

3.1 BASICS OF INFORMATION TECHNOLOGY

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RATIONALE

Information technology has great influence on all aspects of life. Almost all work places and living environment are being computerized. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS office; using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

Note:

1. *Teaching of theory should be dovetailed with practical work*
2. *The following topics may be taught in the laboratory along with the practical exercises.*

DETAILED CONTENTS

Relevant Instructions For Practicals

1. Information Technology – its concept and scope
2. Computers for information storage, information seeking, information processing and information transmission
3. Elements of computer system, computer hardware and software; data – numeric data, alpha numeric data; contents of a program, processing
4. Computer organization, block diagram of a computer, CPU, memory
5. Input devices; keyboard, mouse etc; output devices; VDU and Printer, Scanner, Plotter
6. Electrical requirements, inter-connections between units, connectors and cables
7. Secondary storage; magnetic disks – tracks and sectors, optical disk (CD and DVD Memory), primary and secondary memory: RAM, ROM, PROM etc., Capacity; device controllers, serial port, parallel port, system bus

8. Exercises on file opening and closing; memory management; device management and input – output (I/O) management with respect of windows
9. Installation concept and precautions to be observed while installing the system and software
10. Introduction about Operating Systems such as MS-DOS and Windows
11. Special features, various commands of MS word and MS-Excel
12. About the internet – server types, connectivity (TCP/IP, shell); applications of internet like: e-mail and browsing
13. Various Browsers like WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol)
14. Basics of Networking – LAN,WAN, Topologies

LIST OF PRACTICALS

1. Given a PC, name its various components and list their functions
2. Identification of various parts of a computer and peripherals
3. Practice in installing a computer system by giving connection and loading the system software and application software
4. Installation of DOS and simple exercises on TYPE, REN, DEL, CD, MD, COPY, TREE, BACKUP commands
5. Exercises on entering text and data (Typing Practice)
6. Installation of Windows 98 or 2000 etc.

Features of Windows as an operating system

- Start
- Shutdown and restore
- Creating and operating on the icons
- Opening closing and sizing the windows
- Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file
- Creating and operating on a folder
- Changing setting like, date, time color (back ground and fore ground)
- Using short cuts
- Using on line help

7. MS-WORD

- File Management:
Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, Giving password protection for a file
- Page Set up:
Setting margins, tab setting, ruler, indenting
- Editing a document:
Entering text, Cut, copy, paste using tool- bars
- Formatting a document:
Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
- Aligning of text in a document, justification of document ,Inserting bullets and numbering
- Formatting paragraph, inserting page breaks and column breaks
- Use of headers, footers: Inserting footnote, end note, use of comments
- Inserting date, time, special symbols, importing graphic images, drawing tools
- Tables and Borders:
Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- Print preview, zoom, page set up, printing options
- Using Find, Replace options
- Using Tools like: Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelops and lables
- Using shapes and drawing toolbar,
- Working with more than one window in MS Word,
- How to change the version of the document from one window OS to another
- Conversion between different text editors, software and MS word

8. MS-EXCEL

- Starting excel, open worksheet, enter, edit, data, formulas to calculate values, format data, create chart, printing chart, save worksheet, switching from another spread sheet
- Menu commands:
create, format charts, organise, manage data, solving problem by analyzing data, exchange with other applications. Programming with MS-Excel, getting information while working
- Work books:
Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations, working with arrays
- Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet
- Creating a chart:
Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
- Using a list to organize data, sorting and filtering data in list
- Retrieve data with MS – query: Create a pivot table, customising a pivot table. Statistical analysis of data
- Customise MS-Excel:
How to change view of worksheet, outlining a worksheet, customise workspace, using templates to create default workbooks, protecting work book
- Exchange data with other application: linking and embedding, embedding objects, linking to other applications, import, export document.

9. Internet and its Applications

- a) Log-in to internet
- b) Navigation for information seeking on internet
- c) Browsing and down loading of information from internet
- d) Sending and receiving e-mail
 - Creating a message
 - Creating an address book

- Attaching a file with e-mail message
- Receiving a message
- Deleting a message

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Computers Today by SK Basandara, Galgotia publication Pvt ltd. Daryaganj, New Delhi
3. MS-Office 2000 for Everyone by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., New Delhi
4. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. A First Course in Computer 2003 Edition with CD by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. Mastering Windows 95, BPB Publication, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

3.2 CLINICAL MICROBIOLOGY- III

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RATIONALE

The students undergoing training of medical laboratory technology learn the techniques of collection of samples, their processing and identification of various pathogens like parasites and viruses by using different techniques. In addition to the above, students are given training in the use of safety measures while handling infected materials. The training is aimed to make the students competent to identify the causative parasites and viruses for microbial infections.

DETAILED CONTENTS

Theory

1. Introduction to medical parasitology (2 hrs)
2. General characteristics of protozoa and helminths (2 hrs)
3. Collection, transport, processing and preservation of clinical samples for routine parasitological investigations (3 hrs)
4. Principle and application of concentration techniques of stool for demonstration of ova and cysts (4 hrs)
5. Morphology, life cycle and lab diagnosis of Giardia and Entamoeba histolytica (4 hrs)
6. Morphology, life cycle and lab diagnosis of Round worm and Hookworm (5 hrs)
7. Morphology, lifecycle and lab diagnosis of Taenia solium and alnia saginata (4 hrs)
8. Morphology, life cycle and lab diagnosis of malarial parasite with special reference to P. vivax and P. falciparum (6 hrs)
9. Morphology and diseases caused by Microfilaria (2 hrs)
10. Introduction of medical virology, characteristics and classification of viruses (4 hrs)
11. Medically important viruses – (Rabies, Polio, HIV, Influenza) (5 hrs)
12. Collection, transport and storage of samples for viral studies (3 hrs)
13. Morphology and detection of Trichomonas vaaginilis (4 hrs)

LIST OF PRACTICALS

1. Collection and routine stool examination for detection of intestinal parasites
 - Saline preparation
 - Iodine preparation
 - Concentration methods
 - a) Flootation method (saturated salt solution/zinc sulphate)
 - b) Centrifugation method (formal ether)

2. Identification of following adult worms from preserved specimen/slides
 - Tapeworm
 - Roundworm
 - Hookworm
 - Pinworm
 - Trichomonas vaginalis

3. Preparation and identification of blood parasite
 - Preparation of stains (Leishman, Giemsa and JSB)
 - Preparation of thin and thick smears
 - Staining of smears by Leishman, Giemsa and JSB stains
 - Examination of smears for malarial parasite (*P. vivax* and *P. falciparum*)
 - Demonstration of various stages of malarial parasite from stained slides
 - Demonstration of various stages of microfilaria

RECOMMENDED BOOKS

1. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. An introduction to Medical Laboratory Technology by FJ Baker; Butterworth Heinemann Oxford
3. Parasitology by KD Chatterjee; Chatterjee Medical Publishers, Kolkatta
4. Textbook of Microbiology by Ananthanarayan and Panikar; Orient Longman, Hyderabad
5. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
6. Text Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
7. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesbrough; Cambridge University Press; UK
8. Text Book of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House; Mumbai
9. Medical Laboratory Science Theory and Practice by J Ochei and A Kolhatkar

3.3 CLINICAL HAEMATOLOGY - III

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RATIONALE

This subject aims 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

Theory

1. Erythrocyte sedimentation rate (ESR) and packed cell volume (PCV) (7 hrs)
 - 1.1 Introduction
 - 1.2 Various methods of estimation, ESR and their merits and demerits
 - 1.3 Factors involved in ESR and PCV
 - 1.4 Interpretation of results
 - 1.5 PCV – Macro and micro methods
2. Anaemias (12 hrs)
 - 2.1 Definition and classification of anaemia
 - 2.2 Reference range, absolute values, calculation and interpretation
3. Supravital stain and reticulocyte counting (3 hrs)
 - 3.1 Introduction
 - 3.2 Principle and procedure of counting
 - 3.3 Normal values and interpretation
4. Haemolytic anemias (20 hrs)
 - 4.1 Classification
 - 4.2 Laboratory diagnosis of haemolytic anaemia
5. Red cell fragility test (6 hrs)
 - 5.1 Principle and procedure
 - 5.2 Clinical importance

LIST OF PRACTICALS

1. ESR estimations (wintrobe and westergren) in blood
2. Determination of PCV (wintrobe and capillary) in blood
3. Counting of Reticulocyte in blood

4. To perform red cell fragility test on blood
5. To perform Sickling test on blood
6. Estimation of foetal haemoglobin by alkali denaturation test
7. Acid elution test on blood sample
8. To perform serum iron and iron binding capacity
9. Estimation of plasma haemoglobin and G₆PD (MRT)

INSTRUCTIONAL STRATEGY

As far as possible, teachers should take up theory and practical classes simultaneously, for better understanding by the students. The teachers are expected to arrange various clinical samples and positive slides for providing maximum exposure to the students. Models and charts should also be used for explaining the topics and instruments/equipment

RECOMMENDED BOOKS

1. Medical Laboratory Technology Vol. 1 by KL Mukherjee; Tata McGraw Hill Publishing Company, New Delhi
2. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworths Heinemann, Oxford
3. Medical Laboratory Manual for Tropical Countries by Monica Cheesbrough; Cambridge University Press; UK
4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Practical Haematology by J.V Decie; ELBS with Churchill Living Stone, UK
6. Medical Laboratory Science Theory and Practical by J. Ochei and Kolhatkar Tata McGraw Hill Publishing Company Ltd., New Delhi 2000 Ed

3.4 CLINICAL BIOCHEMISTRY- III

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3 - 6

RATIONALE

The students are imparted basic training of theoretical and practical aspects in the field of clinical biochemistry. The students are made to learn the techniques of collection of clinical samples and their processing along with 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, quality control and automation

DETAILED CONTENTS

Theory

1. Serum Bilirubin (7 hrs)
 - 1.1 Formation and excretion of bilirubin
 - 1.2 Formation of bile pigments
 - 1.3 Conjugated and unconjugated bilirubin
 - 1.4 Principle and procedure of serum bilirubin estimation
 - 1.5 Reference values
 - 1.6 Clinical importance

2. Inorganic phosphate (5 hrs)
 - 2.1 Principle and procedure of estimation
 - 2.2 Reference values
 - 2.3 Clinical importance

3. SGOT and SGPT (AST and ALT) (6 hrs)
 - 3.1 Principle and procedure of estimation
 - 3.2 Reference values
 - 3.3 Clinical importance

4. ALP and ACP (Alkaline and Acid Phosphatase) (5 hrs)
 - 4.1 Principle and procedure of estimation
 - 4.2 Reference values
 - 4.3 Clinical importance

5. Serum Amylase (3 hrs)
 - 5.1 Principle and procedure of estimation
 - 5.2 Reference values
 - 5.3 Clinical importance
6. Creatinine (serum and urine) (6 hrs)
 - 6.1 Principle and procedure of estimation
 - 6.2 Reference values
 - 6.3 Clinical importance
 - 6.4 True creatinine and its estimation
7. Blood Urea (3 hrs)
 - 7.1 Formation and excretion of urea
 - 7.2 Principle and procedures of different methods of urea estimation
 - 7.3 Reference levels
 - 7.4 Clinical importance
8. Other Renal Function Tests (8 hrs)
 - 8.1 Functions of kidney
 - 8.2 Creatinine clearance test, urea clearance test
 - 8.3 Clinical importance
9. Uric Acid (5 hrs)
 - 9.1 Principle and procedure of estimation
 - 9.2 Reference values
 - 9.3 Clinical importance

LIST OF PRACTICALS

1. Serum bilirubin estimation
2. Serum uric acid estimation
3. Creatinine estimation in serum and urine
4. SGOT/AST estimation
5. SGPT/ALT estimation

6. ALP estimation
7. ACP estimation
8. Serum amylase estimation
9. Serum inorganic phosphate estimation
10. Serum calcium estimation

RECOMMENDED BOOKS

1. A Procedure Manual for Routine Diagnostic Tests Vol. I, II and III by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. Practical Clinical Biochemistry by Varley; Heinmann Publishers, Oxford
3. A Text Book of Medical Laboratory Technology by P Godkar; Bhalani Publishers, Mumbai
4. Medical Laboratory Science, Theory and Practice by J Ochei and A Kolhatkar
5. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesberg; Cambridge University Press, UK

3.5 HISTOPATHOLOGY – II

L T P
3 - 4

RATIONALE

This subject is aimed at preparing the students to prepare stained tissue section of various types (paraffin, frozen). One should be able to provide special stain. He/she should be able to organize the histopathology laboratory of the above services and provide basic equipment maintenance.

DETAILED CONTENTS

Theory

1. Histochemical Stains (12 hrs)
 - 1.1 Introduction to histochemical and special stains and their uses
 - 1.2 Different types of histochemical and special stains
 - PAS
 - Silver impregnation method for reticuline fibres
 - Ziehl Neelson for AFB (Mycobacteria laprae and tuberculosis)
 - Masson's trichrome stain
 - Perl's reaction – iron
 - Oil red 'O' – fat
 - Von Gieson's – connective tissue
 - Gran's stain – gram negative and gram positive bacteria

2. Decalcification (15 hrs)
 - 2.1 Use of decalcification
 - 2.2 Various types of decalcifying fluid
 - 2.3 Their mechanism, advantage, disadvantage and applications
 - 2.4 Assessment of declacification

3. Handling of fresh histological tissues (Frozen Section) (15 hrs)
 - 3.1 Processing of frozen tissue
 - 3.2 Cryostat/Freezing microtome
 - 3.3 Advantage, disadvantage of cryostat/freezing microtome
 - 3.4 Working, principle, care and preventive maintenance of microtomes
 - 3.5 Section cutting
 - 3.6 Staining (routine and special)
 - 3.7 Mounting

4. Autopsy Techniques (6 hrs)
- 4.1 Preparation for autopsies
 - 4.2 Use and care of instruments
 - 4.3 Collection of various types of samples and their preservation

LIST OF PRACTICALS

1. Demonstration of PAS stain
2. Demonstration of Z-N stain for AFB
3. Demonstration of Masson's Trichrome stain
4. Demonstration of Perl's Reaction
5. Demonstration of von Gieson's stain
6. Demonstration of Gram's stain
7. Preparation of decalcifying fluids
8. Assessment of decalcification by mechanical, chemical and X-ray method
9. Demonstration of freezing microtome/cryostat with emphasis on maintenance
10. Rapid staining method for frozen section in case of urgent biopsies
11. Demonstration of fat by oil Red 'O'

RECOMMENDED BOOKS

1. Cellular Pathology Techniques by CFA Culling, Butterworths Co., London
2. Theory of Practice of Histopathological Techniques by Bancroft and Stevens
3. Histological Techniques by Carleton, Harry, Oxford
4. An Introduction to Medical Laboratory Technology by FJ Baker et. al., Butterworths Co., London
5. Laboratory Methods of Histotechnology by Armed Forces Institute of Pathology, Washington DC