

INTERNSHIP REPORT

Submitted to

**SATHYABAMA INSTITUTE OF SCIENCE AND
TECHNOLOGY**

In partial Fulfillment for the Award of The Degree Of

BACHELOR OF SCIENCE

In

MEDICAL LABORATORY TECHNOLOGY

By

Mr. VINOTH. P (Reg. No: 41737023)



DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

SCHOOL OF ALLIED HEALTH SCIENCES

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A++" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

APRIL - 2024



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

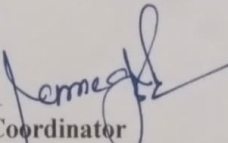
Accredited A++ Grade by NAAC | 12B Status by UGC | Approved by AICTE

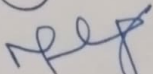
www.sathyabama.ac.in

DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

BONAFIDE CERTIFICATE

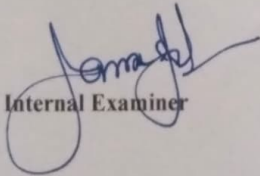
This is to certify that this internship report is the bonafide work of Mr.Vinoth.P who have done the internship work as a team and carried out the training program at “SATHYABAMA INSTITUTE of SCIENCE AND TECHNOLOGY” and “EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION- EGMORE” under our supervision from August 2023 to April 2024.

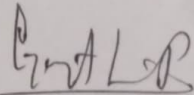

Coordinator
(Dr. James John)


Head of the Department
(Dr. J. Premkumar)

Head of the Department
Department of Medical Laboratory Technology
Sathyabama Institute of Science & Technology
(Deemed to be University)
Category I University by UGC
J. P. Nagaraja
Chennai - 600 115

Submitted for Viva voce examination on 12th April 2024


Internal Examiner

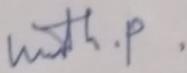

External Examiner
(Dr. HARITHA K. P.)

DECLARATION

I, Mr. VINOTH .P (41737023), hereby declare that the internship trainings done by me at "SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY" under the guidance Of Dr. JAMES JOHN and "EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION- EGMORE" under the guidance of Ms. D. JASMINE PRIYA at Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of science degree in MEDICAL LABORATORY TECHNOLOGY.

Date: 21.04.2024

Place: CHENNAI


(Mr. VINOTH .P)

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to The Board of Management of Sathyabama Institute Of Science And Technology for their encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Premkumar .J.** Head of the Department, School of Allied Health Sciences, Department Of **Medical Laboratory Technology** for Providing me necessary support during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. James John** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of **Medical Laboratory Technology** who were helpful in many ways for the completion of the project.

CONTENTS

S. NO	Topics	Page No
1	INTRODUCTION	1
2	MEDIA CULTURE	2
3	MEDIA PREPARATION	2
4	TYPES OF MEDIA CULTURE	3
5	AUTOCLAVE	4
6	BLOOD SMEAR	5
7	URINALYSIS	6
8	INTRODUCTION TO BLOOD BANK	7
9	DONOR SELCTION	7
10	TYPES OF BLOOD BAGS	7
11	BOOD DONATION	8
12	BLOOD GROUPING	9
13	FORWARD GROUPING	9
14	REVERSE GROUPING	11
15	SCREERNING TEST	11
16	HIV TEST PROCEDURE	12
17	CENTRIFUGE	13
18	STORAGE	14
19	CROSS MATCHING	15
20	MAJOR CROSS MATCHING	15
21	MINOR CROSS MATCHING	16
22	FIG/TABLE INDEX	17
23	Conclusion	18

INTRODUCTION

I attend internship in the SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY, Laboratory during my internship training period on 1st November 2023 and 30th November 2023 from 9am to 3.15pm.

Microbiology:

The microbiology lab is a facility equipped for studying microorganisms like bacteria, viruses, fungi, and parasites. Its main purpose is to conduct research, diagnose infections, and develop treatments. It typically contains specialized equipment such as microscopes, incubators, and culture media for cultivating and analyzing microorganisms. The lab follows strict protocols for handling potentially hazardous materials and ensuring accurate results.

Clinical Pathology:

Clinical pathology is the branch of medicine that focuses on diagnosing diseases through the analysis of bodily fluids and tissues. It plays a crucial role in patient care by providing information that helps physicians understand and manage various health conditions. Clinical pathologists utilize a range of laboratory techniques and technologies to examine samples such as blood, urine, and tissues, aiming to identify abnormalities, infections, and other factors affecting health. Through their work, they contribute to accurate diagnosis, monitoring of disease progression, and treatment decisions.

Hematology:

A hematology lab is a specialized laboratory that focuses on the analysis of blood samples to diagnose and monitor various blood disorders and related conditions. Hematology labs play a crucial role in healthcare by providing valuable information about the composition and function of blood components such as red blood cells, white blood cells, and platelets. They use a variety of techniques, including blood cell counts, blood smears, and specialized tests to detect abnormalities such as anemia, infections, clotting disorders, and leukemia. Results from hematology lab tests help physicians make accurate diagnoses, monitor treatment responses, and manage patient care effectively.

MICROBIOLOGY

In Microbiology lab, I have seen and learned about the media culture, types of media, media preparation, and autoclave.

Media Culture:

In microbiology, media culture refers to the preparation and cultivation of microorganisms in a controlled environment, typically using agar plates or liquid nutrient broths. These cultures are essential for studying microbial growth, metabolism, genetics, and other aspects of microbiology.

Media Preparation:

Preparing culture media involves several steps to ensure the proper growth of microorganisms;

- 1. Gather Ingredients:** Depending on the type of media needed (e.g., agar plates, broth), gather ingredients like agar powder, peptone, yeast extract, sodium chloride, and any additional nutrients or supplements required.
- 2. Sterilization:** Autoclave or sterilize the ingredients to kill any existing microorganisms and ensure a sterile environment for culturing.
- 3. Mixing:** Combine the sterilized ingredients in appropriate proportions according to the specific recipe for the desired type of media (e.g., nutrient agar, LB broth).
- 4. PH Adjustment:** Adjust the pH of the media to the appropriate level for the microorganisms you intend to culture, typically around pH 7.0.
- 5. Dispensing:** Pour the liquid media into containers (e.g., Petri dishes, test tubes) or bottles, or dispense it into plates or tubes, depending on the intended use.
- 6. Solidification:** If preparing agar plates, allow the media to cool and solidify to form a gel-like substance.
- 7. Sterilization Verification:** Ensure that the prepared media is still sterile after preparation and before use by performing sterility checks, such as streaking a sample onto agar plates and incubating to check for microbial growth.

8. Storage: Store the prepared media properly to maintain its sterility and integrity until ready for use, typically at refrigerated temperatures for short-term storage or frozen for longer-term storage.

Types of Media Culture:

In microbiology, media culture refers to the substances used to grow microorganisms in a laboratory setting. The types include:

1. **Nutrient Agar:** A general-purpose medium used to grow a wide range of microorganisms.
2. **Blood Agar:** Contains blood cells, often sheep's blood, used to differentiate bacteria based on their ability to hemolyze (break down red blood cells).
3. **MacConkey Agar:** Selective for Gram-negative bacteria and differential for lactose fermentation.
4. **Sabouraud Agar:** Used for the isolation of fungi, particularly dermatophytes and yeast.
5. **Thioglycollate Broth:** Used to culture anaerobic bacteria as well as microaerophilic organisms.
6. **Chocolate Agar:** Enriched medium used for fastidious bacteria, such as *Haemophilus influenza*.
7. **Lowenstein-Jensen Medium:** Used for culturing *Mycobacterium tuberculosis*.
8. **Triple Sugar Agar:** Commonly used in identification of Enterobacteriaceae
9. These are just a few examples; there are many specialized media types used for various purposes in microbiology.

Autoclave:

An autoclave is a device used in laboratory settings, medical facilities, and industrial applications to sterilize equipment and materials by subjecting them to high-pressure saturated steam at elevated temperatures. The process effectively kills bacteria, viruses, fungi, and other microorganisms, making the items sterile and safe for use in various applications, such as medical procedures, laboratory experiments, and food processing. Autoclaves are equipped with temperature and pressure controls to ensure that the conditions necessary for sterilization are maintained throughout the process. They are commonly used in settings where strict hygiene and sterility are essential.



Fig: 1. Autoclave

Blood Smear:

- A blood smear, also known as a peripheral blood smear or peripheral smear, is a procedure in which a drop of blood is spread thinly on a glass slide, stained, and examined under a microscope. It is a fundamental technique used in hematology to assess the morphology of blood cells.
- The smear allows for the examination of red blood cells, white blood cells, and platelets. By examining the size, shape, and distribution of these cells, hematologists can diagnose various blood disorders such as anemia, infections, leukemia, and clotting disorders. Abnormalities such as the presence of immature cells, unusual shapes, or abnormal distributions can provide valuable diagnostic information.
- Blood smears are often performed as part of a complete blood count (CBC), which provides information about the quantity and quality of blood cells in a person's bloodstream. The results of a blood smear analysis can guide further diagnostic testing and treatment decisions for various medical conditions.

Figure: 2.1 Blood Smear

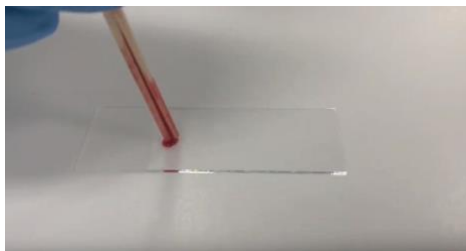


Figure: 2.2 Spreader Slide

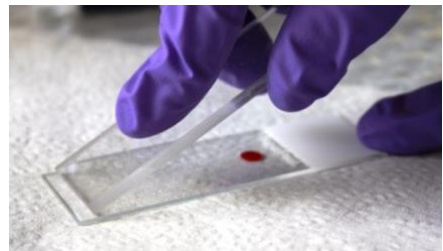


Figure:2.3 Pushing Slide

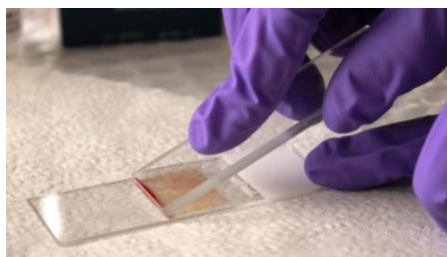


Figure:2.4 Tongue Shape



Urinalysis:

- A urinalysis is a test of your urine. It's used to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes.
- A urinalysis involves checking the appearance, concentration and content of urine. For example, a urinary tract infection can make urine look cloudy instead of clear. Increased levels of protein in urine can be a sign of kidney disease.
- Unusual urinalysis results often require more testing to find the source of the problem.

Figure: 3 Urinalysis



INTRODUCTION TO BLOOD BANK

I've trained in the Lions blood bank, Egmore. The screening, component separation, Blood grouping, and bleeding room. In reception, where all the details of donors are collected. Then the doctor checks the donor. In the phlebotomy lab or bleeding room they'll have the Hemoglobin level with copper sulphate, the blood bag is selected according to the Hb level and collects blood. The next lab where the blood grouping, cross matching, lysis check, coombs test and water bath is done. The screening lab they test for any diseased samples to be known and if those are in such conditions, it will not be useful in transfusing to the recipient and so they are discarded and finally, the storage room is where they store blood components, plasma, whole blood, WBC and platelets according to the temperature.

Blood Donors:

Most blood donors are volunteers. However, sometimes, a patient may want to donate blood a couple of weeks before undergoing surgery, so that his or her blood is available in case of a blood transfusion. Donating blood for yourself is called an autologous donation.

DONOR SELECTION:

- Must be at least 16 years of age, or in accordance with state law.
- Must be in good health.
- Body weight - not less than 45 Kg.
- Must pass the physical and health history exam given before donation.
- Past three months - not donated blood or been treated for Malaria.
- Women should not be pregnant or breast feeding her child.

Types of Blood Bags:

Single bag:

- For whole blood collection. The contains CPDA (citrate-phosphate-dextrose-adenine) solution available capacity of 350ml and 450ml.

Double BAG:

- For whole blood collection. Separations of two different blood components (Red Blood Cells and Plasma) obtained through the process of centrifugation and extraction.

Triple Bag:

- Triple blood bag with SAGM, for whole blood collection. Separation of three blood components (Red Blood Cells, Plasma and Platelets).

- The primary bag contains CPD (Cephalopelvic Disproportion) and one satellite bag contains SAGM (Saline, Adenine, Glucose, and Mannitol).

BLOOD DONATION:

- Blood donation is a vital part of worldwide healthcare. It relates to blood transfusion as a life-sustaining and life-saving procedure as well as a form of therapeutic phlebotomy as a primary medical intervention.
- Whole blood donation is the most common type of blood donation. During this donation, you donate about a pint (about half a liter) of whole blood. The blood is then separated into its components — red cells, plasma and sometimes platelets.
- Blood is essential to help patients survive surgeries, cancer treatment, chronic illnesses, and traumatic injuries. This lifesaving care starts with one person making a generous donation.

Safe blood saves lives. Blood is needed by women with complications during pregnancy and childbirth, children with severe anemia, often resulting from malaria or malnutrition, accident victims and surgical and cancer patients.



Figure: 4 Blood Donation

Blood Grouping:

According to the Blood Banks, distribution of blood types includes the following:

- -O Rh-positive - 39%
- -A Rh-positive - 31%
- -B Rh-positive - 9%
- -O Rh-negative - 9%
- -A Rh-negative - 6%
- -AB Rh-positive - 3%
- -B Rh-negative - 2%
- -AB Rh-negative - 1%

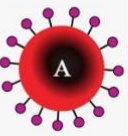
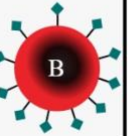
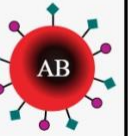
	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in red blood cell	 A antigen	 B antigen	 A and B antigens	None

Table: 1 Blood Grouping.

Forward Grouping:

- a. The forward grouping suggests the presence or absence of A and B antigens in RBCs.

- b. Have 3 tiles for the experiment. One for A group, other for B group and one more for the D antigen.
- c. Clean the fingertip aseptically.
- d. During collection of blood, the first drop should be discarded because the apprehension of blood is mixed with the tissue fluids
- e. The collected blood sample should be diluted with the help of normal saline in watch glass. After diluting, put the diluting blood in drops on titles taken.
- f. 3 antisera were subsequently diluted to blood drops on titles. It should be mixed thoroughly with the help of toothpicks.
- g. Toothpicks should not be shared with any other blood drops.
- h. Have to wait for a few minutes to observe the agglutination and for results.

Figure: 5 Forward Grouping



Table: 2 Forward_Grouping

Cells/Group	Group A	Group B	Group AB	Group O
Red Blood cells Type	A	B	AB	O
Antibodies in plasma	Anti B	Anti A	None	Anti A & Anti B
Antigen in red blood cells	A Antigen	B Antigen	A and B Antigen	None

Reverse Grouping:

- a. Reverse grouping indicates the presence or absences of anti-A and anti-B in serum.
- b. Label tubes as A and B.
- c. Tube A: Place 1 drop of red cells each from 3 of A group samples.
- d. Tube B: Place 1 drop of red cells each from 3 of B group samples.
- e. Add Normal saline and suspend the cells. Centrifuge the tubes for at least 1 minute at 1000 rpm.
- f. To make 5% red cell suspension, add 1 drop of RBC to 19 drops of saline. Make 20% suspension for the slide method.
- g. Test the pooled cells prepared by adding the antisera (Anti-A, B) in use.

Screening Test:

Screening for any unexpected red blood cell antibodies that may cause problems in the recipient

Screening for current or past infections, including:

- Human immunodeficiency virus (HIV)
- Hepatitis viruses B
- Hepatitis viruses C
- Syphilis
- Malaria

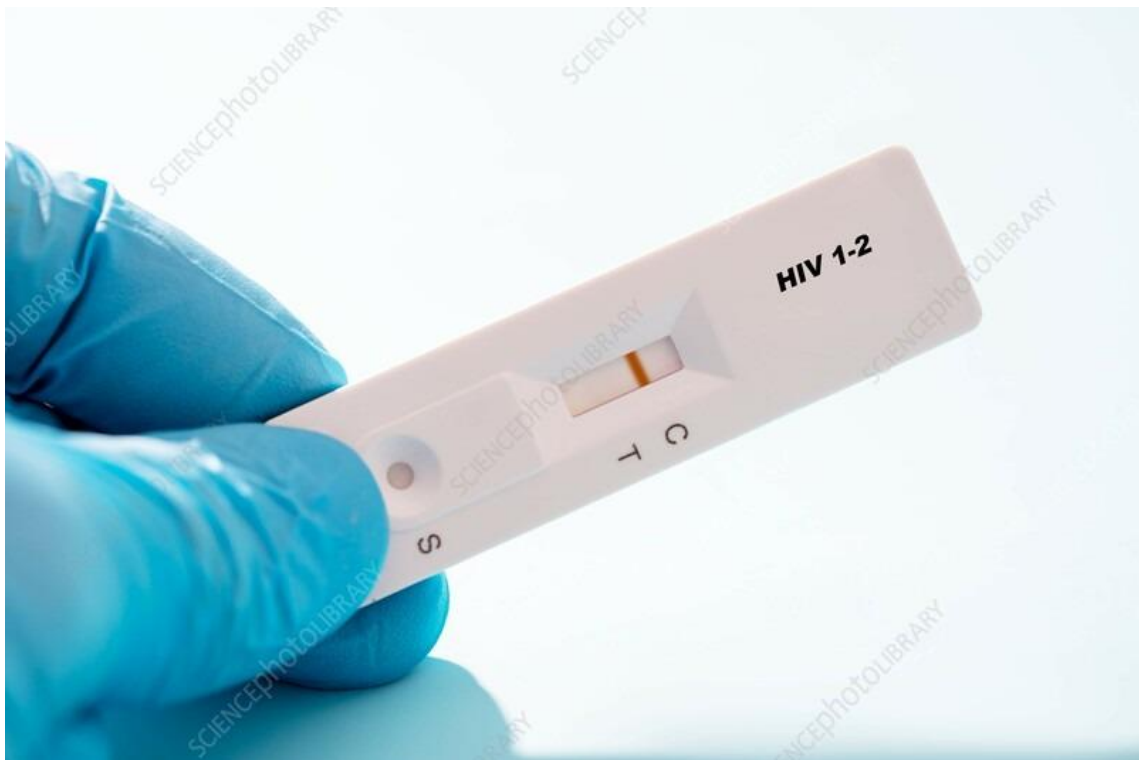
Table: 3 Screening Test

A Cells	B Cells	ABO Reverse typing
+	+	O
O	+	A
+	O	B
O	O	AB

HIV TEST PROCEDURE

- a. Bring all the reagents and specimens to room temperature before use.
- b. Take out the required number of strips and immediately close the pouch.
- c. Prepare ELISA protocol sheet indicating the location of controls and specimen.
- d. Use controls in duplicate.
- e. Add 200 μ l sample diluent to separate wells. Add 10 μ l of control or specimen in the wells.
- f. Gently shake the plate to mix thoroughly. Care should be taken to avoid spillage.
- g. Apply plate sealer and incubate for 30 minutes at 22-28° C.
- h. Wash each well by filling approximately 350 μ l diluted wash buffer and aspirating/flicking off 24 six times. Blot dry.
- i. Add 100 μ l diluted conjugate in each well and incubate for 30 minutes at 22-28° C.
- j. Wash six times as in step 9. Blot dry.
- k. Add 100 μ l substrate and incubate at 22-28° C away from light for 30 minutes.
- l. Stop reaction by adding 100 μ l stop solution. The stop solution should be added in the same sequence as substrate addition.
- m. Read the absorbance at 450 nm with 600-700 nm as reference within 30 minutes of stopping the reaction.

Figure: 6 HIV Test



Centrifuge:

- a. A machine called a centrifuge spins your blood to separate your red blood cells, platelets and plasma. As the blood is separated, the heavier reds cells sink to the bottom.
- b. Centrifugal force is used to separate the components of blood – red blood cells, platelets and plasma – from each. Other.
- c. The result is that the particles with different densities precipitate in layers.

Figure: 7.1 Blood Bag Centrifuge



Figure: 7.2 Blood Tube Centrifuge



Storage:

- a. The 'Blood cold Chain' is the system for storing & transporting blood & blood components so that they are kept at the correct temperature at all times from collection from donor to administration to the patient.
- b. Any break in the blood cold chain increases the dangers for the recipients of blood products.
- c. The 'Blood cold Chain' is the systematic process for safe storage & transportation of blood & blood components so that they are kept at the correct temperature at all times from blood collection from a donor to administration of blood to a patient in need of transfusion.
- d. Blood bank refrigerators, Plasma freezers, platelet agitator cum incubators, blood transport boxes are the blood cold equipment used for storage of blood and components

Figure: 8 Blood Bags Storage



Cross Matching:

In blood banking, cross-matching refers to the compatibility testing between the donor's blood and the recipient's blood to ensure safe transfusions. The principle and procedure of cross-matching are crucial steps to prevent adverse reactions during blood transfusions.

Principle:

The principle of cross-matching is based on the compatibility of antigens and antibodies present in the donor's and recipient's blood. When incompatible blood is transfused, it can trigger an immune response in the recipient, leading to serious complications such as hemolysis (destruction of red blood cells), shock, and even death. Cross-matching ensures that the donor's blood is compatible with the recipient's blood to minimize the risk of adverse reactions.

Procedure:

The cross-matching procedure involves several steps:

Patient Identification: Confirm the identity of the patient and ensure proper labeling of the blood samples to prevent any errors.

Blood Typing:

Both the donor's and recipient's blood types are determined through ABO and Rh typing. This involves testing for the presence of A, B, and Rh antigens on red blood cells.

Compatibility Testing:

The donor's blood is mixed with a small sample of the recipient's blood. This can be done using either the major cross-match or minor cross-match technique.

Major Cross-Match:

In this method, the donor's red blood cells are mixed with the recipient's serum (containing antibodies). If agglutination (clumping) occurs, it indicates an incompatible reaction, suggesting that the donor's blood is not suitable for transfusion to the recipient.

Minor Cross-Match:

Here, the recipient's red blood cells are mixed with the donor's serum. Agglutination indicates an incompatible reaction, suggesting that the recipient may have antibodies against the donor's blood.

Interpretation: Based

On the results of cross-matching, the compatibility of the donor's blood with the recipient's blood is determined. If there is no agglutination in the cross-match, it indicates compatibility, and the blood can be safely transfused. If agglutination occurs, further investigation is required, and alternative donor blood may need to be found.

S. No	Fig/Table No	Topics	Pages No
1.	Fig:1	Autoclave	4
2.	Blood Smear		
	Fig:2.1	Blood Drop	5
	Fig:2.2	Spreader Slide	
	Fig:2.3	Pushing	
	Fig:2.4	Tongue Shape	
3.	Fig:3	Urinalysis	6
4.	Fig:4	Blood Donation	8
5.	Fig:5	Forward Grouping	10
6.	Fig:6	HIV Test	12
7.	Blood Centrifuge		
	Fig:7.1	Blood Bag Centrifuge	13
	Fig:7.2	Blood Tube Centrifuge	
8.	Fig:8	Blood Bag Storage	14
9.	Table	Blood Grouping	9
10.	Table:2	Forward Grouping	10
11.	Table:3	Screening Test	11

Conclusion:

In my first day; I entered into the blood bank I saw reception, there was Staffs sitting front of the computer and doing there works Then, I observed the blood grouping and cross matching. After that I saw the refrigerators in the lab for each blood components to store them in a suitable temperature. I put blood group and cross matching for the patient with the help of technicians. We observed blood issue thoroughly. Then I saw thawing bath of FFP. I learn about pooled cell preparation. I observed antibody screening for the donated blood in gel card. We saw the blood collection from the donor. Then we put blood grouping for donated blood. I saw component separation for the donated blood then I did. Then I watched Screening for HIV, VDRL, HBsAg, HCV and Malaria. I saw all the records in the blood bank and discarding the expired and screening positive blood bags. Last day everything I did demo for myself and I concluded my internship.

