**TECHNICAL REPORT ON STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)**

**AT**

**Primary Health Care Center, LAMORDE**

**MUBI SOUTH, ADAMAWA STATE**

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**BY**

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# DEDICATION

This technical report is dedicated to Almighty God and to my beloved parents for making my SIWES experience successful.

# ACKNOWLEDGEMENTS

I thank God Almighty for making me to undergo students industrial work experience scheme (SIWES) successfully.

My gratitude goes to my parents for their prayers, financial and moral support during my attachment.

I whole heartedly thank my Head of department Mr. Yakubu Sule, SIWES coordinator and all lectures of Science Laboratory Technology, for their effort to ensure my success as their student.

I acknowledge the support and guidance of my industry-based supervisor for his time and support throughout my SIWES program at Primary Health Care Center, Lamorde, Mubi South, Adamawa State.

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I am greatly indebted to my co-SIWES students to mention, may God strengthen our relationship together and grant us academic excellence.

I sincerely thank you all for your contribution and support.

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# CHAPTER ONE

# INTRODUCTION

The Student Industrial Work Experience Scheme (SIWES) was designed by the Federal Government Establishment by decree No. 47 with statuary responsibility of man power training to bridge the gap between theoretical class work and the actual practical experience which is really what the labor market require of a graduate.

The program was established in 1973 and board as industrial Training Fund (ITF) with the view of generating trained manpower sufficient to meet the needs of the country's development plan. Despite the obstacles and huddles such as accommodation problems during the program, these are worthy adventure. I salute the pioneers and right-thinking person that initiate (SIWES) (Ramayah & Lee, 2012).

## 1.1 Aim and Objectives of SIWES

The aim and objectives of SIWES is to bridge the gap between theories learned and the practical aspect found in the field or industry as it may be. In addition, the following are some of the aim and objective.

1. To strengthen the relationship between institution of learning and the industries.
2. To expose and prepare student for the industrial challenges that is likely to be encountered in the future.
3. To create the mind set of industrial based skills necessary for smooth transition from class room to the world of application (field) after graduation.
4. To expose students to know how to handle, maintain and make use of tools and equipment that may not be available at their institutions of learning.
5. The SIWES also aims at preparing student for work after graduation (Ramayah & Lee, 2012).

## 1.2 Aim and Objectives of Industrial Training Fund (ITF)

1. To provide materials, logistics and firm for the smooth running of the training.
2. Organizes orientation for the prospective student to prepare them before going to the field.
3. Formulate policies for suitable and smooth running of the scheme.
4. Provide insurance cover for student on SIWES (Ramayah & Lee, 2012).

## 1.3 Role of Students

The students are beneficiaries of the scheme and therefore have a role to play which include.

1. To be regular and punctual at all times.
2. To attend SIWES orientations organized by the ITF before going out to the field.
3. To be obedient and adhere to the rules and regulations of the organization in which the student is undergoing the training.
4. Report daily activities carried out by the student in the log book.
5. To avoid changing places of attachment unnecessarily.
6. To be diligent, honest and take pride in the organization (Ramayah & Lee, 2012).

## 1.4 History of Lamorde Primary Health Care

Lamorde Primary Health Care was established around 1990 at Lamorde ward, Mubi South Local Government Area. It was first known as Lamorde Dispensary with 3 numbers of trained staff and 4 untrained staff, 1 security, as time goes by, the promotion of Lamorde Health Care Center. But with this development it was not without challenges such as insufficient ward and consulting room. However, the challenges were so really solved by expansion and renovation of the existence of the MDG (Millennium Development Goal). The organization has finally signed a full contract with PBF (Performance Based Finance) around 2014 with her present staff and 13 that is 16 trained staff and untrained staff respectively making the total number of 29 staff in all.

## 1.5 Organization chart of Primary Health Care Center, Lamorde

**Laboratory manager**

Medical Lab Scientists/Medical Lab Technicians

Cashier

Hematology Section supervisor

Clinical Chemistry

Microbiology Section Supervisor

Secretary

Medical Lab Scientists/Medical Lab Technicians

Medical Lab Scientists/Medical Lab Technicians

Student

Student

Student

Figure 1: Organization Chart

## 1.6 Introduction to Laboratory

The laboratory is a room or building equipped for scientific experiment, research, or teaching or for the manufacture of drugs or chemicals.

## 1.7 Safety Rules of the Laboratory

1. Do not enter the medical laboratory bare footed.
2. Do not eat, during or take food into the laboratory.
3. Wash your hands carefully when leaving the laboratory.
4. Report any accident you have
5. Keep your work area tidy and clean up any spill including water on the floor.

# CHAPTER TWO

# HAEMATOLOGY UNIT

Hematology is the study of blood in its normal and abnormal condition and the tests carried out under this unit include (Hoffman *et al.*, 2018).

1. Packed Cell Volume
2. Blood Grouping

## 2.1 Method of Blood Sample Collection

There are two ways medically through which blood sample can be collected. The ways are as follows:

1. Through vein
2. Through capillary

**Vein blood sample collection**

**Materials required:** Swap, EDTA container, Tunicate, Syringe and Needle.

**Procedure:**

1. The patient hand was tied with a tunicate
2. The preferred area of the patient was wiped using a swap, so that the vein will be seen clearly.
3. The patient was introduced to close his tied hand fingers so that the vein will pump up.
4. Then about 1/3 of the needle was inserted into the vein and the plump of the syringe was drawn back for the blood sample to be collected.
5. After the blood sample was collected, the tunicate was untied first before the needle was removed from the vein.
6. Then the blood sample was transferred into the EDTA container.

**Capillary blood sample collection**

**Materials required:** Swap, EDTA container, Lancet.

**Procedure:**

1. The patient’s finger was wiped using a swap.
2. The wiped area was pricked with a lancet.
3. The finger was pressed gently for free flow of blood.
4. Then the blood sample was collected into the EDTA container.

## 2.2 Packed Cell Volume (PCV)

**Aim**: PCV is a test to analyse the level and proportion of red blood cells in the blood stream.

**Procedure**:

1. Under aseptic condition venous blood sample was collected into the capillary tube.
2. The capillary tube was filled to the 10cm mark and placed in the centrifuge machine.
3. The centrifuge machine was turned on at high speed.
4. The centrifuge machine was left for 10 minutes and the result obtained.

Packed Cell Volume (PCV): Range

Children at birth 44 – 54 %

Children 2 – 6 years 35 – 40 %

Children 6 – 12 years 34 – 45 %

Adult Men 40 – 54 %

Adult Women 36 – 46 %

## 2.3 Blood Grouping

**Aim**: To help identify the blood group of an individual

Various Types of Blood Group

- Orh Positive - Orh Negative

- Arh Positive - Arh Negative

- Brh Positive - Brh Negative

- ABrh Positive - ABrh Negative

**Procedure How to Determine Blood Group:**

1. The region for sample collection was swabbed with a cotton wool moistened in alcohol to help prevent infection.
2. The antigen was mixed with antibodies against type A, B and O.
3. It was rotated in a slow circular motion to ensure a proper mixture of antibodies against type A, B and O.
4. It was checked to see whether or not the blood cells stick together.
5. The blood type of a person was determined.

**A B ORh**

A+ 0+

1. 0-

AB+

AB-

B+

A B- B-

# CHAPTER THREE

# Parasitology UNIT

Parasitology is the branch of biology or medicine concern with the study of parasitic organism (Hoffman *et al.*, 2018).

Tests done under this unit include.

- Malaria parasite (MP)

- Urine Analysis

- Stool Microscopy Test

- Urine Microscopy Test

## 3.1 Malaria

Malaria is a disease caused by plasmodium parasite transmitted through bite of an infected mosquito. There are two methods of detecting malaria RDT and Microscopy.

**Aim:** To diagnose plasmodium Falciparum in the blood.

**RDT Test Procedure:**

1. The expiry date of the test packet was checked
2. The test packet was open and the cassette was removed.
3. The patient name was written on the cassette.
4. The 4th finger of the patient was grasp clean with the alcohol swab and allowed to dry.
5. The finger was pricked with a lancet in order to get a capillary blood.
6. The blood device was used to collect blood sample and placed in a square hole marked “A”.
7. The buffer was dropped in a square marked “B”.
8. It was left for 15 minute and the result was obtained.

**Microscopy Test Procedure:**

1. A blood sample was collected using syringe and needle.
2. The blood was placed on a clean slide and was smeared before it allowed to dry.
3. The field stain “A” was dropped on the slide and was left for 5 minutes before stain “B” was added.
4. The oil immersion was dropped on the slide and was viewed under microscope using x100 objective lens.

## 3.2 Urine Analysis

It is used to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes.

**Aim**: To detect the normality or abnormality of urine.

**Urine Analysis Test Procedure:**

1. The urine was collected in a clean container.
2. The urine sample was poured on a test strip and allowed for 60 seconds.
3. The colour chart on a test strip was compared with the colour chart provision on the container of the test strip before the result was interpreted.

## 3.3 Urine Microscopy Test

It is used to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes.

**Aim**: To detect the normality or abnormality of urine.

**Urine Microscopy Test Procedure:**

1. The urine was collected in a test tube.
2. The urine sample was placed into the centrifuge machine. The machine was allowed for 5 minutes before sample removed.
3. The urine sample was removed and placed on a clean slide.
4. The result was interpreted after the slide was placed under microscope and observed using x100 objective lens.

## 3.4 Stool Microscopy Test

Stool is a waste product that are found in the intestine and passed out from the body through the anus. Stool parasites include round worms, hook worms and liver flukes.

**Aim**: Stool microscopy test is a test used to determine the presence of bacteria, viruses or parasites.

**Stool Microscopy Test Procedure:**

1. The stool sample was collected in a clean container.
2. The micropipette was used to take the sample of stool and placed on a clean slide.
3. The glass slide was placed under microscope and observed using x100 objective lens and the result obtained.

# CHAPTER FOUR

# Chemical Pathology UNIT

This is the study of chemicals and test carried out under this unit include (Hoffman *et al.*, 2018).

1. Hepatitis B Surface Antigen (HBsAg)
2. Blood Glucose (Sugar) Level Test
3. Widal Test

## 4.1 Hepatitis B Surface Antigen (HBsAg)

Hepatitis B Surface Antigen (HBsAg) is a serious liver infection caused by the hepatitis B virus.

**Aim:** To detect the actual presence or absence of the Hepatitis B virus called the surface antigen in blood.

**Hepatitis B Test Procedure:**

1. The finger of the patient was cleaned with alcohol swab and allowed to dry before pricing
2. The finger was pricked with a lancet and little drop of blood was placed on the test strip.
3. 3 drop of buffer solution was dropped on a test strip.
4. It was allowed for 2 minutes before the result interpretation.

## 4.2 Blood Glucose (Sugar) Level Test

Glucose is the main sugar found in your blood. It comes from the food you eat and is your body main source of energy. There are two types of blood glucose (sugar) test.

Fasting Blood Sugar (FBS): This is blood test done on empty stomach.

Random Blood Sugar (RBS): This is blood test done at any time. These tests show the glucose level in the blood.

**Aim**: To determine the glucose level in the blood of a patient

**Blood Glucose Procedure:**

1. The finger of the patient was cleaned with alcohol and allowed to dry before prick.
2. The finger was pricked with a lancet and a little drop of blood was placed on a test strip inserted into the accu-check (blood glucose meter)
3. Within some seconds, the blood glucose meter read the blood glucose level which the result was obtained.
4. Fasting blood sugar (FBS) = 3.5 – 6.0.

## 4.3 Widal Test

Widal test is intended for the detection of typhoid antibody usually found after two weeks of salmonella infection. The level of antibody progressively rise to maximum by 3 – 4 week if no specific antibiotic are taken.

**Widal Test Procedure**

1. The blood was collected using syringe and needle.
2. The blood sample was placed in to the centrifuge machine in order to separate the serum with plasma.
3. The serum was mixed with antigen O and H on a clean white tile.
4. The result was observed after the reaction of antibodies.

## 4.4 Introduction to Immunology

This is the study of human immunity and tests done under this unit include:

Pregnancy Test (PT)

Human Immune Virus (HIV)

## 4.5 Pregnancy Test (PT)

Pregnancy Test (PT), measures the amount of hormone called Human Chorionic Gonadotropin (HCG). HCG can be present in the blood and urine approximately 1 – 9 days after conception.

**Pregnancy Test Procedure:**

1. The urine sample was collected in a clean container.
2. The test strip was inserted into the container and allowed for few seconds before removing.
3. The strip was removed from the container and allowed for 2 minutes before the result was interpreted.

## 4.6 Human Immune Virus (HIV)

This is an infection that attacks the body immune system, speicifically the white blood cells called CD4 cells. HIV is causes Acquired Immune Deficiency Syndrome (AIDs) which is a chronic immune system disease caused by the HIV.

**HIV Test Procedure:**

1. Finger of the patient was cleaned with alcohol swab and allowed to dry before prick.
2. The finger was pricked with a lancet and a little blood was placed on a test strip.
3. A buffer was added on a test strip. The strip was allowed for 15 minutes before the result was interpreted.
4. The result should be negative, positive or invalid.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

## 5.1 Conclusion

This student industrial work experience scheme attachment program has really enlightened us a lot of things that we have not done during our theoretical study and it also exposed us to many principles, test and some machines that we have not seen or handled before.

## 5.2 Recommendations

This Student Industrial Work Experience Scheme (SIWES) at Primary Health Care Center, Lamorde, Mubi South, Adamawa State was interesting; we find it difficult to carry out some of the test with modern equipment in the laboratory. Likewise, there was restriction on some of the equipment which is only operated by the specialist in the establishment. In this respect I am pleading with the government to provide modern equipment to school. The students should be given opportunity to operate the available equipment in school laboratory (Physics, Chemistry, and Microbiology).

Secondly the ITF official should try to visit establishments where students are undergoing their SIWES program.

Finally, my advice to incoming students who may undergo their course of study and the establishment should be equipped with modern equipment.

# REFERENCES

Hoffman, R., Benz, E. J., Silberstein, L. E., Heslop, H. E., & Weitz, J. I. (2018). Hematology: Basic Principles and Practice. *Elsevier Health Sciences*, 7(1), 44-78.

Ramayah, T., & Lee, J. W. C. (2012). Impact of Industrial Training on Generic Skills Development: A Study Among Malaysian Undergraduates. *Education and Training*, 54(8/9), 707-720.