TAMIL NADU PROFESSIONAL ALLIED AND HEALTHCARE COUNCIL

TPAHC




# REVISED SYLLABUS

## DIPLOMA IN

# BLOOD BANK TECHNOLOGY

## (D.B.B.T.)

**Academic Session : 2026 – 2027**









## TAMIL NADU PROFESSIONAL ALLIED AND HEALTHCARE COUNCIL

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EXAMINATION
March & April

PROFESSIONAL EDUCATION | PRACTICAL TRAINING | CLINICAL EXCELLENCE | QUALITY HEALTHCARE

APPROVED SYLLABUS

*Empowering Allied & Healthcare Professionals for a Better Tomorrow*

## Syllabus of Diploma in Blood Bank Technology

## FIRST YEAR (1st)

| S. No. | Subjects | Distribution of Marks | | | |
|---|---|---|---|---|---|
| | | TH | PR | Viva-voce | Total |
| Paper I | Microbiology & biochemistry | 100 | - | - | 100 |
| Paper II | Hematology. | 100 | - | - | 100 |
| Paper III | General immunology | 100 | - | - | 100 |
| Paper IV | Blood components and blood donation | 100 | - | - | 100 |
| **PRAC** | Practical and Viva | - | 100 | 100 | 200 |
| | **Total** | **500** | | | **600** |

## Syllabus of Diploma in Blood Bank Technology

## SECOND YEAR (2nd)

| S. No. | Subjects | Distribution of Marks | | | |
|---|---|---|---|---|---|
| | | TH | PR | Viva-voce | Total |
| Paper I | Transfusion therapy | 100 | - | - | 100 |
| Paper II | Immunohematology | 100 | - | - | 100 |
| Paper III | Quality control in Blood Banking and Legal aspect | 100 | - | - | 100 |
| Paper IV | Recent advances in blood banking techniques | 100 | - | - | 100 |
| **PRAC** | Practical and Viva | | 100 | 100 | 200 |
| | **Total** | 600 | - | - | **600** |

# FIRST YEAR-1st

## Microbiology and Bio Chemistry

1. Introduction to microbiology, fundamental of microscopy, sterilization and disinfection.
2. Classification of microorganisms and their staining techniques.
3. Bacteriological media, pure cultures and cultural characteristics, bacteria of medical importance.
4. Transfusion transmitted infection, HIV, HCV, HBV, Malaria, syphilis.
5. ELISA, Rapid and other tests for diagnosis of transfusion transmitted infections.
6. Personal and laboratory bio safety, management of biomedical waste and viral inactivation.
7. Instrumentation principles: Ph meter, colorimeter Spectrophotometer, electrophoresis equipment.
8. Bile salt, bile pigment and iron metabolism.

## Hematology

1. Normal erythropoietin, leucopoiesis, formation and function of platelets.
2. Classification of anemia, their laboratory diagnosis, hemoglobinopathy: beta thalassemia and sickle cells disease, G6PD deficiency, polycythemia.
3. Autoimmune hemolytic anemia, classification, diagnosis, specificity of auto antibodies.
4. Coagulation mechanism, hemostasis, laboratory tests for coagulation, platelet disorders.
5. Hematological malignancies.
6. Bone marrow transplantation, peripheral stem cells, cord blood stem cells, cord blood banking.
7. Collection of blood samples, types of anticoagulants.
8. Complete hologram, different methods of hemoglobin screening and estimation: copper sulphate, hematology analyzers, shale's cyan meth hemoglobin and hem cue method, red cell indices

## General Immunology

1. Principle of basic immunology, history, immunity.
2. Antigens: Immunogenic, allo-antigen, soluble antigen, red cell antigen, epitopes.
3. Antibodies: Polyclonal antibodies, development of antibodies, structure of immunoglobulins, characteristics of immunoglobulins.

4. Monoclonal antibodies: Hybridoma technology, human monoclonal antibodies, applications of M Ab.
5. Antigen antibody reaction: antigen concentration, antibody concentration, enhancing medical, other factors influencing antigen antibody reaction, immunoassays: ELISA.
6. Cells of immune system: Phagocytic cells, antigen presenting cells, T-cells, T-cells subsets, B-cells, CD markers, Flowcytometry for counting T&B cells.
7. Autoimmune disorders.
8. Complement system
9. HLA antigens, HLA Antibodies, HLA Serology, Histocompatibility matching: Molecular methods.
10. Molecular methods in immunology.
11. Immunology of transplantation.
12. Genetics of blood groups and their classification basics.....

# Blood Donation and Blood components

1. Selection of blood bags for component preparation, preparation of red cell concentrates, fresh frozen plasma, platelet concentrate, cryoprecipitate, washed red cells and frozen red cells.
2. Plasma fractionation: Principles, manufacturing of different plasma derivatives.
3. Types and method of preparation of component, testing labeling, storage and quality control.
4. Storage and transportation of blood components.
5. Preparation of Leuk reduced blood products, leukocyte filter, principal of component extractors.
6. Metabolic changes in blood components during storage, release of cytokine during storage.
7. Inventory management and maintenance of blood stock.
8. Irradiated blood components.
9. Blood substitute.
10. Measurement of factor VIII Level in FFP.
11. Measurement of fibrinogen level in FFP.
12. Sterility test on whole blood and platelet concentrates.
13. Measurement of pH and other platelet parameters.
14. Preparation of cryoprecipitate, peripheral blood stem cell.
15. Donor motivation, motivational techniques, social marketing, preparation of IEC Materials.
16. Donor recruitment and retention Management to blood donation, type of blood donors, donor selection, medical interview and medical examination, screening for hemoglobin estimation, managing deffered blood donors, technique for conversion of first time donor into regular voluntary donor, donor felicitation.
17. Blood collection room equipment, their principle and use, emergency medicines, pre donation counseling, bleeding of the donor, post donation care and counseling.

18. Screening of blood units for mandatory test, dissertation of infected units.
19. Blood donation drive: awareness programs prior to blood donation drive, visit of camp site, staff requirement, management of camp, transportation of blood units from camp site to blood bank.
20. Preservation of donated blood, blood preservation solution, additive solution.
21. Apheresis procedures, products, preparation of multiple products on cell separators, maintenance of cell separator equipment.
22. Autologous blood donation.

# SECOND YEAR- 2nd SYLLABUS

## Transfusion Therapy

1. Criteria for acceptance of requisition form, management of blood bank issue counter, inspection of blood component prior to issue.
2. Blood transfusion, transfusion filters, post transfusion care, therapeutic plasma exchange.
3. Judicious use of blood, management of different type of anemia, management of bleeding patient, neonatal transfusion, transfusion practices in surgery, transfusion therapy for oncology and transplantation patients.
4. Pathophysiology, diagnosis and management of hemolytic disorder.
5. Hemolytic transfusion reaction immediate and delayed, immune and non-immune reaction patho-physiology, clinical signs and symptoms, laboratory invigilation for HTR tests to defect bacterial contamination in blood.
6. Non-hemolytic transfusion reactions immediate and delayed, febrile reaction, allergetic reaction, clinical signs and symptoms.
7. Acute transfusion lung injury, all immunization, iron overload, graft versus host disease.
8. Strategies to prevent transfusion reactions.

# Immunohematology

1. Basic principles of Immunohematology, application of blood groups, population genetics, forensic medicine, transfusion medicine.
2. ABO Blood group systems: History, Genetics, ABH antigens, Biochemical synthesis of blood group antigens, antigenic sites, weaker variants, Bombay group, phenotype, ABO antibodies.
3. Rh blood group system: History, Geneticist, molecular genetics, nature of Rh antigens, partial D, Weed D, other variants of Rh, Rh null, Rh antibodies, factors influencing Rh immunization, functional role of Rh antigens.
4. Other blood group systems: Lewis, P, Li, MNSs, Kell, Duffy, Celano, In, Private antigens, public antigens.
5. Antenatal serology, hemolytic disease of the new born due to ABO incompatibility, Rh incompatibility and other allo-antibodies.
6. Red cell serology techniques, their advantages and disadvantages, cell and serum grouping, deection of weak A and B antigens and weak D/ Partial D cases, Trouble shooting in red cells serology.
7. Pre transfusion testing, different method of cross matching, cross matching in special circumstances, emergency cross matching, electronic cross matching.
8. Principles of direct and indirect ant globulin test enzyme technique, albumins technique, detection of blood group antibodies, identification of their specify, clinical significance of antibody detection, differentiation between auto and allo-antibodies.

# Quality Control in Blood Banking and Legal Aspects

1. Quality control of blood grouping reagents, QC of anti- human globulin reagent, bovine albumin, normal saline.
2. Quality control of blood bags.
3. Quality control of different blood bank components, sterility test on component.
4. Automation in blood banking.
5. Calibration, validation and maintenance of blood bank equipment, QC of blood bank techniques, internal and external QC
6. Organization of blood bank services, blood bank premises and infrastructure, regional blood transfusion center and blood storage centers, blood bank management system.
7. Record keeping and reporting, hemovigilance.
8. Regulations for blood bank operation: Drugs and cosmetics law, national blood policy. standards in blood banking, licensing procedures.

9. Recruitment and training of blood bank personnel, proficiency testing.
10. Blood bank accreditation.
11. Ethical and legal considerations pertaining to transfusion practice, identification of blood stains, paternity testing, donor notification and counseling, look back programme, drugs and cosmetics act, accreditation, consumer protection act and others.

# Recent Advances and Modern Biological Technique in Blood Banking

1. Automation and computerization, use of bar code.
2. Automated blood group and processing.
3. Automated infectious screening, nucleic acid testing, western blot, polymerase chain reaction (SSCCP, SSOP), Dot blot hybridization, aphaeresis, stem cell in blood banking.
4. Principle, methods relevance in transfusion medicine.
5. Blood substitutes.
6. Glucuronidation to preserve RBCs.
7. EQUAS samples and their report.

## REFERENCE BOOKS:


1. Modern blood banking and transfusion practices by Denise M. Harmenting, 5th Ed.
2. Transfusion medicine technical manual-DGHS, Ministry of Health and Family Welfare, Govt. of India, Second Ed. 2003.
3. Blood transfusion in clinical medicine by PL Mollison.
4. AABB Technical Manual, 17th Ec. AABB.
5. Compendium of transfusion medicine, RN Makro.
6. Practical Hematology, JA Dacie and SM Lewis.
7. Basic Immunology, A K Abbas and A H Lichtman, Second Ed., Saunders Elsevier.
8. Essential Immunology, I Roitt, 8th Ed., Blackwell Scientific Publications.
9. Basic Molecular and Cell biology, David Latchman, BMJ Publishing group, 1997.
10. Voluntary blood donation program NACO Ministry of health and Family welfare, Govt. of India, New Delhi, 2007.
11. National guide book in blood donor motivation, NACO, Ministry of Health and Family Welfare, Govt. of India.
12. Standards for blood banks and blood transfusion service, NACO Ministry of Health and Family Welfare, Govt. of India, New Delhi, 2007.

13. Text book of Pathology - Robbins.
14. Clinical practice of transfusion medicine-Petzswisher.
15. Principle of transfusion medicine - Rossi's.
16. Current medical diagnosis and treatment-Tiverney, Mchpee, Papadakis.
17. Clinical Manual of Clinical pathology and Bio chemistry.
18. Drugs & cosmetics Act, 1940
19. NACO Guidelines.