

3.1 INTRODUCTION TO COMPUTERS

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RATIONALE

Computers have made great inroads into engineering design, personnel administration, project planning and monitoring, banking, transportation, automatic machine operation and many other areas of human endeavour. During the past decade, the use of computers has been growing at fast rate. The time has now come when engineering technician has to familiarise themselves with computers to enable them to cope with the inevitable computerisation of a significant portion of their job. Hence this subject. This is a practical course. Theory if any may be dealt in the practical session only.

DETAILED CONTENTS

1. Introduction to Computer:
 - 1.1 Block diagram of a computer and overview of its working
 - 1.2 Basic concepts in stored programme execution
 - 1.3 Input, output and secondary storage devices
 - 1.4 Concept of RAM (Random Access Memory), ROM (Read Only Memory)
 - 1.5 Introduction to operating system, Compilers, Assembler, Loader, Linker, Programming Language.
 - 1.6 Types of computers - Micro (PC, PC-XT, PC-AT), Mini, Main Frame and Super Computers - their capabilities
2. Familiarization with Computer and MS-DOS
 - 2.1 Identification of subsystems and terminology
 - 2.2 Interconnecting various external units including computer
 - 2.3 Introduction to files
 - 2.4 Booting the system from floppy and hard disk
 - 2.5 Selection of drive
 - 2.6 Organizing information on a disk
 - 2.7 Formatting floppies, disks
 - 2.8 Creating and working with directories

2.9 File operations such as copying, renaming and deleting

2.10 Printing files

3. Word processing: *MS word*

3.1 Opening a document

3.2 Preparing a document

3.3 Editing document

3.4 Character, word and line editing

3.5 Margin setting, paragraph alignment

3.6 Block operations

3.7 Spell checker

3.8 Saving document

3.9 Applying Print control

3.10 Printing a document on a dot-matrix printer or which is available

4. SPREAD SHEET — *MS-Excel*

4.1 Application of spread sheet

4.2 Structure of a spread sheet

4.3 Preparing spread sheet for simple data and numeric operations

4.4 Using formulae in spread sheet operations

4.6 Making tables, sorting

4.7 Creating of graphs, pie charts, bar charts

4.8 Printing

5. COMPUTATION AND GRAPHIC TOOLS —

5.1 Use of computation tools for

5.1.1 Evaluation of function

5.1.2 Tabulation of function

5.1.3 Integration of functions

5.1.4 Matrix calculation

5.1.5 Statistical calculation

6. Concept of Medical equipment interface with computers

Methodology and modalities of data transfer from medical equipment to computers.

Reporting using various equipment

Simple application development on X-base (Dbase/Foxpro etc)

3.2 CLINICAL MICROBIOLOGY-III (Parasitology and Virology)

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OBJECTIVE

This section deals with various viruses and parasites

DETAILED CONTENTS

1. Antimicrobial susceptibility testing of bacteria principles and methods
2. Morphology, life cycle and lab-diagnostic techniques of Giardia and Entamoeba histolytica
3. Morphology, Life cycle and lab-diagnostic techniques of Roundworms and Hookworms
4. Morphology, life cycle and lab-diagnostic techniques of T. solium and T. saginata
5. Morphology, life cycle and lab-diagnostic techniques of Malarial parasite with special reference to P. vivax and P. falciparum
6. Hydatid cyst and cysti-cercosis
7. Concentration techniques of stool for demonstration of Ova (principles and applications)
8. Introduction to medical virology
9. Some of medically important viruses (Rabies, Polio, HIV, Influenza, Hepatitis, Dengue)
10. Collection, transportation and storage of samples for viral diagnosis
11. Processing of samples for viral diagnosis (Egg inoculation and tissue cell culture)

LIST OF PRACTICALS

1. Testing antimicrobial susceptibility of bacteria by Stoke's / Kirby bauer disc diffusion
2. Routine stool examination for detection of intestinal parasites with concentration methods (Detection of Entamoebae, histolytica, giardia and other trophozoites, cysts and eggs):
 - Saline preparation
 - Iodine preparation

LIST OF PRACTICALS

1. Testing antimicrobial susceptibility of bacteria by Stoke's Kirby bauer disc diffusion
2. Routine stool examination for detection of intestinal parasites with concentration methods (Detection of Entamoebae, hytolytica, giardia and other trophozoites, cysts and eggs):
 - Saline preparation
 - Iodine preparation
 - Floatation method - ZnSO₄
 - Centrifugation method - formal ether
3. Identification of adult worms from preserved specimen/slides
 - Tapeworm
 - Tapeworm segments
 - Ascaris
 - Hookworms
 - Pinworms
4. Malarial parasite:
 - Preparation of thin and thick smears
 - Staining of smears by JSB, and Giemsa stains
 - Preparation of stains
 - Examination of smears for malarial parasites (P.viva and P.falciparum)
 - Demonstration of various stages of life cycle of malarial parasites from stained slides

3.3 CLINICAL HEMATOLOGY-III

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OBJECTIVE

The training in this subject is imparted to enable the students to carry out routine clinical laboratory investigation (blood, urine etc). He/she should be able to provide technical help for selected sophisticated hematological techniques with adequate knowledge of various principles. The training in laboratory safety is also provided

DETAILED CONTENTS

1. Erythrocyte sedimentation rate(ESR) and packed cell volume
 - 1.1 Introduction
 - 1.2 Various methods of estimation
 - 1.3 Factors on which ESR and PCV depends
 - 1.4 Interpretation
2. Hemolytic anemia
 - 2.1 Types and principles
 - 2.2 Its diagnostic methods
 - 2.3 Sickie cell anaemia
3. Reticulocyte counting
 - 3.1 Introduction
 - 3.2 Principle and setting up the test
 - 3.3 Normal values and interpretation
4. Red Cell Fragility Test
 - 4.1 Principle and setting up the test
 - 4.2 Clinical importance
5. Anaemias
 - 5.1 Definition and types of anaemia; Theories and factors of anaemia
 - 5.2 Plasma haemoglobin and foetal hemoglobin estimation

LIST OF PRACTICALS

1. ESR estimations (wintrobe and westergren)
2. PCV (Wintrobe and capillary)
3. Reticulocyte counting
4. Red cell fragility test
6. Sickling Test
7. Foetal haemoglobin test

3.4 CLINICAL BIOCHEMISTRY-III

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OBJECTIVE

The students are imparted basic training of theoretical and practical aspects in the field of clinical biochemistry. The students are made to learn the technique of collection of clinical samples and their processing alongwith recording of data. The student will also obtain the basic knowledge of chemistry and metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained. The students are also given basic training in safety measures while handling bio specimens

DETAILED CONTENTS

1. Blood Chemistry

Composition, process of sterilising blood collecting equipment, methods of collection and preservation of blood, use of various anticoagulants, selection of anticoagulants, separation of serum/plasma, protein - free filtrate

2. Blood Sugar and GTT

2.1 Carbohydrates, function and metabolism in body

2.2 Sugars in blood, clinical significance

2.3 Principle and method of estimation

2.4 Normal and abnormal values

2.5 True and apparent sugar

2.6 Renal threshold

2.7 G.T.T - Importance, principle and techniques of GTT

3. Non protein - Nitrogen

Difference between PN and NPN. Total NPN, Formation of different NPN. Normal levels, clinical significance. Estimation of different NPN like urea, uric acid and creatinine in blood

4. Kidney Function Tests

Function of kidney in respect of NPN, clinical importance of clearance tests. Determination, dilution and concentration methods of specific gravity test

5. Plasma and Serum Proteins

Definition, protein in biological system, function and metabolism of proteins, separation of different proteins in plasma. Normal and abnormal levels, clinical significance. Estimation of A, G, ratio. Isoelectric point of protein.

6. Prothrombin Time

Coagulation of blood significance of PT determination, principle of estimation

7. Liver Function Tests

Liver and its function, different LFTS - bilirubin, A: G, *SGOT, *SGPT, *ALP, PT etc.

Estimation of conjugated and unconjugated bilirubin in relation to differential diagnosis of jaundice

LIST OF PRACTICALS

1. Preparation of blood collecting vial using different anticoagulants
2. Preparation of serum and plasma, preparation of PFF
3. Preparation of all reagents required for following quantitative estimation
4. Blood Sugar estimation
5. Estimation of urea in serum
6. Estimation of uric acid in serum
7. Estimation of creatinine in serum
8. Estimation of serum A, G ratio
9. Estimation of serum bilirubin (free and conjugated)
10. Urine analysis for interpretation
11. Prothrombin time determination (demonstration only)

* Enzymology is a part of biochemistry IV. In this subject of this semester, these enzymes are mentioned in relation to function of liver. Hence only brief knowledge is given

3.5 HISTOPATHOLOGY-II

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OBJECTIVE

The training of this subject imparted in organising and handling of microtomic, microtome knives, autotechnicon, its care and maintenance. He/she is also given proper practical training for cutting very thin section and made him/her perfect in routine staining i.e. H and E.

DETAILED CONTENTS

1. Tissue Processing and Decalcification Techniques
 - 1.1 Microtomes - types of microtomes
 - 1.2 Advantages and disadvantages
 - 1.3 Care and maintenance
2. Microtome Knives
 - 2.1 Honing techniques
 - 2.2 Stropping techniques
 - 2.3 Maintenance
 - 2.4 Automatic knife sharpner
 - 2.5 Care and maintenance
3. Histokinetes (Manual processing) and its working principles
 - 3.1 Changing of reagents
 - 3.2 Maintenance
4. Autotechnicon
 - 4.1 Uses, advantages and disadvantages
 - 4.2 Maintenance
 - 4.3 Set up
5. Block Making
 - 5.1 Manual (Attachment and block to block holder)
 - 5.2 Automatic

6. Section Cutting
 - 6.1 Albuminization of slides
 - 6.2 Trimming
 - 6.3 Cutting of paraffin sections
 - 6.4 Errors and remedies
7. Technique of attaching sections to slide from tissue floatation water bath
 - 7.1 Stretching during floatation
 - 7.2 Removal of folds in sections
8. Staining (Routine)
 - 8.1 Haematoxyline and Eosin
 - 8.2 Principles and histological background
 - 8.3 Blueing of section
 - 8.4 Differentiation
 - 8.5 Errors and remedies and its interpretations
 - 8.6 Quality control
9. Special stain - introduction and their uses

LIST OF PRACTICALS

1. Decalcification (techniques of grossing and bone specimens)
2. Microtome, its care and maintenance
3. Microtome Knives (Different types) Honing and stropping. Care and maintenance
4. Embedding, trimming and cutting of section
5. Preparation of stains, its principle
6. Staining H and E

3.6 E.C.G

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OBJECTIVE

A diploma holder of medical laboratory technology is supposed to have some knowledge and skill in performing ECG and its maintenance alongwith its importance.

DETAILED CONTENTS

1. Introduction and basic principle along with types of leads
2. Normal electrocardiogram
3. Value of Electrocardiogram in health and disease
4. Method of Analysis of the electrocardiogram
5. Care and maintenance of E.C.G. Machine