

**VEER NARMAD SOUTH GUJARAT UNIVERSITY,  
SURAT-7**

**Syllabus  
of  
F.Y. B.Sc. Medical Technology  
(As per CBCS )  
2012 – 13**

## **F.Y. B.Sc. Semester – I**

### **MT 01: Introduction to Medical Technology**

#### **Unit 1: Organization of Clinical Laboratory**

- 1.1 Functional Components of Clinical Laboratories
- 1.2 Clinical Laboratory Set up
- 1.3 Laboratory ethics and Code of Conduct

#### **Unit 2: Laboratory Solutions**

- 2.1 Types of solutions
- 2.2 Preparations of solutions
- 2.3 Handling & Storage of solutions
- 2.4 Record Keeping

#### **Unit 3: Laboratory Glasswares**

- 3.1 Types of glasswares
- 3.2 Handling & Cleaning of glasswares
- 3.3 Calibration of glasswares
- 3.4 Maintenance & Record Keeping

#### **Unit 4: Laboratory Safety and Emergency First Aid**

- 4.1 Risk Assessment & Common causes & types of Laboratory Hazards
- 4.2 Emergency First Aid measures
- 4.3 Biomedical Waste –Classification , treatment & disposal
- 4.4 Biosafety Levels

#### References :

- 1) Kanai L. Mukherjee, *Medical Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company Ltd.
- 2) A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Hill Pub
- 3) P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,2<sup>nd</sup> Edition, Bhalani Pub.
- 4) Monica cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambridge Editions.

## MT 02 : Introduction to Laboratory Instruments

### Unit 1: Microscope

- 1.4 Introduction: Types & terminologies
- 1.5 Components of microscope
- 1.6 Operation , Working Principle & Trouble shooting of microscope
- 1.7 Use , care & maintenance

### Unit 2: Colorimeter and Spectrophotometer

- 2.1 Introduction : similarity and difference
- 2.2 Components & Basic Principle
- 2.3 Handling & maintenance
- 2.4 Calibration of instrument

### Unit 3: Sterilization Equipments

- 3.1 Autoclave
  - 3.1.1 Components
  - 3.1.2 Working Principle & Operation
  - 3.1.3 Use , Precaution , Care & Maintenance
  - 3.1.4 Sterility testing
- 3.2 Hot Air Oven
  - 3.2.1 Principle, Components & operation
  - 3.2.2 care & maintenance
  - 3.2.3 use & Sterility testing

### Unit 4: Other Laboratory Equipments

- 4.1 Centrifuge
- 4.2 Balance
- 4.3 Water Bath
- 4.4 Water Distillation
- 4.5 P<sup>H</sup> Meter

#### References :

- 1) Kanai L. Mukherjee, Medical *Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company Ltd.
- 2) A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Hill Pub
- 3) P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,2<sup>nd</sup> Edition, Bhalani Pub.
- 4) Monica cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambridge Editions.

## **Practicals of Sem 1 – Medical Technology.**

- 1) Study of Laboratory Organization.
- 2) Study of Laboratory glassware & reagents.
- 3) Study of Laboratory Instruments & equipments.
- 4) Study of First aid measures in Laboratory Hazards.
- 5) Sterilization by Autoclave & Hot air oven.
- 6) Measurement & Adjustment of P<sup>H</sup>.
- 7) Calibration of laboratory glasswares.
- 8) Study of Hay infusion.
- 9) Study of Bacterial motility.
- 10) Preparation of Laboratory Solutions.

### References :

- 1) Kanai L. Mukherjee, *Medical Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company Ltd.
- 2) A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Hill Pub
- 3) P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,2<sup>nd</sup> Edition, Bhalani Pub.
- 4) Monica cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambridge Editions.
- 5) Patel, R.J., and Patel,R.K.,(2000).*Experimental Microbiology,Volume 1&2*,Aditya.

## **F.Y. B.Sc. Semester – II**

### **MT 03 : Fundamentals of Medical Technology**

#### **Unit 1 : Units of Measurements**

- 1.1 The Metric System
- 1.2 International Unit
- 1.3 Laboratory calculation & conversion

#### **Unit 2: Clinical Specimen: Collection, Processing ,Handling & transportation**

- 2.1 Blood
- 2.2 Urine
- 2.3 Body Fluids – CSF, Pleural fluid, Synovial fluid, Peritoneal fluid & Pericardial fluid
- 2.4 Sputum
- 2.5 Throat & Mouth Specimen
- 2.6 Pus , Ulcer & Skin Specimen
- 2.7 Stool

#### **Unit 3 : Quality Control in Clinical Laboratory**

- 3.1 Common Terms used in Quality Control
- 3.2 Preanalytical, Analytical and Post Analytical Factors
- 3.3 Preparation of Quality Control Charts

#### **Unit 4 : Statistics in Clinical Laboratory**

- 4.1 Basics Terminologies
- 4.2 Standard deviation and Coefficient of Variation
- 4.3 Types of errors
  - 4.3.1 Standard errors of Mean
  - 4.3.2 Analytical errors
- 4.4 Method Selection using Statistical Equations

#### References :

- 1) Kanai L. Mukherjee, *Medical Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company Ltd.
- 2) A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Hill Pub
- 3) P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,2<sup>nd</sup> Edition, Bhalani Pub.
- 4) Monica cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambridge Editions.

## **MT 04 : Introduction to Microbiology**

### **Unit 1 : Human and Microbial world**

- 1.1 Origin of Microorganisms
- 1.2 Medical Microbiology and its development
- 1.3 Microbial World and its Classification
  - 1.3.1 Typical and Atypical Prokaryotes
  - 1.3.2 Eukaryotes

### **Unit 2 : Classification and Identification of Prokaryotes**

- 2.1 Taxonomic Hierarchy
- 2.2 Phenotypic Characteristics of microorganisms
  - 2.2.1 Morphological features of microorganisms
  - 2.2.2 Physiological & Metabolic Characteristics of microorganisms
- 2.3 Genotypic Characteristics of microorganisms

### **Unit 3 : Control of Microbial Growth**

- 3.1 Principle of Control of Microbial Growth
- 3.2 Selection of an Antimicrobial Procedure
- 3.3 Methods for destruction of microorganisms & Viruses
  - 3.3.1 Physical methods
  - 3.3.2 Chemical methods
  - 3.3.3 Other methods

### **Unit 4: Viruses and Eukaryotic microbes**

- 4.1 Viruses
  - 4.1.1 General Characteristics
  - 4.1.2 Classification of viruses
  - 4.1.3 Viral replication
- 4.2 Fungi – Morphology and characteristics, Reproduction & Clinical Significance
- 4.3 Protozoa- Morphology and characteristics, Reproduction & Clinical Significance
- 4.4 Algae- Morphology and characteristics, Reproduction & Clinical Significance

#### References :

- 1) Nester Anderson, Roberts , Pearsall, Nester; *Microbiology*; International Edition; McGraw Hill Pub.
- 2) Michael J. Pelczar, JR. E.C.S.Chan, Noel R. Krieg; *Microbiology*; Tata Mcgraw- Hill Edition Wiley, J., & Sherwood, L. (2007). *Prescott, Harley, and Klein's Microbiology*, 7 Ed., McGraw-Hill Pub.
- 4) Dr.H.A.Modi, *Elementary Microbiology, Fundamentals of Microbiology ,Volume-1*, Akta Prakashan , Nadiad.
- 5) Dr.H.A.Modi, *Elementary Microbiology, An Introduction to Microbiology ,Volume-2*, Akta Prakashan , Nadiad.

## Practicals of Semester -2 Medical Technology

1. Study of different Specimen Collection ,Handling and Transport.
2. Preparation of Bacteriological medias.
3. Preparation of Fungal medias.
4. Measurement of Microorganisms.
5. Study of Biochemical characteristics of Microorganisms.
6. Study of Growth characteristics of Microorganisms.
7. Study of Morphological Characteristics of Microorganisms by Simple & Differential Staining.
8. Study of Fungi- Penicillium, Aspergillus, Mucor, Rhizopus & Yeasts.
9. Preparations of Solutions.
10. Preparations of Buffer Solutions
11. Preparations of Quality Control Charts.
12. Cultivation of Viruses (Demonstration)

### References :

- 1) Kanai L. Mukherjee, *Medical Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company Ltd.
- 2) A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Hill Pub
- 3) P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,2<sup>nd</sup> Edition, Bhalani Pub.
- 4) Monica cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambridge Editions.
- 5) Patel R.J. and Patel R.K. ,(2000) *Experimental Microbiology,Volume-1 & 2*,Aditiya.