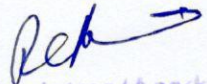
UNIT-IV (6 hours)

Blood collection, storage and labeling

- Different types of Blood Collection including Autologous blood donation and Therapeutic Phlebotomy -Indications and procedure of therapeutic phlebotomy

Preservation of donated blood, blood preservative solutions and Additive solutions.

- Blood donation.
- Criteria for Autologous blood donation
- Autologous blood donation advantages &disadvantages
- Different types of Autologous blood donation.

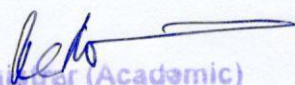

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2nd YEAR (Semester - III)

Subject: BLOOD DONATION & DONOR MANAGEMENT PRACTICAL

SYLLABUS

1. Preparation of phlebotomy site.
2. Operation of blood collection monitor, tube sealer and needle destroyer..
3. Donor Room Protocol, Donor Screening
4. Qualifying Test for Blood Donation- Laboratory investigations
5. Donor Suitability /Selection
6. Selection of Bags for Collection of Blood
7. Blood Collection – Solutions & Method for Preparing Phlebotomy Site
8. Test Tube Samples – arrangement and requirement
9. Blood Collection – Method of Accurately Relating Product to Donor
10. Blood Collection Procedure
11. Post Blood Donation Care
12. Post donation instructions
13. Management Of adverse reaction in the donor
14. Blood Collection- Collection of Autologous Blood from the Donor
15. Study of Outdoor Camps – Organization – Identifying needs and management.


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Semester-IV					
Subject Code	Subjects	Contact Hours / Week			
		Theory	Practical	Clinical	Total
	Basic Immunohematology	3			
practical	Basic Immunohematology- PRACTICAL		2		
	Blood Component preparation	3			
practical	Blood Component preparation – PRACTICAL		2	4	
	Transfusion Transmitted Infection & Bio-Medical Waste Management	3			
practical	Transfusion Transmitted Infection & Bio-Medical Waste Management- PRACTICAL		2	2	
Total					



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2nd YEAR (Semester - IV)
Subject: Basic Immunohematology

SYLLABUS

UNIT-I (9 hours)

Introduction to Immunology

- **Cells of immune system and their role:** Phagocytic cells, Antigen presenting cells, T cells, T cell subsets, B cells, CD Markers.
- **Antigens:** Immunogen, allo-antigen, soluble antigen, Red cell antigen,
- **Immunoglobulins** - characteristics of immunoglobulins,
- **Complement System, HLA system.**

Antibodies:

- Polyclonal anti bodies, development of antibodies, structure of Monoclonal antibodies
- Hybridoma technology,
- Human monoclonal antibodies.
- Antigen antibody reaction: Antigen concentration, antibody concentration, enhancing media, other factors influencing antigen antibody reaction.

UNIT-II (9 hours)

Basic Principles of Immuno-hematology

ABO Blood of Group Systems:

- History, Genetics, ABH antigens
- Biochemical Synthesis of blood group antigens
- Antigenic sites, weaker variants, Bombay Phenotype, ABO antibodies
- Red cell serology techniques, their advantages and disadvantages
- Cell and serum grouping, detection of weak A and B antigens
- Secretor status.
- Trouble shooting in red cell serology.
- ABO blood group discrepancies
- Other blood group system.
- Application of Blood groups: -Population Genetics, Forensic medicine, Transfusion medicine

UNIT-III (6 hours)

Rh Blood Group System:

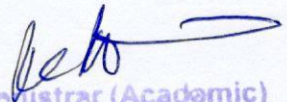
- History, Genetics, Molecular Genetics, Nature of Rh Antigens
- Partial D, Weak D, other variants of Rh, Rh Null

- Rh antibodies factors influencing Rh immunization, Functional role of Rh antigens
- Other Blood Group Systems: Lewis, P, Ii, MNSs, Kell, Duffy, Celano, In
- Principles of Direct and indirect antiglobulin test technique
- Weak Rh DTyping
- Antenatal Serology, Hemolytic disease of the newborn due to ABO and RhIn compatibility

UNIT-IV (12 hours)

Introduction to pre-transfusion workup

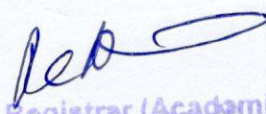
- Pre transfusion testing - Patient specimen labelling requirements, Patient / component identification requirements
- Testing of the recipient blood sample.
- Compatibility testing
- Different methods of cross matching, Saline Cross match, Saline replacement for rouleaux, enzyme technique, albumins technique
- Human human globulin techniques of cross matching.
- Cross matching in special circumstances,
- Emergency cross matching, - neonatal cross matching, transfusion in Autoimmune hemolytic anemia.
- Advanced technique including Micro plate and Gel card techniques
- Labelling and issue of blood.


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2nd YEAR (Semester - IV)
Subject: Basic Immunohematology PRACTICAL

SYLLABUS

1. Determination of ABO & Rh Blood Group –slide method
2. Preparation of Red Cell Suspensions
3. Determination of ABO & Rh Blood Group –tube method – cell group & Serum group
4. Determination of ABO group of red cells and serum – Microplate and Gel card test
5. Reading, Grading and Recording Results.
6. Performing Direct Anti-globulin Test.
7. Performing Indirect Antiglobulin Test.
8. Saline crossmatch.
9. Performing Anti-globulin Cross-Match.
10. Anti A and anti B titer estimation.
11. Weak D testing.


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2nd YEAR (Semester - IV)
Subject: Blood Components

SYLLABUS

UNIT-I (6 hours)

Basic steps in Blood components preparation & labeling.

- Different types of blood components
- Equipments used for component preparation.
- Care and precautions to be taken during whole blood collection and before component preparation.
- Programming for component preparation.
- PRP & Buffy coat methods.
- Other methods of component preparation
- Storage of individual blood components
- Composition- volume, cellular, plasma and clotting factor content
- Advantages of Blood component preparation.

UNIT-II (3 hours)

Preparation of Components

- Preparation of red cell concentrate
- Fresh Frozen plasma
- Other plasma products,
- Platelet concentrates
- Cryoprecipitate,
- Washed red cells
- Plasma Fractionation: Principles, manufacturing of different plasma derivatives

UNIT-III (2 hours)

Storage conditions for components and —Storage lesions

- Metabolic changes in blood components during storage
- Release of cytokine during storage.
- Component Testing, Labeling, Transportation and storage of blood components.
- Inventory management and maintenance of bloodstock

UNIT-IV (3 hours)

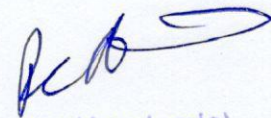
Modified blood components

- Preparation of leuko-reduced blood products, Leukocyte filters, Irradiated blood components

- Blood substitutes, Washed /plasma reduced blood components, frozen red cells.
- Specialized blood components –CMV free and HLA matched & Blood substitutes
- Recombinant clotting & hematopoietic growth factor

UNIT-V (5 hours)

- a) Automation in Blood component preparation. (2 h)
 - b) Quality control of whole blood and components (3 h)
- i) Quality control procedures, measures and sterility tests and recording of data for
- a. Whole blood
 - b. PRBC
 - c. Modified PRBC
- FFP and Plasma products
 - Platelet components
 - Plasma fractionation products & Pathogen inactivation method
- ii) Factors affecting the quality of blood components.



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2nd YEAR (Semester - IV)
Subject: Blood Components PRACTICAL

SYLLABUS

Methods of Blood component separation for

- 1. Packed Red Blood cell**
- 2. Semi packed PRBC**
- 3. Fresh Frozen Plasma**
- 4. Cryoprecipitate**
- 5. Random Donor Platelet**
- 6. Leucoreduction-a) Bedside Leucoreduction, b) Inlet Leucoreduction**
- 7. Irradiation for various blood components**
- 8. Documentation**
- 9. Quality control of Blood Components.**



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2nd YEAR (Semester - IV)

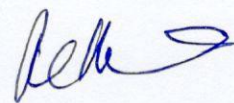
Subject: Transfusion Transmitted Infection & Bio-Medical Waste Management

SYLLABUS

(26 hours)

- Introduction
- Transfusion transmitted infections-viral, parasitic, spirochetal, bacterial
- Emerging infections-like Epstein -Barr virus, CMV, Parvovirus B19 and Creutzfeldt - Jacob disease.
- Pathogen inactivation methods
- TTI testing methods
- Laboratory screening tests for TTI, Spot tests, Limitation of various tests
- Various types of ELISA
- Quarantine and recipient tracing, procedures for look-back and recipient follow-up
- Compare & contrast various methodologies such as ELISA, rapid & Chemiluminescence used in screening of transfusion transmitted infections.
- National policy on TTI testing of blood donors.
- Donor referral in case of TTI reactive samples
- **Automation in Blood donor screening ,**
- NAT, Western Blot
- Automation in blood donor TTI screening.
- Confirmatory tests for TTI testing.
- Quality control test in TTI Laboratory and their Documentation.
 - **Preventive strategies for transfusion transmissible infections**
- **Microorganism risk to healthcare workers and biosafety level**
- **Good laboratory practices**
 - Universal precautions –Bio waste management.
 - Disposal of Reactive Bags and samples.
 - Post exposure prophylaxis
- **Special references for blood transfusion service and biosafety**

- **Biomedical waste management in reference to blood transfusion service.**
- **Autoclaving** --Discard of Blood& components-infected and expired.
- **Documentation.**
- Demonstrate proficiency in the preparation and use of internal control in transfusion transmitted infection screening. Proficiency testing – IQAS & EQAS, Pathogen reduction.




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2nd YEAR (Semester - IV)

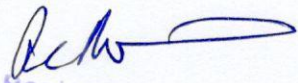
Subject: Transfusion Transmitted Infection & Bio-Medical Waste Management Practical

SYLLABUS

- 1. Rapid screening test for TTI- principles, methods for HIV, HCV, HBV, Malaria.**
- 2. Serological tests for syphilis**
- 3. ELISA-HIV,HCV,HBV.**
- 4. Chemiluminescence-principles and methods**
- 5. Sterilization-Principles, Procedures and Records**
- 6. Spill Management**
- 7. Interpretation of TTI Laboratory Quality control test**


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Semester-V					
Subject Code	Subjects	Contact Hours /Week			
		Theory	Practical	Clinical	Total
	Advanced Immunohematology	3			
practical	Advanced Immunohematology - PRACTICAL		2	2	
	Blood Transfusion Therapy	3			
practical	Blood Transfusion Therapy - PRACTICAL		2	2	
	Apheresis and Recent Advances	3			
practical	Apheresis and Recent Advances - PRACTICAL		2	4	
Total					


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3rd YEAR (Semester - V)
Subject: Advanced Immunohematology

SYLLABUS

UNIT-I (7 hours)

Interpretation of ABO grouping

- Solving ABO and Rh grouping discrepancies
- Sub-groups of ABO
- Polyagglutination.

Other Blood Group Systems

Rh, Kell, Duffy, Kidd, Lewis, MNSs, P, Luthern –methods of testing, phenotyping

Use of enzymes in blood banking

Investigation of autoimmune hemolytic anemia.

Saliva testing

UNIT-II (9 hours)

Antibody screening

- Pooled cell and 3-cell panel
- Antibody identification-1 cell & extended cell panel.
- Detection of blood group antibodies, identification of their specificity, Clinical significance of antibody detection,
- Differentiation between auto and allo-antibodies
- Gel Technology
- Antenatal Serology
- Rh Incompatibility and other allo-antibodies

UNIT-III (3 hours)

Preparation of Red Cell panels

Elution & Adsorption Procedures.

Reagents used in advanced immunohematology.

Cryopreservation & thawing techniques of cell Panels and Red blood cells

UNIT-IV (3 hours)

Newer techniques

Gel technology and microplate technology,
Automaton in blood grouping

Virtual Cross match and Molecular blood grouping

UNIT-V (3 hours)**Advanced Immunology**

General principles of Immunology and Complement System

HLA SYSTEM

HLA antigens


HLA antibodies

HLA Serology

HLA phenotyping

and

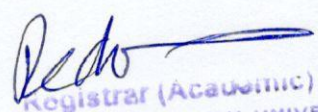
Various Histocompatibility matching procedures


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3rd YEAR (Semester - V)
Subject: Advanced Immunohematology PRACTICAL

SYLLABUS

1. Detecting weak A and B antigens and antibodies by cold temperature enhancement
2. Confirming weak A or weak B subgroup by adsorption and elution
3. Testing saliva for A, B and H antigens
4. Confirming anti-A1 in an A2 or weak A subgroup
5. Testing for weak D
6. Removing auto-antibody by saline washes
7. Immediate spin compatibility testing
8. Indirect antiglobulin test
9. Direct antiglobulin test
10. Antibody screening and detection by using various number of red cell panel.
11. Elution & Adsorption Procedures
12. Preparation red cell panels


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3rd YEAR (Semester - V)
Subject: Blood Transfusion Therapy

SYLLABUS

UNIT-I (3 hours)

Management of Blood Bank Issue/ Reception Counter

- Criteria for acceptance of requisition form.
- Inspection and selection of blood component.
- Plan for transfusion.
- Criteria for issue of blood and blood Components.

UNIT-II (12 hours)

Indications for Transfusion Therapy

- Use red cell components in different types of anemia,
- Use of blood components in bleeding patient,
- Neonatal transfusion.
- Transfusion practices in surgery,
- Selection of units for cross-matching,
- Transfusion therapy for oncology and Transplantation patients.
- Transfusion indications for Red blood cells, Platelets, Plasma / cryoprecipitate, Granulocytes.
- Use of returned unused blood components from different blood storage and wards.
- Acceptance of blood components from other recognized Blood bank
- Pre Transfusion strategies in special cases regarding samples, techniques and protocols in special patients circumstances -Pediatric / neonatal, Obstetric, cardiac surgery .
- Burns & Trauma patients-transfusion strategies.
- MSBOS (maximal surgical blood order schedule)
- Immune haemolytic anaemia (warm and cold agglutinins)

UNIT-III (5 hours)

Complications of Transfusion therapy

- Blood administration, monitoring, use of transfusion filters, post transfusion care.
- Identifying type and grade of transfusion reaction.
- Bed side management
- Fetal and neonatal thrombocytopenia.
- Granulocyte transfusion.
- Platelet refractoriness Recognition and evaluation.
- Calculation of CCI(Corrected count increment) and platelet recovery

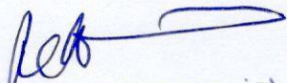
UNIT-IV (11 hours)

Transfusion reactions-diagnosis and reporting:

- Classification, Pathophysiology, Investigations, diagnosis and reporting.
- Hemovigilance
- Haemolytic transfusion reaction -immediate and delayed.
- Immune and non-immune reaction pathophysiology.
- Clinical signs and symptoms and laboratory investigation for Hemolytic transfusion reactions.
- Transfusion reaction workup.
- Non- haemolytic transfusion reactions Immediate and delayed
- Bacterial contamination, febrile reaction, Allergic reaction, Anaphylactic reactions, Transfusion related lung injury.
- PTP(post transfusion purpura), Alloimmunization, Iron overload, Graft versus host disease.
- Infectious complications: Bacterial, parasitic, viral,
- Current risk & Prevention strategies of transfusion reactions and rational use of blood

UNIT-V (4 hours)**Introduction to Special Transfusion therapies**

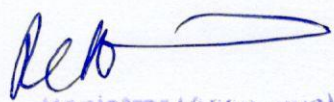
- Intra-uterine transfusions.
- Cardiac surgeries.
- Massive transfusion protocols.
- Switching ABO/Rh types.
- Exchange transfusion in neonatal hyperbilirubinemia.


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3rd YEAR (Semester - V)
Subject: Blood Transfusion Therapy PRACTICAL

SYLLABUS

1. Labeling and documentation during Issue of blood components
2. Type of component required and number of units required in various clinical conditions and their assessment
3. Posttransfusion investigation to study efficacy of transfused components
4. Sample to be collected in a case of suspected blood transfusion reaction
5. Visual inspection of serum and plasma for haemolysis and investigations done to demonstrate haemolysis.
6. Investigation of a Transfusion reaction
7. Reporting transfusion reaction workup
8. Transfusion reaction case studies-Charts.
9. Reconstitution of red cell and plasma for exchange transfusion.
10. Bed side Leucoreduction.
11. Irradiation of Blood /Blood products
12. Monitoring/ Observation of transfusion of different blood products inwards.


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3rd YEAR (Semester - V)
Subject: Apheresis and Recent Advances

SYLLABUS

UNIT-I (6 hours)

General aspects of apheresis and its products

Introduction

Principles of blood component separation by apheresis

Equipments and technology

Types of apheresis

General requirement for apheresis

General criteria for selecting apheresis donor

Apheresis procedures, Apheresis products

Maintenance of cell separator equipment.

Plateletpheresis, Plasmapheresis

Anticoagulants for apheresis

Therapeutic apheresis

Records, storage and quality control.

UNIT-II (6 hours)

Stem cell Preparation and Banking

Introduction, Principles of stem cell harvesting

Peripheral blood Hematopoietic stem cell

Procedures for collection of stem cell and calculation of stem cell collected.

Quality control of products.

Cryopreservation, maintenance, QC and thawing procedures in stem cell banking.

Documentation.

UNIT-III (4 hours)

Recent Advances in Blood Banking

Latest trends in blood banking - Donor screening, retention, Blood collections, component setc.

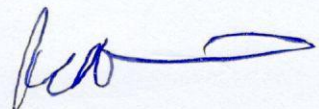
Recent advances in Automation of Blood Banking. Recent advances in apheresis procedures

Nucleic Acid Testing.

Stem Cells & Cord stem cell banking. Artificial blood

3rd YEAR (Semester - V)

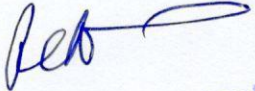
Subject: Apheresis and Recent Advances PRACTICAL



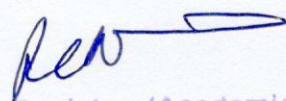
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SYLLABUS

- Donor screening,
- Apheresis procedures
- Kit installation, troubleshooting and entire procedure.
- Labelling and Quality control of various apheresis products.
- Storage and Records.


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Semester-VI					
Subject Code	Subjects	Contact Hours /Week			
		Theory	Practical	Clinical	Total
	Quality Control and Documentation	3			
practical	Quality Control and Documentation - PRACTICAL		2	2	
	Blood Bank Equipments	3			
practical	Blood Bank Equipments - PRACTICAL		2	2	
	Blood Bank Posting & Camp visit	Blood Donation Camp- 10 Nos		12	
Total					


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3rd YEAR (Semester - VI)
Subject: Quality Control and Documentation

SYLLABUS

UNIT- I (6 hours)

Quality control System

- Introduction -Quality control, Quality Assurance, Quality Management
- Quality control of empty blood bags.
- Quality control of different blood bank Components
- Sterility test on component.
- Quality control of blood bags
- Quality Assurance Hb & PCV
- Quality control of blood grouping reagents
- QC of anti-human globulin reagent, bovine albumin, Normal saline, other Anti-sera etc.
- QC of TTI test kits—Elisa & Rapid

UNIT- II (4 hours)


Equipments

- Quality control of all equipments.
- Calibration, validation and maintenance of blood bank equipment.
- QC of blood bank techniques Quality Assurance - Temperature Records, Sterility Testing.
- Internal QC and External QC

UNIT- III (3 hours)

Quality parameters of various blood components

- Quality Assurance
- Blood components— red cells and FFP
- Cryoprecipitate, platelets.
- Red Cell and WBC contamination.
- Calibration, validation and maintenance of blood bank equipment
- QC of blood bank technique.

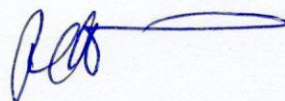


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UNIT- IV (10 hours)

Quality policy, quality manual, Internal and external audit and process control

- Documents, Registers, Records & Formats.
- Licensing, Drug authority's inspection and compliance.
- Registers forms, Documentation and Standard operating procedures(SOP or GMP),
- Blood bank management system,
- Regulations for blood bank operation, Drugs and cosmetics Law.
- National blood policy, standards in Blood Banking, licensing procedures, ethical aspects of blood transfusion.
- Recruitment and training of blood bank personnel.
- Proficiency testing.
- Hospital Transfusion Committee.
- Blood Bank Accreditation- . ISBT, NABL, NABH standards and accreditation.
- Legal and ethical aspects, Regulatory Acts, Bio hazard Waste Disposal Act, National blood policy.

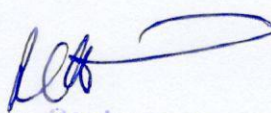


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3rd YEAR (Semester - VI)
Subject: Quality Control and Documentation PRACTICAL

SYLLABUS

1. Quality control of A, B antisera and ABO Cells
2. Quality control of Rh anti-sera, coomb's control cells.
3. Quality of AHG reagents.
4. Titer of anti-D reagents with Homozygous and Heterozygous Rh positive cells
5. Titer determination
6. Empty Blood bags Quality control
7. Quality control of various other consumables like- Normal saline, Oxygen cylinder
8. Quality control of 22% bovine albumin
9. Quality control of Papain, Cysteine.
10. Quality control of Copper sulphate solution
11. Quality control in various blood Component products.
12. Quality control in various apheresis products.
13. Quality control in whole blood.
14. Validation of refrigerators, cold room, incubator and other equipments.
15. SOP writing for simple laboratory tests
16. Quality Control measures in Blood Donation area--
 - Quality control of CBC,
 - Quality control of Hb%,
 - Quality control of Weighing balance,
 - Quality control of Donor arm/ Phlebotomy site.


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3rd YEAR (Semester - VI)
Subject: Blood Bank Equipments and reagents

SYLLABUS

(18 hours)

BLOOD BANK EQUIPMENTS AND REAGENTS

- General Lab equipments-requirements, selections, installations, validation, use and unique identification numbers
- Elisa readers, washers,
- Weighing devices
- Refrigerators-Blood bank Refrigerators, reagent Refrigerators
- Platelet agitators & Incubators
- Deep freezers
- Thawing bath & devices
- Plasma expressers
- Donor couches
- Blood collection monitor
- Refrigerated centrifuge
- Biosafety Cabinet / Laminar air flow.
- Sterile connecting devices
- Apheresis equipment's
- Computers
- Software & Hardware
- Temperature regulating devices (Incubators, Hot air oven)
- Autoclaves
- Cell washers
- Hospital information system (HIS)
- Automation platforms
- Blood serology: Various reagents & Kits ordering, specifications & Documentation
- Ordering, specifications, procuring and documentation of TTI kits and all reagents
- Ordering, procuring and documentation of other equipments-in component preparation laboratory.
- Miscellaneous equipments
- Calibration and maintenance of equipments
- Equipment detail records

3rd YEAR (Semester - VI)
Subject: Blood Bank Equipments PRACTICAL

SYLLABUS

1. Calibration of various equipments-Daily and Half yearly
2. Maintenance of equipment
3. HIS entry of all particulars with generation of Inventory,
Master register and documentation
4. Working or demonstration of semi-automated and fully automated Platform

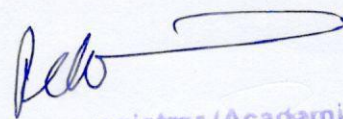


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3rd YEAR (Semester - VI)
Subject: Blood Bank Posting & Camp visit

SYLLABUS

1. Blood Bank Posting-
 - Reception
 - Blood collection area
 - Red cell serology
 - TTI lab
 - Component area and apheresis.
 - Issue counter
 - Apheresis area
2. Blood Donation Camp Visit
3. Any other


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