

3.1 CLINICAL MICROBIOLOGY- III (Parasitology and virology)

L T P
3 - 4

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 at making 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, morphology, classification (2 hrs)
 - 2.1 Protozoa
 - 2.2 Helminths
3. Laboratory Samples (2 hrs)

Collection, transportation, processing and preservation of samples for routine investigations – Blood, stool
4. Concentration techniques (6 hrs)
 - Principle and application of concentration techniques of stool for demonstration of ova and cysts
5. Giardia and Entamoeba histolytica (5 hrs)
 - Morphology
 - Life cycle
 - Lab diagnosis
6. Ancylostoma and Ascaris lumbricoides (6 hrs)
 - Morphology
 - Life cycle
 - Lab diagnosis
7. T solium, T saginata (5 hrs)
 - Morphology
 - Life cycle
 - Lab diagnosis

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|-----|---|---------|
| 8. | Malarial Parasite (P. Vivax and P. Falciparum) | (6 hrs) |
| | - Morphology | |
| | - Life cycle | |
| | - Lab diagnosis | |
| 9. | Virology | (4 hrs) |
| | - Introduction | |
| | - General Characteristics, Classification Structure of virus. | |
| 10. | Medically important viruses | (6 hrs) |
| | Pathogenicity, Lab diagnosis and prevention of – | |
| | - Rabies | |
| | - Polio | |
| | - HIV | |
| | - Influenza | |
| 11. | Virological Samples | (4 hrs) |
| | - Collection | |
| | - Transportation | |
| | - Storage | |

LIST OF PRACTICALS

1. Collection and routine stool examination for detection of intestinal parasites
 - Saline preparation
 - Lugol's Iodine preparation
 - Concentration methods
 - a) Floatation method (saturated salt solution/zinc sulphate)
 - b) Centrifugation method (formal ether)
2. Identification of following adult worms from preserved specimen/slides
 - Tapeworm
 - Roundworm
 - Hookworm
 - Giardia
 - Entamoeba . hystolytica, E. Coli
3. Preparation and identification of blood parasites
 - Preparation of stains (Leishman, Giemsa Field)
 - Preparation of thin and thick smears
 - Staining of smears by Leishman, Giemsa Field
 - Examination of smears for malarial parasite (P. vivax and P. falciparum)
 - Demonstration of various stages of malarial parasite from stained slides

INSTRUCTIONAL STRATEGY

The teacher should lay emphasis on common names, morphology of helminth and blood parasites. The students should be shown diagrams/illustration/permanent fixed slides and audio-visual aids. The students should be made aware about medically important viruses, collection and cultivation of viruses.

RECOMMENDED BOOKS

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

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	2	4
2	2	6
3	2	6
4	6	8
5	5	6
6	6	14
7	5	10
8	6	14
9	4	8
10	6	12
11	4	12
Total	48	100

3.2 HAEMATOLOGY - III

L T P
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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) (12 hrs)
 - 1.1 Introduction
 - 1.2 Various methods of estimation of ESR and PCV and their merits and demerits
 - 1.3 Factors involved in ESR
 - 1.4 Interpretation of results

2. Red Cell indices (Mean Corpuscular Values) – MCV, MCH, MCHC (5 hrs)

Theory, reference range, calculation and interpretation

3. Supravital stain and reticulocyte counting (7 hrs)
 - 3.1 Introduction
 - 3.2 Principle and procedure of staining and calculation
 - 3.3 Reference values and interpretation
 - 3.4 Variation in Physiological Values

4. Anemias (16 hrs)
 - 4.1 Definition and classification
 - 4.2 Laboratory diagnosis of:
 - (a) Iron deficiency anaemia
 - (b) Megaloblastic anaemia
 - (c) Haemolytic anaemia
 - (d) Aplastic anaemia

5. Red cell fragility test (8 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. Estimation of plasma haemoglobin and G₆PD (MRT)

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on concepts and principles while covering the subject contents. In the practical work, the students should be given opportunity to do practical work individually but under supervision.

Visits to hospital/medical colleges should be planned to demonstrate the processes. It is important to make use of models and audiovisual aids to show specific processes. Experts should be invited to deliver lectures on specific topics and share their experiences.

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

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	12	30
2	5	8
3	7	15
4	16	35
5	8	12
Total	48	100

3.3 CLINICAL BIOCHEMISTRY- III

L T P
3 - 4

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 (6 hrs)
 - 1.1 Formation and excretion of bilirubin
 - 1.2 Formation of bile pigments
 - 1.3 Conjugated and unconjugated bilirubin
 - 1.4 Principle and procedures of serum bilirubin estimation (Direct & Indirect)
 - 1.5 Reference values
 - 1.6 Clinical importance

2. Urinary Proteins and Creatinine (4 hrs)
 - 2.1 24 hr. urinary proteins and creatinine estimation
 - 2.2 Reference values
 - 2.3 Clinical importance

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

4. ALP and ACP (6 hrs)
 - 4.1 Principle and procedures of estimation
 - 4.2 Reference values
 - 4.3 Clinical importance

5. Serum Amylase (3 hrs)
 - 5.1 Principle and procedures of estimation
 - 5.2 Reference values
 - 5.3 Clinical importance
6. Renal Function Tests (9 hrs)
 - 6.1 Renal clearance test-Principle and procedures
 - 6.2 Clinical importance
7. Serum Calcium and Phosphorus (4 hrs)
 - 7.1 Principle and procedures of estimation
 - 7.2 Reference values
 - 7.3 Clinical importance
8. Lipid Profile (10 hrs)
 - 8.1 Formation of cholesterol
 - 8.2 High density and low density cholesterol
 - 8.3 Principles and procedures of estimation
 - 8.4 Reference value
 - 8.5 Clinical importance
 - 8.6 Triglycerides
 - 8.7 Estimation and importance of various ratios of HDL, LDL and VLDL

LIST OF PRACTICALS

1. Serum bilirubin estimation
2. Phosphorus estimation
3. Calcium estimation
4. Renal clearance tests
5. SGOT estimation
6. SGPT estimation
7. ALP estimation
8. ACP estimation
9. Total cholesterol estimation
10. Triglyceride estimation
11. Estimation of HDL and calculation of VLDL and LDL
12. Urinary protein and creatinine estimation (24 hr)
13. Estimation of serum amylase

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on concepts and principles while covering the subject contents. In the practical work, the students should be given opportunity to do practical work individually but under supervision.

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 H. 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 Ochaie and A Kolhatkar, Tata McGraw Hill

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	6	12
2	4	8
3	6	12
4	6	12
5	3	10
6	9	14
7	4	12
8	10	20
Total	48	100

3.4 HISTOPATHOLOGY AND CYTOLOGY- I

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RATIONALE

This part of the subject is aimed at introducing the students to the various types of tissue preparations and developing expertise in the students to cut very thin tissue sections from tissue blocks and facilitate visualization using various stains and dyes. Cytology part aims at exposing the students to the latest advancements in cytological investigations.

DETAILED CONTENTS

Theory

1. Introduction and definition of: (1 hr)
 - 1.1 Histology
 - 1.2 Histopathology
 - 1.3 Biopsy
 - 1.4 Autopsy
 - 1.5 Autolysis
 - 1.6 Putrefaction

2. Preparation of Tissue (Different Methods of Preparation of Tissue) (2 hrs)
 - 2.1 Unfixed Tissue preparations
 - 2.1.1. Imprint methods – Impression Smears
 - 2.1.2 Teased preparation
 - 2.1.3 Squashed preparation
 - 2.1.4 Frozen section

 - 2.2 Fixed Tissue preparations (introduction only)
 - 2.2.1 Paraffin embedding
 - 2.2.2 Celloidin embedding
 - 2.2.3 Gelatin embedding

3. Reception of Specimen (1 hr)
 - 3.1 Reception, recording, labeling and preservation of histological specimen
4. Fixation (Histological Specimens) (6 hrs)
 - 4.1 Classification of fixatives
 - 4.2 Composition of various fixatives
 - 4.3 Advantages and disadvantages
5. Processing (by Paraffin Technique) (6 hrs)
 - 5.1 Dehydration
 - 5.2 Clearing/Dealcoholization
 - 5.3 Infiltration and impregnation
 - 5.4 Paraffin embedding
 - 5.5 Automation: Histokinete (automatic tissue processor)
 - its types, working, care and maintenance
6. Microtomy (7 hrs)
 - 6.1 Microtome
 - 6.1.1 Types
 - 6.1.2 Advantages and disadvantages
 - 6.1.3 Working principle, care and maintenance
 - 6.2 Microtome Knives
 - 6.2.1 Various types of knives
 - 6.2.2 Sharpening of knives
 - Honing technique
 - Stropping technique
 - Automation: Automatic knife sharpener – uses, care and maintenance
 - Uses of abrasives and lubricants
 - 6.3 Section Cutting
 - 6.3.1 Rough cutting
 - 6.3.2 Fine cutting
 - 6.3.3 Use of tissue floatation bath
 - 6.3.4 Use of various adhesive media and lifting of sections to the slide
 - 6.3.5 Errors /cutting faults in sections and their remedies

7. Theory of staining (Routine) (5 hrs)
- 7.1 Dye Chemistry
- 7.2 Principle and mechanism of routine stain (Haematoxylin and Eosin)
- 7.3 Various steps of staining (Haematoxylin and Eosin)
- Deparaffinization
 - Hydration
 - Nuclear Staining
 - Differentiation
 - Blueing
 - Counterstaining
 - Dehydration
 - Clearing and Mounting
 - Results
- 7.4 Automation: Use of automatic stainer and coverslipper
8. Mountants (2 hrs)
- 8.1 Various types of mounting media (aqueous, resinous)
- 8.2 Advantages and Disadvantages
9. Various Terms associated with staining (4 hrs)
- 9.1 Solvents
- 9.2 Mordants
- 9.3 Metachromasia
- 9.4 Accelerators
- 9.5 Progressive and regressive staining
- 9.6 Use of controls in staining and their significance
10. Cell (2 hrs)
- 10.1 Definition and function
- 10.2 Structure
11. Exfoliative Cytology (4 hrs)
- 11.1 Introduction
- 11.2 Preparation of vaginal & cervical smears
- 11.3 Collection and Processing of specimen for cytology
- Urine
 - Sputum
 - CSF (Cerebro Spinal Fluid)
 - Other fluids

12. Fixation (Cytological Specimen) (2 hrs)
- 12.1 Definition
- 12.2 Various types of Cytological fixatives
- 12.3 Advantages and Disadvantages
13. Cytological Staining (4 hrs)
- Principle, Technique and interpretation of results in
- Papanicolaou staining
 - May Grunwald & Giemsa staining
 - Haematoxylin and Eosin staining
- 14 Role of Laminar airflow and cytotechnician in cytology (2 hrs)

LIST OF PRACTICALS

1. Reception of specimen, labeling and preserving the specimen
2. Preparation of various smears by unfixed methods
 - Imprint smears
 - Teased smears
 - Squashed smears
3. Preparation of different fixatives with special emphasis on preparation of formaline based fixatives
4. Preparation of paraffin blocks from various tissue pieces and labeling with emphasis on orientation
5. Handling of microtome
6. Sharpening of microtome knives
7. Preparation of blocks for fine cutting
 - Rough cutting
 - Trimming
8. Practice of fine section cutting
9. Practice of lifting of sections on the slides
10. Performing H&E staining on sections
11. Mounting and labeling of tissue section using various mounting medias
12. Demonstration of cell
13. Processing of urine samples for malignant cells
14. Processing of sputum sample for malignant cytology
15. To perform PAP stain on given smear
16. To perform MGG stain on given smear
17. To perform H&E on given smear

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on concepts and principles while covering the subject contents. In the practical work, the students should be given opportunity to do practical work individually. Visits to hospital/medical colleges should be planned to demonstrate the processes. It is important to make use of models and audiovisual aids to show specific processes. Experts should be invited to deliver lecture on specific topics and share their experiences.

RECOMMENDED BOOKS

1. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworths Scientific, London
2. Carleton's Histological Technique by RAB, Drury, MADM (OXON), FRC Path, Northwick Paru Hospital, Harrow, Middlesex
3. Theory and Practice of Histological Technique by John D. Bancroft, Churchill Livingstone, London
4. Cellular Pathology Techniques by CFA Culling, Butterworths, London
5. Medical Lab Technology by Dr. Ramnik Sood, MD, Maulana Azad College, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	1	2
2	2	4
3	1	2
4	6	13
5	6	13
6	7	14
7	5	12
8	2	4
9	4	8
10	2	4
11	4	8
12	2	4
13	4	8
14	2	4
Total	48	100

3.5 BASICS OF INFORMATION TECHNOLOGY

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- - 4

RATIONALE

Information technology has great influence on all aspects of life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. 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/Open 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:

Explanation of Introductory part should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Information Technology – its concept and scope, applications of IT, impact of computer and IT in society.
2. Computers for information storage, information seeking, information processing and information transmission
3. Computer Application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, Air and Railway Ticket reservation, robotics, Military, banks, Insurance financial transactions and many more
4. Elements of computer system, computer hardware and software; data types – numeric data, alpha numeric data; contents of a program, processing
5. Computer organization, block diagram of a computer, CPU, memory
6. Input devices; keyboard, Scanner, mouse etc; output devices; VDU and Printer, Plotter
7. Electrical requirements, inter-connections between units, connectors and cables
8. Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD), primary and secondary memory: RAM, ROM, PROM etc., Capacity; device controllers, serial port, parallel port, system bus
9. Installation concept and precautions to be observed while installing the system and software
10. Introduction about Operating Systems such as MS DOS, Windows, Windows NT etc. as an interface to Computer System
11. Special features, various commands of MS Office/Open Office

12. About the internet – server types, connectivity (TCP/IP, shell); applications of internet like: e-mail and browsing
13. Various Browsers like Internet explorer, Mozilla Firefox, WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol)
14. Basics of Networking – LAN, WAN, Topologies
15. Ethics and information Technology
16. Future with information Technology

LIST OF PRACTICALS

1. Given a PC, name its various components and peripherals. List their functions
2. Practice in installing a computer system by giving connection and loading the system software and application software
3. Exercises on entering text and data (Typing Practice)
4. Installation of operating System viz. Windows XP, Windows 2007 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, colour (back ground and fore ground)
 - Using short cuts
 - Using on line help
5. Word Processing (MS Office/Open Office)
 - 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, line spacing
- 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 envelopes and labels
- 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

6. Spread Sheet Processing (MS Office/Open Office)

- Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets
- Menu commands:
 - Create, format charts, organise, manage data, solving problem by analyzing data, exchange with other applications. Programming with Excel Work Sheet, 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 query: Create a pivot table, customising a pivot table. Statistical analysis of data
- Exchange data with other application: embedding objects, linking to other applications, import, export document.

7. PowerPoint Presentation (MS Office/Open Office)

- a) Introduction to PowerPoint
 - How to start PowerPoint
 - Working environment: concept of toolbars, slide layout, templates etc.
 - Opening a new/existing presentation
 - Different views for viewing slides in a presentation: normal, slide sorter etc.
- b) Addition, deletion and saving of slides
- c) Insertion of multimedia elements
 - Adding text boxes
 - Adding/importing pictures
 - Adding movies and sound
 - Adding tables and charts etc.
 - Adding organizational chart
- d) Formatting slides
 - Using slide master
 - Text formatting
 - Changing slide layout
 - Changing slide colour scheme
 - Changing background
 - Applying design template
- e) How to view the slide show?
 - Viewing the presentation using slide navigator
 - Slide transition
 - Animation effects etc.

8. Working with Data Processing (MS Office/Open Office)

- a) Understanding different data types
- b) Creation of table

- c) Entering data in a table and modify it.
 - d) Creating simple Queries
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

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connections and proficient in making use of MS Office/Open Office in addition to working on internet. The student should be made capable of working on computers independently

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Information Technology for Management by Henry Lucas, 7th edition, Tata Mc Graw Hills, New Delhi
3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
4. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.
5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, 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
9. On Your Marks - Net...Set...Go... Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi
10. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

3.6 TRANSFUSION MEDICINE

(Blood Banking)

L T P
3 - 2

RATIONALE

Blood transfusion has become a life saving procedure in modern medical sciences. To avoid any mistake, the students must understand to learn the blood bank procedures, such as ABO & Rh blood grouping carefully and accurately. He must also have an adequate knowledge of cross matching both major and minor procedures as well as selection of a suitable donor. He should be competent enough to collect blood and its long-term preservation for safe blood transfusion.

DETAILED CONTENTS

1. Historical introduction to Transfusion medicine (blood banking) (2 hrs)
2. Development of ABO antigen in red cells (4 hrs)
3. Glassware used in Blood Banking (3 hrs)
 - Types of glassware and cleaning agents used
 - Cleaning of new and used glassware/plastic ware
 - Care of glassware/plasticware
4. Anticoagulants used in blood bank (3 hrs)
 - 4.1 Types and composition of various anticoagulants
 - 4.2 Advantages and disadvantages of various anticoagulants
5. Screening of blood donors for: (10 hrs)
 - 5.1 MP
 - 5.2 VDRL
 - 5.3 HIV
 - 5.4 HbsAg
 - 5.5 HCV
6. Antigen and Antibody (3 hrs)
 - 6.1 Definition of antigen and antibody
 - 6.2 Classification of antigens and antibodies.
7. ABO Blood Group System (3 hrs)
 - 7.1 Antigens and antibodies involved
 - 7.2 Principle and procedure of ABO blood grouping
 - 7.3 Various other sub groups A1,A2,A1B,A2B

- | | | |
|-----|--|---------|
| 8 | The Rh Blood Group System | (3 hrs) |
| | 8.1 Antigen and antibody involved | |
| | 8.2 Principle and procedure of Rh grouping | |
| | 8.3 Variant of D antigen (Du) | |
| 9. | Coombs Test | (3 hrs) |
| | 9.1 Direct coombs test (principle, procedure, importance and application) | |
| | 9.2 Indirect coombs test (principle, procedure, importance and application) | |
| 10. | Cross Matching | (2 hrs) |
| | 10.1 Types of cross matching | |
| | 10.2 Various methods and their procedures | |
| 11. | Blood Collection and storage | (2 hrs) |
| | 11.1 Screening of blood donor and characteristics of ideal blood donor. | |
| | 11.2 Blood collection procedure | |
| | 11.3 Transportation and storage | |
| 12. | Various blood components (Packed cells, Fresh frozen plasma,
Cryoprecipitate, PRP(Platelet rich plasma) | (4 hrs) |
| | 12.1 Preparation | |
| | 12.2 Preservation | |
| 13. | Blood Transfusion reactions | (6 hrs) |

LIST OF PRACTICALS

1. Washing and sterilization of glass ware
2. Performing ABO blood grouping by following method:
 - Direct
 - Tube Test
 - Indirect (reverse)
 - Subgroup
3. Performing-Rh grouping by following techniques:
 - Slide
 - Tube technique
4. Performance of Coombs Test
 - Direct
 - Indirect

5. Cross Matching (compatibility testing)
 - Major
 - Minor
6. Preparation of anticoagulants
 - ACD (Acid Citrate Dextrose)
 - CPD (Citrate Phosphate Dextrose)
 - CPDA (Citrate Phosphate Dextrose Analine)

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on concepts and principles while covering the subject contents. In the practical work, the students should be given opportunity to do practical work individually.

Visits to hospital/medical colleges should be planned to demonstrate the processes. It is important to make use of models and audiovisual aids to show specific processes. Experts should be invited to deliver lecture on specific topics and share their experiences.

RECOMMENDED BOOKS

1. Introduction to Modern Lab Technology by FJ Baker, Butterworth, Heinemann Publishers Oxford
2. Text book of Modern Lab Technology by Praful and Godker, Bhalani Publisher, Mumbai
3. Modern Lab Technology – A Procedure Manual for Routine Diagnostic Test by Kanai L. Mukerjee, Volume 1, Tata McGraw Hill Publishing, New Delhi
4. Modern Blood Banking and Transfusion Practices by Denise M Harmering, Jay Pee Brothers, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	2	4
2	4	10
3	3	6
4	3	6
5	10	20
6	3	6
7.	3	6
8	3	6
9	3	6
10	2	4
11	2	4
12	4	10
13	6	12
Total	48	100

ENTREPRENEURIAL AWARENESS CAMP

The employment opportunities for diploma holders especially in public sector are dwindling. The diploma holders need to explore the possibilities of becoming entrepreneurs. For this, they must be acquainted with entrepreneurship development, scope of setting up small-scale industry, existing business opportunities, financial support available and various aspects of managing business. In this context, an entrepreneurial awareness camp is suggested. During the camp, experts from various organizations such as banks, financial corporations, service institutes etc. may be invited to deliver expert lectures. Successful entrepreneurs may also be invited to interact with the students. Students may be encouraged to read papers or give seminar during the camp on Entrepreneurship Development related topics.

The camp is to be organized at a stretch for two to three days during fourth semester. Lectures will be delivered on the following broad topics. There will be no examination for this subject

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and self employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centres, Commercial Banks, State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other Financial and Development Corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business

ENVIRONMENTAL STUDIES

RATIONALE

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

Lectures will be delivered on following broad topics.

DETAILED CONTENTS		
1	Basics of ecology, eco system and sustainable development.	
2	Conservation of land reforms, preservation of species, prevention of advancement of deserts and lowering of water table	
3	Sources of pollution - natural and man made, their effects on living and non-living organisms	
4	Pollution of water - causes, effects of domestic wastes and industrial effluent on living and non-living organisms	
5	Pollution of air-causes and effects of man, animal, vegetation and non-living organisms	
6	Sources of noise pollution and its effects	
7	Solid waste management; classification of refuse material, types, sources and properties of solid wastes, abatement methods	
8	Mining, blasting, deforestation and their effects	
9	Legislation to control environment	
10	Environmental Impact Assessment (EIA), Elements for preparing EIA statements	
11	Current issues in environmental pollution and its control, Global warming, Green house gases, non-conventional sources of energy, introduction to clean technology.	
12	Introduction to Green buildings, site selection, material efficiency, energy efficiency, water efficiency, building form.	
13	Role of non-conventional sources of energy in environmental protection	

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Marks Allotted (%)
1	5
2	7
3	7
4	10
5	10
6	6
7	10
8	6
9	6
10	8
11	10
12	5
13	10
Total	100