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# SYLLABUS

# HAEMATOLOGY

## MEDICAL TECHNICIANS

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**For exams starting in October 2024**

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# 1. Introduction

## **Objective**

The objective of this syllabus is to provide student technicians with a guideline to the essential aspects that must be covered in order to adequately prepare the Haematology Technician candidate for the HPCSA's Professional Board Examination of Medical Laboratory Technology, who wish to register as Haematology Medical Technician at the end of their second year of training.

It is expected from them that they cover all the practicals included in this instruction manual. Their promoters must ensure that they are competent in all the prescribed laboratory procedures.

The student will be able to provide an adequate practical and theoretical knowledge of screening, quantitative and qualitative analytical process used in the testing of specimens in a haematology laboratory. In addition, they are required to have minimal understanding of the interpretation of the final results. The candidates are expected to be able to correlate their practical knowledge and laboratory testing with the clinical condition and other discipline.

## **RANGE**

- Peripheral Blood and Bone Marrow
- Body fluids for specific testing such as:
  - Urine for haemosiderin and eosinophils.
  - Sputum for eosinophils.
  - CSF for cytospin.

## **Specific Outcomes**

At the end of the training period the student will sit for an examination consisting of two, two-hour papers. Both papers will be broadly based on the entire field of Haematology as covered in this syllabus up to, and including the final year. The students will be required to draw from all knowledge gained to date in order to answer these papers. The emphasis will be on laboratory techniques and concepts expected of a fully competent Medical Technician in Haematology. Specific details of methods, times and quantities will be asked. Students will however, be expected to know basic principles and expected results.

## **Laboratory Requirements**

HPCSA regulations require that accredited training laboratories perform minimum of 80% of the tests identified in this syllabus. Laboratories are required to ensure that the interns receive appropriate training in the tests contained within the syllabus but which is not routinely performed on site. (Where practical training at an alternate training facility is not feasible, minimum of theoretical and written assessments are compulsory)

## 2. Statutory Regulations and Ethics

### Objective

Provide the student with basic information on the regulations and ethical principles which apply to the practice of medical technology.

### Specific Outcomes

On completion of this section the student should be able to:

- Demonstrate basic understanding of the structure and functions of the Health Professions Council of South Africa (HPCSA).
- Demonstrate basic knowledge of the structure and function of the South African Professional Board for Medical Technology (PBMT).
- Understand the regulations relating to the scope of practice for Medical Technicians.
- Demonstrate understanding of the legal and ethical standards related to the professional practice of medical technology/technicians.
- Discuss the application of legal and ethical guidelines with regards to the communication and distribution of patient results via electronic platforms.
- Demonstrate an understanding of the requirements for the acquisition of Continual Education Units (CEUs).
- Demonstrate knowledge on the practice/ ethos of how confidentiality in the workplace is achieved and maintained.
- Demonstrate an understanding of No. 61 of 2003: National Health Act, 2004 as related to technology in a medical laboratory.

## 3. Total Quality Management

### 3.1. Laboratory Safety

### Objective

Provide knowledge of all safety procedures in the workplace and the understanding of the relevant legislation relating to laboratory safety procedures.

### Specific outcomes

On completion of this section the student should be able to:

- Explain and apply the fundamental concepts of the relevant legislation pertaining to laboratory safety.  
**RANGE:** *Occupational Health and Safety Act; Hazardous Substances Act; Compensation for Occupational Injuries and Diseases Act*
- Demonstrate knowledge of the procedures to follow in the event of laboratory accident or emergency.  
**RANGE:** *Chemical or bio-hazardous spill; Fire; Flood; Bomb threat*

- Describe the correct procedures for the storage, handling and disposal of laboratory waste.
- Describe the application of laboratory safety procedures to the collection, transport, storage and analysis of biological specimens including the International Air Transport Association (IATA) regulations.  
**RANGE:** *Biological specimens; Human tissue; Solid and liquid bio-hazardous waste; Radioactive waste; Sharps*
- Describe the basic principles for the storage, handling and disposal of chemicals; poisons; flammable substances; gases and infectious material.
- Describe procedures to follow for the prevention, control and management of laboratory acquired infections including general housekeeping and decontamination of equipment.
- Describe the purpose and basic content of the material safety data sheets (MSDS).
- Demonstrate knowledge of the protocols to follow in the event of injuries on duty including needle-stick injury.
- Define the role of the designated safety personnel.  
**RANGE:** *Fire marshal; Safety representative; First aid officer*
- Recognise the international safety symbols used in the laboratory environment.  
**RANGE:** *Prohibition Signs, Mandatory Signs, Warning Signs, Safe Condition Signs and Fire Equipment Signs.*
- Demonstrate the knowledge of all safety and emergency equipment.  
**RANGE:** *Safety goggles, Eyewash stations, Lab coats, Protective gloves, Fire extinguishers, Chemical fume hoods, First aid kits, Fire Blankets*

### 3.2. Specimens/Pre Analytical Requirements

#### Objective

Demonstrate an understanding of the optimal requirements for the maintenance of the integrity and suitability for the Haematology laboratory analysis with particular reference to the tests specified throughout this syllabus.

#### Specific outcomes

On completion of this section the student should be able to:

- Describe the optimal specimen requirements for the individual tests.
- Describe the conditions under which the specimens must be transported to the laboratory.
- Display knowledge of the optimal storage conditions should testing be delayed and the stability of the specimen for the individual testing process.
- Demonstrate knowledge of the concentration, mode of action and uses of anticoagulants commonly used in Haematology.
- Select the correct anticoagulant/preservative for the analysis to be performed.
- Where applicable, capture the data and patient demographics that are required for the registration of the specimens at the laboratory accurately.
- Explain the principle of continuous identification and tracking of the specimen, aliquots and documentation.
- Identify criteria for the rejection of unsuitable specimens.
- Conduct the pre-analytical check and preparation required for specimen type and test requested.

### 3.3. Laboratory Equipment

#### Objective

Explain the correct use, principle of operation and maintenance of laboratory equipment and implement the correct troubleshooting procedures when indicated.

#### Specific outcomes

*(Applicable to all equipment/instrumentation and analysers in the Haematology department)*

On completion of this section the student should be able to:

- Describe the principle of operation where applicable.
- Operate all equipment optimally in accordance with recommended procedures.
- Apply the correct safety precautions during the operation and maintenance of equipment.
- Demonstrate appropriate knowledge of, and apply the procedures to follow for the required routine maintenance, service and calibration requirements within scope, of / for the specific instrumentation.
- Discuss the appropriate functional checks that are performed to ensure optimal preparations.
- Conduct applicable decontamination procedures.

**RANGE:** *General cleaning, disinfection and sterilisation.*

- Apply the appropriate functional checks to ensure optimal operation.
- Describe and implement troubleshooting procedures when optimal operation is not demonstrated by the functional checks.
- Demonstrate knowledge of, and maintain, all equipment records and documentation required for good laboratory practice.
- Demonstrate a basic knowledge of the working and standardisation of large apparatus used in Haematology:

**RANGE:**

- Haematology analyser.
- Flow cytometer (CD4 counts).
- Coagulation instrument.

- A working knowledge of laboratory equipment and reagent preparation, specifically related to Haematology.

**RANGE:**

- **All glassware:** volumetric and graduated.
- **Pipettes:** glass, automated and disposable.
- **Balances:** top pan and fine chemical.
- **Small equipment:** Stirrers, hotplates, pH meters, rotators, shakers, rollers (flat bed and vortex), pro-pipettes, rubber teats, pipette aids, microscopes (light, phase contrasts, inverted and fluorescent), fume cupboards, bio hazardous safety cabinets (Class I and II), Centrifuges (micro haematocrit, safety, temperature controlled, ultra), water baths, fridges and freezers, stop watches/timers, spectrophotometers, thermometers, incubators (Haematology related 37°C).
- **Laboratory instrumentation:** Staining instruments and automated analysers are included in this range – knowledge of the makes and models in use in the current workplace.

### 3.4. Laboratory Reagents

#### **Objective**

Provide details of the correct preparation, storage and disposal of laboratory reagents.

#### **Specific outcomes**

On completion of this section the student should be able to:

- Differentiate between standards, controls and calibrators.
- Prepare, store and safely dispose of laboratory reagents.
- Demonstrate knowledge of the objective, use and retention of package inserts / instructions for use (IFU's).

At the end of this section the student must be competent in preparing:

#### **RANGE:**

*Physiologically normal saline,  
Buffer,  
stock solutions, working solutions, working reagents,  
controls, calibrators,  
reagent kits as related to Haematology.*

### 3.5. Stock Control

#### **Objective**

Outline the processes involved in good stock management.

#### **Specific outcomes**

On completion of this section the student should be able to:

- Demonstrate an understanding of the receipt of stock including the required records regarding the condition of goods, expiry dates and lot numbers.
- Demonstrate knowledge of the basic principles to apply when managing stock of reagents.
- Describe the correct storage conditions of stock.
- Demonstrate knowledge of company policy with regard to the use of expired reagents, controls.
- Differentiate between open vial stability and expiry date

### 3.6. Quality Control/ Quality Assurance / Accreditation

#### Objective

The student needs an exposure to aspects of quality control.

#### Specific outcomes

On completion of this section the student should be able to:

- Discuss basic quality assurance and quality control in the correct context.
- Define the process of quality assurance in the per-analytical, analytical and post analytical areas.
- Define the appropriate quality control process performed in the analysis of all parameters, equipment and analyser operation, reagent preparation as contained in the syllabus.
- Explain the principles of internal and external quality control procedures in the context of the tests they can performed.
- Apply basic knowledge of all the principles, procedures and calculations and interpretation of internal and external, **quantitative** quality control data.
- Apply basic knowledge of all the procedures, principles and interpretation of internal and external **qualitative** quality control data.
- Demonstrate a basic understanding of the potential causes and apply appropriate troubleshooting procedures in the event of failed internal and external, quantitative and qualitative quality control.
- Define basic terminology used in the assessment of quality control results.  
**RANGE:** *Westgard rules, shift, trend, outlier, positive and negative bias, specificity, precision, sensitivity, systematic error, random error, delta difference, reference range, linearity, reportable range.*
- Demonstrate a basic understanding of the term “Uncertainty of Measurement” and its’ application to the Haematology laboratory results.
- Describe and apply the appropriate quality control for all testing procedures included in this syllabus.
- Demonstrate general knowledge on the terms accreditation, International Organisation for Standardisation (ISO 15189).
- Demonstrate general knowledge on the use, performance and evaluation of RISK assessments.
- Define and explain all quality assurance terminology.  
**RANGE:**
  - *Non-conformance*
  - *Corrective action*
  - *Preventive action*
  - *Root cause analysis*
  - *Continual improvement of quality assurance and quality control processes*
  - *Audits – Internal & External (Onsite, virtual, desktop, horizontal, vertical, witnessing)*



### 3.7 Method Validation

#### **Objective**

Expose the student to aspects of method validation.

#### **Specified outcomes**

On completion of this section the intern/student should be able to:

- Differentiate between validation and verifications in terms of relevant ISO standards.
- Demonstrate an understanding of the approach to the validation and/or verification of new equipment, reagents and testing kits (Qualitative and Quantitative).
- Basic knowledge of the following statistical analysis

**RANGE:** *Bias (proportional and constant),  
Biological variation,  
Slope, Intercept, R-value,  
Upper and Lower limit of acceptance,  
reference range / normal range; analytical range / reportable range;  
linearity,  
specificity; sensitivity,  
within run and between run precision studies,  
correlation*

### 3.8. Personnel

#### **Objective**

Provide knowledge of basic requirements for personnel in terms of relevant Basic Employment Act.

#### **Specific outcomes**

On completion of this section the student should be able to:

- Describe the personal documents and records which are required for all laboratory personnel which falls within the scope of practice of Medical Technicians.
- Demonstrate an understanding of the terms “training” “competency” and “ongoing competency” in terms of training laboratory personnel which falls within the scope of practice of Medical Technicians.

### 3.9. Documentation

#### **Objective**

Provide knowledge of requirements of documentation in terms of Good Laboratory Practice.

#### **Specific outcomes**

On completion of this section the student should be able to:

- Demonstrate a basic knowledge of the management of laboratory documentation in terms of GLP and in terms of relevant ISO standards (ISO 15189).
- Demonstrate basic knowledge of issuing new documents, frequency of review, process of obsolete documentation, documentation retention and disposal.
- Demonstrate a basic knowledge of required content for SOPs including the minimum content of the cover page.

#### **RANGE:**

- Differentiate between a record and document.
- Policies, Procedures (SOPs), equipment records, working instructions, quality control records, personnel records, package inserts / IFUs and archiving.
- Laboratory Policies on: Issue of new documents, review process, raw data, process for obsolete documentation, document retention and disposal.
- Demonstrate knowledge on editable and final / non-editable types of records.

## 4. Laboratory Related Mathematics

#### **Objective**

Provide and instruct on the application of the correct mathematical formulae to relevant calculations used in Haematology.

#### **Specific outcome**

On completion of this section the student should be able to:

- Demonstrate the proficiency in the use of the correct formula used in the calculation of their patients' haematological results. Red Cell Parameters (MCV, MCH, MCHC, HCT (L/L), PCV (%) and RDW), absolute and relative differential white cell counts, correction for the presence of nucleated red cell parameters, percentage haemolysis, mean corpuscular fragility, percentage parasitaemia, INR, absolute reticulocyte count, RMI/RPI, reticulocyte percentage and corrected reticulocyte count, International Standard Ratio (INR).
- Demonstrate an ability to apply the calculations required for the preparation of solutions or patients samples. Normal solutions, percentage solutions, molar solutions, titrations/dilutions, serial and doubling dilutions.
- Apply the correct formula used in the assessment of quality control results. SD, SDI, CV, mean, median, reference range.

#### **Note: SI Units applicable**

*(Exception: Traditional unit for Haemoglobin and MCHC is g/dL)*

## 5. Haematology Theory

### 5.1 Anatomy and Physiology of the Bone Marrow

#### Objective

The objective is to provide the student with working knowledge, and understanding of basic aspects of haemopoiesis.

#### Specific Outcome

On completion of this section the student:

- Be able to define haemopoiesis.
- Demonstrate an understanding of the function of bone marrow relevant haemopoiesis.
- Demonstrate an understanding, and be able to illustrate the origin and normal development of the following haemopoietic elements:
  1. Erythrocytes
  2. Leucocytes
  3. Thrombocytes

### 5.2 Erythrocytes

#### Objective

The objective is to supply the student with sufficient understanding of normal and abnormal erythrocytes pertaining to the syllabus.

#### Specific Outcome

- Demonstrate sufficient knowledge outlining normal red cell life span, both theory and illustration of maturation from blast to mature erythrocyte.
- Demonstrate a basic understanding of Extravascular and Intravascular Haemolysis.
- Demonstrate knowledge of the structure, appearance and function of normal circulating reticulocytes and red blood cells.
- Provide a general description and knowledge of anaemia.
- Provide basic knowledge of the laboratory findings, including full blood count parameters and morphological findings, in the following:
  - Iron deficiency anaemia.
  - Megaloblastic anaemia.
  - Haemolytic anaemia
    - Spherocytes: Hereditary Spherocytosis, IgG AIHA, Haemolytic disease of the newborn (HDN)
    - Auto Agglutination: IgM AIHA
    - Sickle Cells: SCA
    - Fragments: DIC
  - Aplastic Anaemia.
  - Normocytic Normochromic Anaemia.
    - Anaemia of chronic disease
    - After acute blood loss
    - Renal disease
    - Mixed deficiencies
    - Bone marrow failure (e.g. post – chemotherapy)

## 5.3 Leukocytes

### Objective

The objective is to supply the student with sufficient understanding of normal and abnormal leukocytes pertaining to the syllabus.

### Specific Outcome

- Demonstrate sufficient knowledge outlining normal leukocyte life span, including the granulocyte maturation sequence from blast to mature granulocyte, both theory and illustration.
- Demonstrate basic knowledge of morphological variations and their significance.
- Demonstrate sufficient knowledge to identify morphological features, written and illustrated of the following:
  - Neutrophils
  - Eosinophils
  - Basophils
  - Lymphocytes
  - Monocytes
- Display an understanding of the significance of raised and reduced numbers (absolute and percentage).
- Demonstrate basic knowledge of morphological variations and their significance of each.
- Outline the basic function of each of the following cells:
  - Neutrophils and band cells
  - Eosinophils
  - Basophils
  - Lymphocytes
  - Monocytes
- Demonstrate an understanding of the meaning of: leukocytosis, neutrophilia, eosinophilia, basophilia, lymphocytosis and monocytosis. Including a basic understanding of each of their applications.
- Demonstrate an understanding of the meaning of: leukopaenia, neutropaenia and lymphopaenia. Including a basic knowledge of their application to the interpretation of results.
- Identify the following white cell morphological changes:
  - Toxic granulation
  - Hypersegmentation
  - Smear Cells
  - Atypical/reactive lymphocyte
  - Inclusions such as: döhle body, vacuolation.
- Demonstrate knowledge of haematological features of infection: Both bacterial and viral.
- Differentiate between a leukaemoid reaction and a leukaemia.

## 5.4 Thrombocytes

### **Objective**

The objective is to supply the student with a basic understanding of normal platelet function and maturation sequence and a basic working knowledge of the abnormalities listed below.

### **Specific Outcome**

When the student has completed this section, they will be able to:

- Demonstrate sufficient knowledge outlining the normal platelet maturation and life span, including the platelet maturation sequence, theory and illustrated.
  - Demonstrate basic knowledge of platelet abnormalities including:
    - Able to provide a definition of Thrombocytopenia.
    - Able to provide a definition of Thrombocytosis.
  - Able to identify abnormal platelet morphology (size and shape e.g. MDS)
- Able to explain causes of false low / high platelet count and true cases, including clumping, satellitism, schistocytes, giant platelets.

## 5.5 Haematological Malignancies

### **Objective**

To provide training for the student to recognise and have a sufficient knowledge of laboratory findings for the morphological and working haematologic parameters to identify the malignancies listed below.

### **Specific outcomes**

On completion the student should be able to identify the following malignancies including the morphology and the full blood count related parameters of:

- Acute leukaemia: Differentiation between myeloid and lymphoid.
- Chronic leukaemia: Myeloid and lymphoid.
- Myeloproliferative neoplasm.
- Myelodysplastic Syndrome.

## 5.6 Haemostasis

### **Objective**

The objective is to provide training for the student, to recognise, and exhibit sufficient knowledge of basic coagulation.

### **Specific Outcome**

On completion of this section the student should demonstrate basic knowledge in the theory of normal blood coagulation, including the role of platelets and clotting factors and be able to:

- List the main components in maintaining haemostasis including:
  - Platelets
  - Vascular Integrity /System
  - Coagulation Factors
  - Fibrinolysis/Fibrinolytic system
- Define the term haemostasis.
- Demonstrate knowledge of the principles behind coagulation testing:
  - PT and the relevance of the INR and warfarin therapy.
  - APTT and effect of heparin therapy on prolonged results.
- Demonstrate knowledge of Platelets including:
  - Basic structure/production of platelets
  - Function of platelets
  - Plug formation
- Demonstrate knowledge of the Coagulation system including:
  - Cascade pathways (internal, external and common pathways)
  - Coagulation factors' function
  - Demonstrate knowledge of the effect of liver disease on coagulation.
  - Demonstrate knowledge of Vitamin K dependant factors.

## 5.7 Blood Parasites

### **Objective**

To provide sufficient training for the student to recognise and understand laboratory findings for the blood parasites listed below.

### **Specific Outcome**

When the student has completed this section they need to demonstrate sufficient knowledge of the following:

- Life cycles and appearance in the peripheral blood of the following parasites:
  - Malaria
  - Trypanosomes
  - Filaria

## 5.8 Basic Haematology Values

### **Objective**

The objective is to supply the student with sufficient training to be able to calculate specific haematological parameters, and understand the importance thereof.

### **Specific Outcome**

On completion of this section the student is expected to demonstrate knowledge, be able to calculate and interpret the following haematological parameters (In addition to Section 4 on haematological related mathematics):

#### **Normal haematological parameters:**

- WBC, RBC, Hb, Hct (PCV), MCV, MCH, MCHC, RDW, Platelets, MPV.
- Neutrophil, lymphocyte, monocyte, eosinophil, basophil.
- Calculation and significance of indices and all commonly determined haematological values.

#### **Red cell parameters:**

- MCV, MCH, MCHC

#### **White cell parameters:**

- Correction for the presence of nucleated red blood cells
- Absolute differential white cell count

#### **Reticulocyte count:**

- Reticulocyte count percentage (Uncorrected reticulocyte count percentage)
- Absolute reticulocyte count
- Relative reticulocyte count
- Corrected reticulocyte percentage
- Reticulocyte production index (RPI).

## 6. Haematology Practical

### Objective

The objective of this section is to award the student a thorough knowledge of the principles and methods of the following procedures, including standardisation and calculations.

### 6.1 Slide Preparation

#### Specific outcome

The student must have a practical understanding of the following methods, pertaining to routine morphology, reticulocyte preparations and malaria examination. They need to know how to carry out the practice indicated below and sufficiently understand what they are used for:

- Preparation of wedge.
- Spinner preparation.
- Buffy layer smears.
- Cytospin.

### 6.2 Stain Preparation

#### Specific outcome

The student must have a practical working knowledge of the types of haematological stains and the staining procedures, and at the end of this section they must know stain preparation and principles including the uses of the following stains.

- Romanowsky stains.
- Supravital stains.
- Malaria parasite staining thick and wedge preparation.
- Cytochemical staining including MPO and Esterase.

### 6.3 White Cell Differentiation

#### Specific Outcome

On completion of this section the student must demonstrate sufficient knowledge to:

- Perform a normal white cell differential and assess the red cell, white cell and platelet morphology.
- Demonstrate sufficient knowledge to identify the following conditions:
  - **Infections:** As covered in 5.3 Leukocytes
  - **Anaemias:** As covered in 5.2 Erythrocytes
  - **Leukaemias:** As covered in 5.5 Haematological Malignancies
  - **Leukaemoid Reactions:** As covered in 5.3 Leukocytes.
  - **Blood parasites:** As covered in 5.7 Blood Parasites



## 6.4 Coagulation

### Specific Outcome

At the end of this section the student must have sufficient knowledge to explain the principle, procedure and perform the following coagulation tests. In addition, reference range and anticoagulant therapeutic effects on these tests:

- Manual and automated Prothrombin Time PT and INR
- Manual and automated Activated Partial Thromboplastin Time (APTT)
- D-Dimers and FDPs
- Bleeding Times and PFA100/200.

## 6.5 Miscellaneous Tests

### Specific outcome

On completion of this section the student should demonstrate sufficient knowledge and understanding of preparation, expected ranges and influencing factors on the following tests:

- ESR manual and semi-automated
- Reticulocyte count manual and automated.
- Iron stain on bone marrow and urine.
- Malaria stain (thick and thin preparations) and antigen test.

## 6.6 Immunohaematology

### Specific outcome

On completion of this section the student is required to sufficiently understand and perform the following tests. They must have a basic knowledge of the principles, methodology and expected results.

- ABO and Rh.
- Direct antiglobulin test (DAT) and Indirect antiglobulin test (IAT) (*Coomb's test*)

## 6.7 Bone Marrows

### Specific Outcome

On completion of this section, the student should have a basic knowledge of the following:

- How to make a bone marrow aspirate wedge preparation.
- Prepare aspirates for cytogenetic and molecular studies.
- Other slide preparations required from bone marrow aspirates, such as: crush and imprints.
- Safety precautions required for all procedures in the bone marrow room.

## 6.8 Flow Cytometry/ CD4 Counts

### Specific Outcome

On completion of this section the student will have sufficient knowledge to:

- Perform daily instrument maintenance.
- Prepare CD4 counts for flow cytometric analysis (automated and manual).
- Plot daily controls.
- Enter results on the LIS.

## 6.9 Laboratory Equipment

### Specific Outcome

On completion of this section the student must have working knowledge of the following pieces of laboratory equipment (*In addition, to section 3.3 Equipment.*)

Student must be able to use and understand the principle of the following equipment:

- PH meter
- Centrifuge
- Chemical balance
- Microscope: Components, Köhler illumination and maintenance
- Water bath
- Automated pipette
- Heating blocks

## 6.10 Molecular Biology

### Objective

Provide the student with an introductory knowledge of basic molecular biology.

### Specific Outcome

At the end of the training the student will be able to:

- Describe workflow dynamics in a molecular biology laboratory.
- Demonstrate a fundamental knowledge of the function of DNA and mRNA in terms of structure, replication, transcription and translation.
- Discuss the principle of the polymerase chain reaction (PCR) and the steps involved.  
**RANGE:** *Denaturation; Annealing; Extension*
- Demonstrate knowledge of the quality controls used in the assay procedure.
- Identify the potential causes of false positive and negative results.  
**RANGE:** *Extraction, pour gels prepare buffers, prepare master mix.*

## 7. Reference Material

Bain, B. J. *et al.* (2017) ***Dacie and Lewis practical haematology***. Elsevier.

Hoffbrand, A. V. and Steensma, D. P. (2019) ***Hoffbrand's Essential Haematology***. 8th ed. Hoboken, NJ: Wiley-Blackwell.

## 8. Nomenclature / Acronyms

**AIHA** – Autoimmune Haemolytic Anaemia

**APTT** – Activated Partial Thromboplastin Time

**CEUs** – Continual Education Units

**CSF** – Cerebrospinal fluid

**CV** – Coefficient Variant

**DIC** – Disseminated Intravascular Coagulation

**DNA** – Deoxy Ribonucleic Acid

**GLP** – Good Laboratory Practice

**Hb/HGB** - Haemoglobin

**HCT** – Haematocrit

**HDN** – Haemolytic Disease of the Newborn

**HPCSA** – Health Professions Council of South Africa

**INR** – International Standard Ratio

**ISO** – International Standard Organisation/International Organisation Standard

**LIS** – Laboratory Information System

**MCH** – Mean Cell Haemoglobin

**MCHC** – Mean Cell Haemoglobin Concentration

**MCV** – Mean Cell Volume

**MDS** – Myelodysplastic Syndrome

**MPO** – Myeloperoxidase

**MPV** – Mean Platelet Volume

**PCR** – Polymerase Chain Reaction.

**PCV** – Packed Cell Volume

**PR** – Prothrombin Ratio

**PI** – Prothrombin Index

**PT** – Prothrombin Time

**RBC** – Red Blood Cell

**RCC** – Red Cell Count

**RDW** – Red Cell Distribution Width

**RMI** – Reticulocyte Maturation Index

**RPI** – Reticulocyte Production Index

**SD** – Standard Deviation

**SOP** – Standard Operating Procedure

**WBC** – White Blood Count

**WCC** – White Cell Count

### ***Appendices***