VEER NARMAD SOUTH GUJARAT UNIVERSITY

Third Year B.Sc.

Medical Technology

Can subject

(In force from June 2003)A student offering Medical Technology, as a special subject will study Can subject — Instrumentation and Laboratory Management.

The teaching periods per week for Can subject are 3, each of 55 minutes.

The university examination of this subject will be of 3 hours duration. The **total** marks for this subject are 70 for university examination and 30 marks for internal examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Third Year B.Sc.

Medical Technology
Can subject
(Interdisciplinary subject)
Instrumentation and Laboratory Management
In force from July 2003)

Unit 1 General — instrumentation

(i) Fundamental, characteristic **of instrumentation — Manual and automated**

(ii) General Equipments: Types of **Balances,** use **and care of balances**

(iii) Centrifuge. Introductions, types of centrifuges, types of **models of** centrifuges, parts of centrifuges & their function, Principle **of centrifugation,** ultracentrifuge, its function, uses and **care of centrifuge**

Unit 2 Photometric Instruments

(i) Photometry: **Introduction, Lambert Beer Law**

(ii) Colorimeters and spectrophotometers: **types, principle, basic components** & their **functions, Procedure, setting up the instrument, dark setting and blank setting (water blank and reagent blank) Instrument performance of spectrophotometer, selection of optimum condition and limitation, quality control check of spectrophotometer, Uses in clinical laboratory**

(iii) **Flame** photometer: **Principles, components, operation, use of internal** standards and applications

(iv) Automation: **Semiauto Analyser and Fullyauto Analyser ; Principle, techniques, applications, advantages and disadvantages**

Unit 3

(i) Potentiometry - pH meter **Principle, operation, glass electrode, reference** electrodes combined electrodes. component of pH **meter, calibration of pH meter, validation. maintenance and source of error**

(ii) Blood gas analyzer (basic concept)

(iii)Microtone Principle, technique *and* applications

Unit 4 A

(i) Fluorometery: Principle, instrumentation, technique **and applications**

(ii) Turbidometry and Nephlometry: Principle, **instrumentation, limitation,** technique and **uses. Limitations —** Turbidometry **vls Nephlometry**

(ii) Refractivity Principle, instrumentation and applications

B Radiation (Basic)

Gamma counter: Introduction, principle, basic components & **their functions,** procedure and uses

Unit 5 Electrophoresis (Basic)

Introduction, lassification. Principle & components of electrophoresis equipments, procedure & maintenance, Immunoelectrophoresls, zone electrophoresis and gel electrophoresis Densitometer: Introduction, principle, components, techniques & application.

Unit 6 A Chromatography (Basic)

Introduction, types of chromatography, Paper Chromatography, Thin Layer Chromatography, Gas Liquid Chromatography and Ion Exchange Chromatography

B Blood Banking

Platelet Incubator, Shaker and Haematology analyzer: Principle, components, techniques and application in blood banking

Unit 7 Microscopy

Introduction, different types of microscopy; electron microscopy and fluorescence microscopy principle , terms commonly used in microscopy reflection, refraction, refractive index, focus magnification, components of microscope , defects inlens system, objectives , use and care of microscope.

Unit 8 Laboratory Management

- **(i) Theories and activities of management and management style of diagnostics test**
- **(ii) Clinical laboratory acts in the State Government and Central Government**
- **(iii) Quality improvement in the laboratory; managing the quality of laboratory test results.**
- **(iv) Financial management in the laboratory**
- **(v) Work load recording system, introduction to cost accounting**
- **(vi) Managing yourself and your career, MTS as patients, liaisons, effective decision making, leader & leadership**
- **(vii) Clinical laboratory utilization, the role of clinical laboratory technologists**

Unit 9 Laboratory Planning

- **(i) General about laboratory planning, general principles, laboratory goals, operational data, marketing potential, hospital laboratory relation, competition, Laboratory trend**
- **(ii) Guiding principles for planning; Hospital laboratory services, criteria, operational cleanliness, separation of hospital laboratory, common area, design aspect, space requirement**

Unit 10 Laboratory Organization

General, principles, components and function of laboratory, staffing the laboratory, job description , specification, personal arrangement and workload assessment, care of laboratory, specimen collection and handling, laboratory services, quality control, material management, safety measures in the laboratory, computer and its uses in clinical laboratory.

REFERENCE BOOKS

1. **Principles of Instrumental analysis, 5 ed, by S Koog, Holler & Nieman, Sauders college publishing.**
2. **Analytical Biochemistry: (Biochemical Technique) P. Ashokan, Chinnama Publication, Nelvisharani, Vellor.**
3. **Clinical Laboratory Management, Eleanor M. Travers, Wiliams and Wilkins.**
4. **Instrumental Methods of Chemical Analysis (Analytical Chemistry) , B.K. Sharma, 1997-98, Goel Publishing House.**
5. **Clinical Chemistry; theory, analysis and correlation, L.A. Kaplan & A.J. Pesce, The C.V. Mosby Co.**
6. **Instrumental Methods of Chemical Analysis, 6e, G.W. Ewing, McGraw Hill.**
7. **Instrumental Methods of Chemical Analysis, Chetwal & Anand, ¸Himalaya Publishing House.**
8. **Microbiology, 4e, M.J. Pelczar, R.D. Reid & E.C.S. Chan, Tata McGraw-Hill Pub. Co. Ltd.**