Course Title: Pathology Techniques-I and Clinical Practice

Study Hours:		**60+160**	**Marks**	
Paper	**:**	**1**	**Theory:**	**120**
Term	**:**	**3rd**	**Practical:**	**30**
			Time:	**3Hrs**

Course contents

STUDY HOURS
(THEORY+PRACTICAL)
60+160

A<u>HAEMATOLOGY AND BLOOD BANKING</u>

A1. Introduction:
- **A1.1** Introduction to Hematology, definition, scope.
- A1.2 Relationship with other subjects of medicine.

A2. Phlebotomy.

A3. Microscope:
- A3.1 Principle.
- A3.2 Types.
- A3.3 Care of microscope.

A4. Anti coagulants:
- A4.1 Different Types of anti coagulants and its uses.

A5. Blood cells and stages of development:
- A5.1 Erythrocytic series
- A5.2 Leukocytic series
- A5.3 Thromobocytic series

A6. Haemoglobin f estimation:
- A6.1 Different methods for haemoglobin estimation.
- A6.2 Normal values of Hb.
- A6.3 Sources of error.

A7. RBC (Erythrocytes):
- A7.1 Morphology.
- A7.2 RBC count and preparation of diluting fluid.
- A7.3 Reticulocytes: staining, count and normal values.
- A7.4 Sources of error.

A8. ROMANOWSKI STAIN:
- A8.1 Types.
- A8.2 Preparation and uses.
- A8.3 Preparation and staining of blood films.
- A8.3 Blood smear preparation, fixation and staining.

A9. Haematocrit(PCV):
- A9.1 Definition.
- A9.2 Methods of measurement
- A9.3 Normal
- A9.4 Absolute values:MCV,MCH, MCHC.
- A9.5 Method of determination.
- A9.6 Normal values.
- A9.7 Sources of error.

A10. Erythrocyte sedimentation rate(ESR):
- A10.1 Methods of sedimentation.
- A10.2 'Normal values.
- A10.4 Interpretration.
- A10.5 Sources of error

A11. Leukocytes:
- A11.1 Types.
- A11.2 Maturation process of granulocyutic, lymphocytic and monocytic series.
- A11.3 Normal counts of each series.
- A11.4 Differential leukocyte count.
- A11.6 Slide making and staining process.
- A11.7 Total leukocyte count.
- A11.8 Diluting fluid.
- A11.9 Sources of error.
- A11.10Neubauer chamber and its uses.

A12.1 PLATELETS:
1) A12.1.1 Morphology.
2) A12.1.2 Normal values
3) A12.1.3 Counting methods:Neubar chamber and coulter counter.
4) A12.1.4 Platelet diluting fluid.
5) A12.1.5 Sources of error.

A12.2 ANAEMIAS:
- A12.2.1 Introduction
- A12.2.2 Classification of anemias.
- A12.2.3 Investigation for the diagnosis of anemia's:
- A12.2.4 Peripheral blood smear: slide preparation, staining and morphology of RBC.

A12.2.5Sickling test.
A12.2.6RBC fragility test.
A12.2..7G6PD test.
A12.2.8 Coombs test.
A12.2.9Acid elution test.
A12.2.10Haemoglobin Electrophoresis.

A13. LEUKEMIAS:
- A13.1 Definition.
- A13.2 Classification of leukemia.
- A13.3 Acute and chronic leukemias.
- A13.4 Staining of bone marrow smears.
- A13.5 Procedure of staining.
- A13.6 Investigations for diagnosing leukaemias

A14. BLOOD COAGULATION:
- A14.1 Intrinsic/Extrinsic pathways.
- A14.2 Bleeding time estimation method:i.Dukeii.Ivy's method.
- A14.3 Normal values of bleeding time.
- A14.4 Sources of error.
- A14.5 Clotting time estimation.
- A14.6 Normal values
- A14.7 PT and APTT: procedure, normal values

A15. INTRODUCTION TO BONE MARROW:
- A15.1 Indications.Sites for bone marrow aspiration.
- A15.2 Procedure.
- A15.3 Trephine biopsy: indications and site for biopsy.

A16. AUTOMATION IN HAEMATOLOGICAL TECHNIQUES:
- A16.1 Haematology analyzers.

A17. BLOOD BANKING AND TRANSFUSION MEDICINE
- A17.1 Introduction
- A17.2 History of blood transfusion.
- A17.3 Importance of blood transfusion.
- A17.4 Temperature maintenance for blood banking.
- A17.5 Record keeping.
- A17.6 Donor selection.
- A17.7 Venepuncture and blood collection.
- A17.8 Labeling and storage.
- A17.9 Blood grouping and cross matching: procedures.
- A17.10Equipments, sera and reagents used in blood bank.
- A17.11 Blood components transfusion.
- A17.12 Space and staffing

A18. ANTIGENS AND ANTIBODIES:

- A18.1 Blood group antigens.
- A19.2 BLOOD GROUP SYSTEMS:
- A19.3 1ABO system.
- A19.4 2Rhesus system.
- A19.5 Sub groups of A.

A20. BLOOD TRANSFUSION REACTIONS:

- A20.1 Types
- A20.2 Investigation for transfusion reactions.
- A20.3 Ant globulin (Coomb's)tests: Direct and indirect Coombs test.
- A20.4 Rhantibodytitre.
- A20.5 Sources of error.

LABORATORY PRACTICAL WORK/EXERCISES:

(a) Each lecture will be followed by two hours practical class where the students will apply their theoretical knowledge in the understanding of related Haematological investigations, which have been proved useful for the diagnosis of human diseases.

(b) During the other laboratory sessions the students will be engaged in the preparation of Hb solution, RBC/WBC/Platelet/Eosinophil diluting fluids, use of microscope, procedures of Haematology investigations, calculations involved in these investigations. Use of Haematology analyzers, performing Hb, TLC, DLC, PCV, Retic count, MP smear, G6PD Absolute values, BT, CT, PT, APTT, Platelet count and special stains.

(c) Blood banking: Learning/practicing of phlebotomy, performing blood groups, cross match, screening of blood for infections diseases. Blood component separation.

RECOMMENDED BOOKS:

1. Manual of Laboratory Medicines AFIP by AFI of Pathology Rawalpindi.
2. District Laboratory Practice in Tropical Countries Vol. I by Monica.
3. District Laboratory Practice in Tropical Countries Vol.II by Monica.
4. A Handbook of Medical Laboratory Technology by VH Talib
5. Medical Micro Biology and Immunology by A Lange Medical Board

REFERENCE BOOKS:

1. Practical Hematology by Dacie
2. Clinical Chemistry : Principles Methods and Interpretation by Dr. Abdus Salam Gandapur

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Course contents

STUDY HOURS
(THEORY+PRACTICAL)

A.CHMICAL PATHOLOGY **60+120**

A1 INTRODUCTION TO CHEMICAL PATHOLOGY.
A2 MEASUREMENTS:
A2.1 Length.
A2.2 Weight.Volume.
A2.3 Concentration: morality, molality, normality.

A3. PRINCIPLES OF INSTRUMENTATION:
A3.1 Colorimetry.
A3.2 Spectropotometry.
A3.3 Flame photometry.
A3.4]PH meter.
A3.5 Automation in chemical pathology.

A4 USES OF EQUIPMENTS:
A4.1 Water bath.
A4.2 Centrifuge.
A4.3 Incubator.
A4.4 Deionizer.
A4.5 Pipettes.

A5 PREPARATION OF REAGENTS:
A5.1 Standard solution.
A5.2 Normal solution. Molar solution
A5.3 % solution.
A6 COLLECTION OF SAMPLES.
A7 STORAGE OF SAMPLES.
A8 PROCEDURES FOR ASSAYS:
A8.1 Blood glucose, glucose tolerance test, Urea, creatinine, uric acid, LFT s, lipid Profile.
A8.2 Equipment used for each type of assay.
A8.3 Apparatus and glassware used for each assay.
A8.4 Reagents or kits required for each assay.
A8.5 Description about each assay.
A9 URINALYSIS:
A9.1 Introduction
A9.2 Urine collection method for routine examination, culture and sensitivity

test.

A9.3 Urine collection for 24 hour proteins and creatinine estimation.
A9.4 Physical examination.
A9.5 Reaction of urine: normal range.
A9.6 Specific gravity of urine.
A9.7 Chemical examination:
A9.8 Urinary proteins.
A9.9 Testing urine for albumin.
A9.1 0Qualitative and quantitative tests for albumin.
A9.11 Urinary reducing substances:
A9.12 Test for glucose in urine.
A9.13 Clinical significance of glycosuria.
A9.14 Test for detune bodies.
A9.15 Examination of urinary sediment.
A9.16 Fresh and well concentrated specimens.
A9.17 Examination of urinary sediments.

A10 RENAL FUNCTION TESTS:

A10.1 Blood urea, serum creatinine, serum electrolytes and creatinine clearance tests.
A10.2 Normal values and interpretation.

A11 DIAGNOSTICS METHODS IN DIABETES MELITIS:
A11.1 Oral Glucose Tolerance Tests.
A11.2 Glucose estimation.

B12 EXAMINATION OF BODY6 FLUIDS.
A12.1 1CSF Examination:
A12.2 2Physical examination.
A12.3 3Chemical examination
A12.4 4Cytology. Count, giemsastain, ZiehlNeelsen stain, gram stain.
A12.5 5Ascetic fluid examination.
A12.6 6Pleural fluid examination.
A12.7 7Exudates and trnsudate.
A12.8 8Seminal fluid examination.

A13 QUALITY CONTROL IN CHEMISTRY.

B .PRACTICAL **60**

1 Receptions
- Bio safety
- Record keeping
- Proper sampling, Labeling
- Proper disposition
- Care of instrument
- Care of chemicals
- Introduction to lab: equipment
- Disinfections of equipment
- Machine's operations

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