# VEER NARMAD SOUTH GUJARAT UNIVERSITY,

Surat-7

Syllabus

of

F. Y. B. Sc. Medical Technology

(As per CBCS)

Effective From 2017-2018

# F. Y. B. Sc. Semester – I

## MT 01: Organization of clinical laboratory

UNIT – 1 Human Health and Clinical Diagnosis in Developing Countries

1.1 Medical Care in India
1.2 Status of Medical Laboratories in Developing Countries
1.3 Commonly Requested Laboratory Tests in India and Other Developing Countries
1.4 Ethics and Law of laboratory Operation

UNIT – 2 Preparation of Laboratory Solutions and Glasswares

2.1 Preparation of laboratory solutions
2.2 Laboratory calculations and Diluting solutions
2.3 Preparation of Buffer solutions
2.4 pH of solutions and indicators
2.5 Introduction of general Laboratory Glassware
2.6 Care and maintenance of Glassware
2.7 Calibration of Glassware

UNIT – 3 Laboratory Organization

3.1 Organization of Laboratory
3.2 Functional Components and Role of Individual Components of Laboratory
3.3 Various types of Laboratories
3.4 A Standard Clinical Laboratory Set up

UNIT - 4 Laboratory Safety

4.1 Implementing a Laboratory Health and Safety Programme
4.2 Safe Laboratory Premise and Personnel Safety Measures
4.3 Laboratory First Aid Kit
4.4 Biosafety Levels and Biosafety Programme
4.5 Decontamination of Infectious Material and Disposal of Laboratory Waste

**References :**

A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Bhalani Pub.

H. A. Modi, *Elementary Microbiology, Fundamentals of Microbiology ,Volume-1*, Akta Prakashan , Nadiad.

Kanai L. Mukherjee, Medical *Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company ltd.

Monica Cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambrige Editions

P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,3rd Edition, Hill Pub

# MT 02: Equipments and Instruments in Medical Technology Laboratory

UNIT – 1 Microscopy

1.1 Introduction and Properties of light
1.2 Basic terminologies: Refraction and refractive Index, Magnification, Numerical aperture, Resolution and Resolving power
1.3 Components, working principle and operation of Bright field microscope
1.4 Dark field microscopy
1.5 Phase contrast microscopy
1.6 Fluorescence microscopy
1.7 Electron microscopy
1.8 Care and maintenance of microscope

UNIT – 2 Photometer, Potentiometer and Osmometer

2.1 Colorimeter
2.2 Spectrophotometer
2.3 Potentiometer
2.4 Osmometer

UNIT – 3 Equipments of Sterilization

3.1 Autoclave
3.2 Hot Air Oven
3.3 Incinerator
3.4 Filters : Depth filters, Membrane filters and HEPA filter

UNIT – 4 Other Laboratory Equipments

4.1 Centrifuge
4.2 Incubator
4.3 Distillation unit
4.4 Weighing Balance

**References :**

A. D. Darji, *Elements of Microbiology*, 2nd Edition, Nirav Prakashan, Ahmedabad.

A.Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Bhalani Pub.

H. A. Modi, *Elementary Microbiology, Fundamentals of Microbiology* ,*Volume-1*, Akta Prakashan , Nadiad.

Kanai L. Mukherjee, Medical *Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company ltd.

P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology,*3rd Edition, Hill Pub

# F. Y. B. Sc. Semester I Practicals

1. Study of Compound Microscope
2. Study of living organism by light microscopy (Hanging drop and wet mount)
3. Study of microorganism by Dark Field Microscopy
4. Study of Laboratory glassware and its calibration
5. Standardization of 1 ml volumetric pipette
6. Cleaning and preparation of glassware for sterilization
7. Study of Laboratory reagents
8. Preparation of Solution (Molar, Normal and Percent)
9. Preparation of various dilutions from stock solution
10. Study of Laboratory Instruments and Equipments
11. Study of Laboratory Hazards and First Aid measures
12. Disposal of Biomedical waste
13. Measurement and adjustment of pH by pH meter.

**References :**

Kanai L. Mukherjee, Medical *Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company ltd.

A. Kolhatkar , J Ochei , *Medical Laboratory Science- Theory and Practice* ,Tata McGraw-Hill Pub

P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology,*2nd Edition, Bhalani Pub.

Monica Cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambrige Editions.

Patel, R.J., and Patel,R.K.,(2000).*Experimental Microbiology,Volume 1&2*,Aditya Pub

# F. Y. B. Sc. Semester – II

## MT 03: Fundamentals of Medical Technology

UNIT – 1 Collection, Preservation, Transportation and Storage of Blood

1.1 Preparation of patient and specimen collection material
1.2 Responsibilities of Phlebotomist
1.3 Blood collection procedure
1.4 Specimen types and anticoagulant selection
1.5 Separation of serum and plasma
1.6 Vacutainers
1.7 Transportation of the specimen
1.8 Storage of the specimen

UNIT – 2 Collection, Preservation, Transportation and Storage of other Clinical Samples

2.1 Urine
2.2 Feces
2.3 CSF
2.4 Sputum, throat and mouth specimen
2.5 Eye and ear specimen
2.6 Wound, abscesses, burn and sinuses specimen
2.7 Urogenital specimen

UNIT – 3 Physical Methods of Sterilization

3.1 Sterilization by Moist heat
3.2 Sterilization by Dry heat
3.3 Radiation as a sterilizing agents
3.4 Filteration

UNIT – 4 Chemical Methods of Sterilization & disinfection

4.1 Common terminologies for microbial control
4.2 Characteristics of an ideal disinfectants
4.3 Mode of action of disinfectant

4.4 Major groups of antimicrobial chemical agents: Phenol and phenolic compounds, Alcohol, Halogen and Heavy metals

4.5 Gaseous chemical sterilants

**References**

H. A. Modi, *Elementary Microbiology, Fundamentals of Microbiology* ,Volume-1, Akta Prakashan , Nadiad.

Kanai L. Mukherjee, Medical *Laboratory Technology-A Procedure Manual for Routine Diagnostic Tests* ,Volume-1 ,Tata McGraw-Hill Pub Publishing Company ltd.

P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology,*3rd Edition, Hill Pub

# MT 04: Introduction to Microbial world

UNIT – 1 Microbial world and its Identification

1.1 Origin of microorganisms
1.2 Medical Microbiology and its development
1.3 Phenotypic characteristics for microbial identification
1.4 Genetic characteristics for microbial identification

UNIT – 2 Eukaryotic microbes: Morphology and Economic Importance

2.1 Common features of Eukaryotic cells
2.2 Molds
2.3 Yeast
2.4 Protozoa

UNIT – 3 Atypical bacteria: Morphology, cultivation and Pathogenic significance

3.1 Rickettsia
3.2 Chlamydia
3.3 Mycoplasma
3.4 Actinomycetes

UNIT – 4 Viruses and Bacteriophage

4.1 General structural properties of Viruses
4.2 Types of viral infections
4.3 Viruses and cancer
4.4 General Characteristics of Bacteriophage
4.5 Lytic cycle and Lysogeny

**Reference:**

H. A. Modi, *Elementary Microbiology, Fundamentals of Microbiology* ,Volume-2 (An Introduction to Microbial World), Akta Prakashan , Nadiad.

J. M. Willey, L. M. Sherwood, C. J. Woolverton, *Prescott's Microbiology*, 8th Edition, McGrow Hill International Edition.

Nester Anderson, Roberts, Pearsall, *Nester's Microbiology*, International Edition, McGrow Hill Pub.

## F. Y. B. Sc. Semester II Practicals

1. Study of Bacteriological and Mycological Media
2. Study of Morphological Characteristics of Microorganisms: Size, Shape, Arrangement
3. Cultivation of microorganisms on Slant, Stab, Broth and Plate.
4. Preparation of Anticoagulated bulbs
5. Separation of Plasma and Serum from blood
6. Differential staining technique
7. Diagnosis of Tuberculosis from sputum by Acid Fast staining technique
8. Detection of Spirochaetes from dental carries by staining technique
9. Detection of *Corynrbacterium diphtheria* by metachromatic staining technique
10. Detection of *Bacillus anthracis* bt spore staining technique
11. Detection of *Klebsiella pneumoniae* by capsule staining technique
12. Study of Fungi: *Aspergillus, Mucur, Rhizopus, Fusarium, Candida albicans, Saccharomyces cerevisiae*
13. Cultivation of Bacteriophage (Demonstration)
14. Bactericidal effect of U.V. rays on microbial growth
15. Bactericidal effect of Formaldehyde on microbial growth
16. Bactericidal effect of Antiseptic and Disinfectant on microbial growth

**References :**

P. B. Godkar , D.P. Godkar, *Textbook of Medical Laboratory Technology*,2nd Edition, Bhalani Pub.

Monica Cheesbrough, *District Laboratory Practice in Tropical Countries* ,Part 1, Cambrige Editions.

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