

**VEER NARMAD SOUTH GUJARAT UNIVERSITY,SURAT.
F.Y.B.Sc. (MEDICAL TECHNOLOGY SYLLABUS)
PROPOSED NEW SYLLABUS IN MEDICAL TECHNOLOGY
(Effective from July 2009 – Revised in BOS)**

PAPER I : FUNDAMENTALS OF MEDICAL TECHNOLOGY

UNIT 1 : INTRODUCTION TO VARIOUS BRANCHES OF MEDICAL TECHNOLOGY

- 1.1) Microbiology- bacteriology, mycology, parasitology & virology.
- 1.2) Immunology and serology
- 1.3) Haematology
- 1.4) Pathology
- 1.5) Clinical biochemistry
- 1.6) Histopathology
- 1.7) Radiation biology and nuclear medicine
- 1.8) Genetics

UNIT 2 : GENERAL TECHNIQUES

- 2.1) Storage of chemicals and reagents
- 2.2) Cleanliness in laboratory
- 2.3) Personnel safety (biosafety)
- 2.4) First aid and its measures
- 2.5) Laboratory hazards - types and symbols
- 2.6) Biomedical waste – storage, treatment and disposal

UNIT 3 : INTRODUCTION,PRINCIPLE ,WORKING AND APPLICATION OF INSTRUMENTS AND EQUIPMENTS IN MEDICAL TECHNOLOGY.

- 3.1) Autoclave
- 3.2) Hot air oven
- 3.3) Incubator
- 3.4) Centrifuge
- 3.5) Water bath
- 3.6) Balance
- 3.7) Water distillation unit
- 3.8) Colorimeter & spectrophotometer
- 3.9) Colony counter
- 3.10) P^H meter
- 3.11) Dessicator

- 3.12) Autopipette
- 3.13) Syringe and needle
- 3.14) Sphygmomanometer & stethoscope
- 3.15) Autoanalyser (Automation)

UNIT 4 (A) : FUNDAMENTAL CHEMISTRY

- 4.a.1.) Properties of water
- 4.a.2.) Law of mass action
- 4.a.3.) Ph , acid and bases
- 4.a.4.) Buffer and buffer action
- 4.a.5.) Types and characteristics of solutions
- 4.a.6.) Strength of solutions(normal, molal, molar and percentage)
- 4.a.7.) Indicators
- 4.a.8.) SI units
- 4.a.9.) Conversion rules
- 4.a.10) Basics of dilution and dilution factor

UNIT 4 (B) : ANTICOAGULANTS

- 4.b.1) EDTA
- 4.b.2.) Tri sodium citrate
- 4.b.3.) Double oxalate
- 4.b.4.) Heparin
- 4.b.5.) Sodium fluoride
- 4.b.6.) ACD
- 4.b.7.) CPD
- 4.b.8.) CPDA

UNIT 5 : QUALITY CONTROL AND LABORATORY ETHICS

- 5.1.) Basic terminologies used in quality control
- 5.2.) Importance and types of quality control
- 5.3.) Types of errors in laboratory techniques
- 5.4) quality control in various laboratories
 - 5.4.1. Microbiology laboratory
 - 5.4.2. Pathology laboratory
 - 5.4.3. Parasitology laboratory
 - 5.4.4. Serology laboratory
 - 5.4.5. Haematology laboratory
 - 5.4.6. Blood bank

- 5.4.7. Clinical biochemistry laboratory
- 5.4.8. Histopathological laboratory
- 5.5.) Code of conduct.

UNIT 6 : COLLECTION ,STORAGE, PRESERVATION AND TRANSPORTATION OF CLINICAL SPECIMENS

- 6.1.) Urine
- 6.2.) Stool
- 6.3.) Sputum
- 6.4.) Pus
- 6.5.) Csf
- 6.6.) Blood
- 6.7.) Body fluids –
 - 6.7.1. Pleural fluid
 - 6.7.2. Pericardial fluid
 - 6.7.3. Peritoneal fluid
 - 6.7.4. Synovial fluid
 - 6.7.4 Amniotic fluid
 - 6.7.6. CSF
 - 6.7.7 Blood
- 6.8.) Throat and mouth specimen.

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PAPER II : INTRODUCCION OF MICROBIOLOGY

UNIT 1 : HISTORY OF MICROBIOLOGY

- 1.1.) Microorganisms and the living world
- 1.2.) Microbiology and origin of life
- 1.3.) Spontaneous generation vs. Biogenesis
- 1.4.) Contribution of Antony Van Leeuwanhoek, Robert Koch, Louis Pastuer & Edward Jenner
- 1.5.) Event important in development of medical technology.

**UNIT 2 : MICROSCOPY- BASIC ,
PRINCIPLE, CONSTRUCTION, WORKING &
APPLICATION.**

- 2.1. Light microscopy
 - 2.1.1.) Bright field microscopy
 - 2.1.2.) Dark field microscopy
 - 2.1.3.) Phase contrast microscopy
 - 2.1.4.) Fluorescence microscopy
- 2.2 electron microscopy
 - 2.2.1.) Transmission electron microscopy(TEM)
 - 2.2.2.) Scanning electron microscopy(SEM)

UNIT 3 : DYES , STAINS AND STAINING TECHNIQUES

- 3.1. Dyes –
 - 3.1.1.) Introduction
 - 3.1.2.) Types & classification
 - 3.1.3.) Applications
- 3.2. Stains - principles of staining
- 3.3 staining techniques –

- 3.3.1.) Simple staining
- 3.3.2.) Negative staining
- 3.3.3.) Differential staining
 - 3.3.3.1.) Gram staining
 - 3.3.3.2.) Acid fast staining
- 3.3.4.) Special staining
 - 3.3.4.1.) Cell wall staining
 - 3.3.4.2.) Capsule staining
 - 3.3.4.3.) Endospore staining
 - 3.3.4.4.) Flagella staining
 - 3.3.4.5.) Metachromatic granule staining
 - 3.3.4.6.) Spirochaete staining

UNIT 4 : PROCARYOTIC (BACTERIAL) CELL

- 4.1.) Introduction
- 4.2.) Structure external to cell wall
 - 4.2.1. Flagella , pili and fimbriae
 - 4.2.2 prosthecae & stalk
 - 4.2.3. Capsules & slime layer
 - 4.2.4. Sheaths
- 4.3.) Cell wall
- 4.4.) Structure internal to cell wall
 - 4.4.1. Cell membrane
 - 4.4.2. Cytoplasm
- 4.5.) Spores

UNIT 5 : STERILIZATION AND DISINFECTANTS

- 5.1.) Introduction and terminology
- 5.2.) Physical sterilization
 - 5.2.1). Using moist heat
 - 5.2.2.) Using dry heat
 - 5.2.3.) Radiation
 - 5.2.4.) Filtration
- 5.3.) Chemical agents
 - 5.3.1.) Ideal characteristics
 - 5.3.2.) Major chemical agents
 - 5.3.2.1. Phenol
 - 5.3.2.2 . Alcohol

- 5.3.2.3. Halogens
- 5.3.2.4. Heavy metals
- 5.3.2.5. Dyes
- 5.3.2.6. Acid & alkalies
- 5.3.2.7. Gaseous agents
- 5.3.2.8. Surface active agents (detergents).

UNIT 6 : PURE CULTURE AND CULTURAL CHARACTERISTICS

- 6.1.) Introduction
- 6.2.) Origin of pure culture technique & basics
- 6.3.) Techniques of isolation
- 6.4.) Morphology and cultural characteristics
- 6.5.) Maintenance & preservation of cultures.

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**PRACTICALS OF PAPER I & II OF FIRST YEAR
B.Sc. MEDICAL TECHNOLOGY.**

1. Organisation of medical technology laboratory.
2. Laboratory Hazards, First- aid and Biosafety measures.
3. Basic laboratory glasswares,equipments and their maintenance.
4. Laboratory chemicals – use and storage.
5. Microscopy(monocular,binocular , bright field & dark-field)
6. Specimens for laboratory examination, labelling , collection , preparation and disposal of some important specimens.
7. Maintenance and preservation of pure cultures.
8. Use of thermometer ,stethoscope, syringe and needle etc.
 - I. Preparation of standard solution ,buffers and various Reagents.
 - II. Preparation of anticoagulants : edta, oxalate and citrate.
 - III. Ph adjustment by – paper strip , lovibond comparator and Ph meter.
 - IV. Use of important instruments : sterilisation by autoclaveand hot air oven.
 - V. Maintenance of aseptic technique.

- VI. Fumigation process – formaldehyde vapour and ethylene oxide.
- VII. Use of antiseptics and disinfectants.
- VIII. Use of uv rays for sterilisation.

- IX. Motility of micro-organisms by:
 - I. Hanging drop method
 - ii. Semi-solid agar block method
 - iii. Wet mount

- X. Staining techniques-
 - 1. Simple staining
 - 2. Negative staining
 - 3. Differential staining
 - I. Gram staining
 - II. Acid – fast staining
 - 4. Special staining
 - I. Cell wall staining
 - II. Capsule staining
 - III. Endospore staining
 - IV. Flagella staining
 - V. Metachromatic granule staining
 - VI. Spirochete staining

- XI. Isolation of bacteria by different methods.

- XII. Study of cultural characteristics of bacterial growth on solid, semi-solid and liquid medium.