VEER NARMAD SOUTH GUJARAT UIVERSITY, SURAT

SYLLABUS OF DIPLOMA IN MEDICAL TECHNOLOGY (EFFECTIVE FROM JULY- 2014)

Diploma in Medical Technology is a one year Post-Graduate (Post B.Sc.) course. A student offering this course will study Papers I, II, III, IV & practicals based on these papers.

The teaching per week for 4 papers is 16 hours & there are 16 hours per week for practicals.

The total marks of papers are 280 for University examination, distributed as 70 of each paper of 3 hours duration & the internal evaluation is of 120 marks distributed as 30 of each paper. The total marks of practicals are 210 for University examination, distributed as 54 for practical paper-I & practicals papers II, III, & IV are each of 52 marks. The internal evaluation for practical is of 90 marks distributed as 24, 22, 22, & 22 for practical based on Paper I, II, III & IV respectively. The University examination for practicals based on paper I is of 12 hours distributed over a period of 2 days & for practicals based on paper II, III, & IV are of one day each & 6 hours per day.

VEER NARMAD SOUTH GUJARAT UIVERSITY, SURAT

P.G. DIPLOMA IN MEDICAL TECHNOLOGY
Teaching and Examination Scheme

Paper	Teaching Schedule Hrs./Wk	University Exam Theory/Practical		Internal Exam Theory/Practical Marks	Total marks Theory/Practical
		Duration (hrs)	Marks		
Theory					
Paper I: Microbiology and Immunology	4	3	70	30	100
Paper II: Clinical Pathology and Parasitology	4	3	70	30	100
Paper III: Haematology and Blood Banking	4	3	70	30	100
Paper IV: Clinical Biochemistry	4	3	70	30	100
Practical					
Paper I: Microbiology and Immunology	4	12	54	24	78
Paper II: Clinical Pathology and Parasitology	4	6	52	22	74
Paper III: Haematology and Blood Banking	4	6	52	22	74
Paper IV: Clinical Biochemistry	4	6	52	22	74
TOTAL	**32**		**490**	**210**	**700**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

REVISED SYLLABUS FOR P.G.DIPLOMA OF MEDICAL TECHNOLOGY
(EFFECTIVE FROM JULY-2014)

PAPER - I MICROBIOLOGY & IMMUNOLOGY

SECTION – I MICROBIOLOGY

1. EVOLUTION AND HISTORY OF MICROBIOLOGY:

a. Introduction and brief history of Microbiology.
b. Contribution of following in Medical Microbiology
i)Leeuwenhoek
ii)Louis Pasteur
iii)Robert Koch
iv)Edward Jenner
v)Lord Lister
vi)Paul Ehrlich
vii)Domagk
viii)Alexander Flemming
ix)Elie Metchnikoff

2. CLASSIFICATION OF MICROORGANISMS:

Introduction –
i)Microorganism,
ii)Groups of microorganism
iii)Place of microorganism in living world.
iv)Difference between Prokaryotes and Eukaryotes.
v)The world of bacteria- significance of Bergey's Manual.

3. MICROSCOPIC EXAMINATION OF MICROORGANISMS:

a. Introduction and use of Microscope in the study of Bacteria
i)Light microscope and Electron microscope
ii)Bright field microscopy
iii)Dark field microscopy
iv)Fluorescence microscopy
v)Phase Contrast microscopy
vi)Electron microscopy

b. Preparation of microorganism for light microscopic examination
a) Wet Mount
b) Hanging drop techniques
c) Staining of Bacteria:
1. Composition and Preparation of Staining
2. Principle and Procedure of Bacteriological stain
i.Simple staining
ii.Gram staining
iii.Acid fast staining
iv.Metachromatic granules staining
v.Negative staining

vi.Spirochete staining
vii.Capsule staining
viii.Spore staining

4. CULTIVATION OF BACTERIA:

i)Nutritional requirements
ii)Nutritional types of bacteria
iii)Bacteriological media
iv)Physical condition for growth
v)Classification and choice of media
vi)Conditions of incubation (Both for aerobic and anaerobic cultures)

5. PURE CULTURES AND CULTURAL CHARACTERIESTICS:

Introduction -
i)Pure culture and mixed culture.
ii)Methods of isolation of pure culture,
iii)Maintenance and preservation of pure culture.
iv)Culture characteristics –
i.Growth on agar slants,
ii.Growth in broth,
iii.Growth in stabs;
iv.Colony characteristics, Growth characteristics.

6. STERILIZATION AND DISINFECTION:

a. Introduction and definition of the terms:
i)Sterilization,
ii)Disinfection and Disinfectant,
iii)Antiseptic, sanitizer,
iv)Germicide,
v)Bactericide,
vi)Bacteriostasis,
vii)Sepsis
viii)Asepsis and Antimicrobial agent.
b. Factors affecting sterilization and disinfection.
i)Sterilization Methods- by heat, chemicals, radiation and filtration.
ii)Characteristic of ideal disinfectant.
iii) Major group of chemical agents as disinfectants.

7. BACTERIA OF MEDICAL IMPORTANCE:

Classification, antigenic structure, pathogenicity, diseases caused, isolation, characterization-Morphology, cultivation and laboratory diagnosis including specimen collection of the following bacteria.

i) Staphylococcus
ii) Streptococcus
iii) Bacillus
iv) Salmonella, Proteus, Escherichia, Pseudomonas, Klebsiella
v) Bordetella and Neisseria
vi) Spirochaetes: Treponema, Leptospira, Borrelia
vii) Vibrio
viii)Corynebacterium

ix) Mycobacterium
x) Clostridium.

8. INTRODUCTION TO MYCOSES

a. Introduction, Morphology and Structure of fungi
b. classification of pathogenic fungi.
c. Nutrition and cultivation of fungi.
d. Cutaneous, Sub cutaneous and Systemic Mycosis (in brief)
e. Lab diagnosis of fungal Infections
f. Opportunistic fungal infections

9. VIRAL INFECTIONS TO HUMAN:

a. General properties of viruses,
b. Classification of viruses
c. Lab diagnosis of viral infections
d. Cultivation of viruses
e. Diseases caused, laboratory diagnosis and prevention of following viruses,
i)AIDS
ii)Hepatitis
iii)Polio
iv)Dengue
v)Postnatal/Congenital infections due to CMV
vi)Herpes Simplex Virus
vii) Rubella

10. BIOSAFETY:

i)Principles of biosafety
ii)Decontamination
iii)Disposal of wastes

11. ADVANCED METHODS FOR MICROBIAL DETECTION

i) Automation in Microbiology and antibiotic Sensitivity test
(Bactac, API 20E,Vitek)
ii) Nucleic acid testing methods

12. **QUALITY CONTROL IN MICROBIOLOGY**

SECTION - II IMMUNOLOGY

1.INTRODUCTION TO IMMUNOLOGY

2. IMMUNITY

i)Introduction
ii)Classification of immunity
(1)Innate immunity
(2)Acquired immunity
(3)Active & Passive immunity
(4)Cell mediated immunity
(5)Humoral immunity

3. COMPONANTS OF IMMUNOSYSTEM

i)Phagocytic cells
ii)T cells
iii)B cells

4. ANTIGEN

Introduction-
i)Types – Immunogens & Haptens
ii)Heterophile & Forssman antigen
iii)Antigenic Determinants
iv)Immunogenicity

5. ANTIBODY

i)Structure & Diversity of antibody
ii)Monoclonal Antibodies and their production
iii)Polyclonal antibody

6. COMPLEMENT

i)Introduction
ii)Activation Various Pathway
iii)Complemet fixation test

7. HYPERSENSITIVITY

i)Introduction and classification of Hypersensitivity
ii)Immediate & delayed Hypersensitivity
iii)Anaphylactic reaction
iv)Tuberculin skin test

8. AUTOIMMUNITY

Basic concepts of Autoimmunity

9. VACCINES

i)Introduction
ii)Vaccination Schedule in India

10. ANTIGEN-ANTIBODY REACTION & THEIR APPLICATIONS:

i) Precipitation tests: The ring test, Agar diffusion methods.

ii) Agglutination tests: Tube test, agglutination microscopic and macroscopic test.

iii) Other serological test: Fluorescent – antibody technique, Haemagglutination test. Lateral flow through assays and Immunochromatography test.

iv) Introduction to Enzyme linked immunosorbent assay (ELISA), RIA, Dot immunoassay,WesternBlot, PCR.

REFERANCE BOOKS:

01. General Microbiology. Roger Y.Stainer, Edward A.Adelberg and John L.Ingrahm,4th ed.,Prentice Mall Inc.

02. Mackie and McCartney Medical Microbiology. A Guide to Laboratory Diagnosis and control of Infection.13th ed., J.P.Duguid, B.P.Marmion and R.H.A.Swain, The English Language Book Society and Churchil Company.

03. Bailey and Scotts Doagnostic Microbiology. Sydney M. Finegold and Ellen Jo Barot, 7th ed., The C.V.Mosby Company.

04. Microbiology. Pelczer, Reid Chah. 5th ed., Tata Mcgraw Hill Publishing co, Ltd.

05. Mannual of Clinical Microbiology. Murray,Baron,Pfaller, Tenover, Yolken, 6th ed., Americal Society for Microbiology.

06.Text book of Microbiology. R.Ananthnarayan and C.K.Jayram Paniker, 5th ed.,Crient Longman.

07.Text Book of Immunology. James T. Barrett. 5th ed.,The C.V.Mosby co.

08. Essential Immunology. Irvan M. Roitt. 6th ed., ELBS and Blackwell Scientific Publication.

09. Immunology. Richard M.Hyde. 3rd ed., (NMS) Indian Edition,Williams and Wilkins,Baltimore, Maryland.

10. Modern Immunology A. Dasgupta. 2nd ed., 1992,Jaypee Brothers Medical Publishers.

11. Immunology. Weir. 7th ed., ELBS,Churchill Livingstone, ELBS students Edition.

12. Immunology for post graduation, Dulsy-Fatima, Arumugam, Saras Publication.

13. A text book of Microbiology, P. Chakraborty.

14. Microbiology, 5th edition, Lansing M.Prescott, John P.Harley, Donald A. Klein, McGraw Hill.

15. District laboratory practice in tropical countries VOL-2, Monica Cheesbrough, Cambridge University Press.

16. A text bool of Microbiology and immunology, 2nd Edition, Subhash Chandra Parija, ELSEVIER, a division of Reed Elsevier India Private Ltd.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

REVISED SYLLABUS FOR DIPLOMA OF MEDICAL TECHNOLOGY (EFFECTIVE FROM JULY-2014)

Paper II: CLINICAL PATHOLOGY AND PARASITOLOGY

SECTION – I CLINICAL PATHOLOGY

1. URINE ANALYSIS:

i)Anatomy and Physiology of Urine formation.
ii)Composition of Urine.
iii)Collection, Preservation & Transportation of Urine.
iv)Routine Examination Physical, Chemical & Microscopic.
v)Correlation of urinary findings in various diseases.
vi)Pregnancy Test

2. STOOL ANALYSIS:

i)Collection, Preservation & Transportation of Stool.
ii)Routine Examination Physical, Chemical & Microscopic.
iii)Correlation and significance in various diseases.

3. CEREBROSPINAL FLUID:

i)Formation of C.S.F.
ii)Collection, Preservation & Transportation of C.S.F.
iii)Composition of CSF.
iv)Physical, Chemical & Microscopic Examination.
v)Correlation of Abnormal C.S.F. findings in various diseases.

4. SPUTUM ANALYSIS:

i)Anatomy and Physiology of Respiratory system.
ii)Collection, Preservation & Transportation of sputum.
iii)Physical, Microscopic & Bacteriological Examination.

5. EXAMINATION OF BODY FLUID:

a.Transudate & Exudate
b.Indications, Collection and Examination-Physical, Chemical & Microscopic of following body Fluids
i)Pleural,
ii)Peritoneal,
iii)Pericardial
iv)Synovial fluid.

6. HISTOPATHOLOGY TECHNIQUES:

a. Routine& Special stains, Museum- Technique & Specimen preservation
b.Tissue Processing and Staining
i)Micro tomes-types, Tissues processing technique cry tome
ii)Fixative cleaning agents
iii)Automation in Histopathology- Tissue processors cryotome
iv)Sample preparation- glossing techniques

v)H & E stain, special stains & FNAC, Cytopathology Technique, staining methods.

7. SEMEN ANALYSIS:

(1) Anatomy & Physiology of Male Reproductive System.
(2) Formation of semen.
(3) Collection
(4) Physical, Chemical & Microscopic Examination as per WHO Recommandation.
(5) Medico – legal significance of Semen examination.

8. GASTRIC ANALYSIS:

(1) Anatomy and Physiology of Stomach.
(2) Collection, Preservation, Transportation & analysis.
(3) Significance and diagnostic importance of Gastric secretions in various clinical conditions.

SECTION – II PARASITOLOGY

1) INTRODUCTION OF CLINICAL PARASITOLOGY:

An elementary study of the types of animal associations, parasitism, commensalism and Symbiosis. Types of parasites, sources of infection,Classification of protozoa & Helminthes.

2) PROTOZOA:

Introduction, classification & study of individual Protozoa
(i) Entamoeba histolytica
(ii) Giardia lamblia
(iii) Leishmania donovani
(iv) Plasmodia its different species
(v) Toxoplasma gondii.
(vi) Trypenosoma.
(vii)Trichomonas

3) CESTODES:

Introduction, classification & study of individual Cestodes.
(i) Taenia saginata.
(ii) Taenia solium.
(iii) Echinococcus granulosus.

4) TREMATODES:

Introduction ,classification & study of individual Trematodes
(i)Schistosoma haematobium,
(ii)Schistosoma mansoni
(iii)Schistosoma japonicum.

5) NEMATODES:

Introduction , classification & study of individual Nematodes.
(i) Intestinal Nematodes:
Ascaris lumbricoides, Ancylostoma deodenale, Necator americans, Strongiloides stercoralis, Trichnella spiralis, Trichuris trichuria, Enterobius vermicularis.
(ii) Somatic Nematodes:
Wuchereria bancrofti, Wuchereria malayi, Dracunculus medinensis.

REFERENCE BOOKS:

01 Text Book of Medical Laboratory Technology, P.B.Godkar, 1994, Bhalani Publishing House,Mumbai

02. Medical Laboratory Technology,Vol I & II, 1999, K.L.Mukharjee.Tata MacGraw Hill.

03. Medical Laboratory Technology, Ramnik Sood, 4th ed., 1994,Jaypee Brothers.

04. A Hand Book Of Clinical Pathology , Chakraborthy & Battacharya, Academic Publisher.

05. Parasitology, K.D.Chatterjee, Chatterjee Medicasl Publisher.

06. Clinical Diagnosis and management by laboratory methods 20th Edition John Bernard Henry Saunders 2005.

07. Medical Parasitology 2nd edition, D.R.Arora, B.Arora, CBS Pub.& Distributer.

08. Text book Of Medical Parasitology, P. Chakraborty, New Central book Agency.

09. District laboratory practice in tropical countries VOL-2, Monica Cheesbrough, Cambridge University Press.

10. Concise Clinical pathology, Ila M. Vora, Pradeep Vaideeswar, Bhalani publishing House, Mumbai, India.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

REVISED SYLLABUS FOR DIPLOMA OF MEDICAL TECHNOLOGY (EFFECTIVE FROM JULY-2014)

Paper III: HAEMATOLOGY AND BLOOD BANKING

SECTION –I HAEMATOLOGY

1) PHYSIOLOGY OF BLOOD

(i) Normal Erythropoesis.
(ii) Leucopoesis.
(iii) Formation & Function of Blood Platelets.

2) A. INTRODUCTION

(i) Collection of Blood samples for Haematological studies.
(ii) Types of Anticoagulants.
(iii) Capillary Blood, Venous blood & Storage of Samples.

B. HAEMATOLOGICAL TEST

(i) Hemoglobin and its estimation.
(ii) Red blood cell, White blood cell count, Platelet count-counting fluids preparation, Function.
(iii) Study of Peripheral smear, Differential WBC count, Morphology of red Blood Cells,
(iv) Romanowasky stains, Staining procedures, preparation of Stains, Artifacts & troubleshooting.
(v) Haematocrit (PCV)
(vi) Absolute Blood Indices.RDW, PDW, PCT.

(vii) Erythrocyte sedimentation rate.
(viii) Osmotic Fragility test-fluid preparation.

3) ANAEMIAS

(i) Definition & Classification of Anaemias.
(ii) Iron & B-12 deficiency anaemia.
(iii) Anaemias of Chronic disorders & Aplastic anaemia.
(iv) Haemolytic anaemia / Sideroblastic anaemia.
(v) R.B.C. Metabolism & G-6PD deficiency anaemia.
(vi) Polycythemia.

4) HAEMOGLOBINOPATHIES

(i) Structure of Haemoglobin Molecule.
(ii) Types of normal Haemoglobins.
(iii) Abnormalities of Haemoglobin Molecule.
(iv) Sickle Cell Anaemia.
(v) Thalassemia
(vi) Tests for Haemoglobinopathies: 1. Screening test (i)Sickling test
(ii) NESTROF
2. Confirmative test (i) Electrophoresis
(ii)HPLC

6) LEUKAEMIAS

(i) Defination, Classification of Leukaemias.
(ii) Cytochemical reaction.
(iii) Acute & Chronic Myeloid Leukaemias.

7) BLOOD COAGULATION

(i) Mechanism of Blood Coagulation.
(ii)Bleeding time/ Clotting time/ Clot Retraction.
(iii)Thrombin time/ Prothrombin time
(iv)Coagulation disorders, Haemophilia A & Haemophilia B.
(v)Platelet disorders.

8) Automation in hematology- Analyser- a) Principle, b) procedure, c) drawbacks & Advantages, d) trouble shooting.

9) Quality control and standard preparation in Hematology.

SECTION – II BLOOD BANKING

1) PRINCIPLES OF IMMUNOHAEMATOLOGY.

2) BLOOD GROUP SYSTEM –I

(i) ABO blood Group system, subgroup of ABO, Variants of ABO blood group system.
(ii) Rh blood group system.
(iii)Serological techniques for detection of ABO & Rh antigens.
(iv)Gel technique for blood grouping and serological Techniques.
(v) AHG test.

3) BLOOD GROUP SYSTEM – II

(i)Other Blood Group systems
(ii)Importance of Atypical antibodies, their detection and clinical significance

4) BLOOD COLLECTION

(i)Screening of Donor,
(ii)Blood Collection,
(iii)Storage and transportation of blood,
(iv)Component preparation:
a)Red cell concentrate
b)Washed red cells
c)FFP
d)Cryoprecipitate
e)Platelet concentrate

5) COMPATIBILITY TESTING

(i)Compatibility testing and special methods of routine and emergency crossmatch
(ii)Trouble shooting in grouping and crossmatching

6) TRANSFUSION REACTION

(i)Types of Transfusion reaction,
(ii)Investigation of Transfusion reaction.

7) HAEMOLYTIC DISEASE OF NEWBORN

Haemolytic disease of the New born due to
(i)ABO incompatibility,
(ii)Rh incompatibility
(iii)Other blood group incompatibility.

.

8) AUTOMATION & BIOSAFETY IN BLOOD BANKING.

9) QUALITY CONTROL IN BLOOD BANKING.

REFERENCE BOOKS :

1. Clinical Haematology. M.M.Wintrobe. Kothari's Indian Edition.
2. Practical Haematology. J.A.Dacei & S.M.Lewis The English Language Book Society. 8th ed., ELBS
3. Handbkook of Medical Laboratory Technology. Bharucha, Meyerm, Moody, Carman, Vellore.
4. Technical Manual, Americal Association of Blood Banks.1996.
5. Compendium Transfusion Medicine, Dr. R.N. Makroo, J. Mitra.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
REVISED SYLLABUS FOR DIPLOMA OF MEDICAL TECHNOLOGY
(EFFECTIVE FROM JULY -2014)

Paper IV: CLINICAL BIOCHEMISTRY

SECTION – I INTRODUCTION

1) GENERAL LABORATORY TECHNIQUES:

i)Important properties of water
ii)Balances and weighing
iii)Units of measurement
iv)Preparation of solution
v)H+ concentration and pH
vi)Acid and Base,
vii)Buffers and buffer action
viii)Indicators
ix)Osmosis and osmotic pressure
x)Safety in the Clinical Laboratory

2) ANALYTICAL PROCEDURES :

i) Photometry: Introduction, Principle of absorption of radiation. The Beer-Lambert's law and its applications in clinical chemistry.
ii) Electrophoresis: Introduction, Principle, basic components, types.

3) INSTRUMENTATION:

i)Principle,
ii)Basic components and use in biochemistry of the following:
(1)PH meter
(2)Colorimeter
(3)Spectrophotometer
(4)Flame photometer
(5)Centrifuges

4) AUTOMATION:

i) Principles
ii) Types and Applications

5) QUALITY CONTROL IN BIOCHEMISTRY:

i)Introduction,
ii)Importance of Quality Control.
iii)Accuracy,
iv)Precision and Reliability;
v)Distribution of data, Central tendency
vi)Standard Deviation.
vii)Preparation of Q.C. Chart,
viii)Normal range,
ix)Coefficient of variation of standards & controls.
x) Quality Control procedures

6) CLINICAL INFORMATICS, LABORATORY INFORMATION PROCESSING, WEB REPORTING.

SECTION – II BIOCHEMISTRY

BIOCHEMISTRY AND ROUTINE BIOCHEMICAL TESTS:

1)CARBOHYDRATES:-

i) Introduction
ii)Classification of carbohydrates
iii)Regulation of Blood Glucose
iv)Determination & Clinical Significance of blood glucose and urine glucose
v)Hyperglycemia and Hypoglycemia
vi)GTT
vii)Diabetes

2) PLASMA PROTEIN: -

i) Introduction
ii) Function of plasma proteins
iii) Determination of proteins
iv) Clinical significance of plasma proteins

3) LIPIDS AND LIPOPROTEINS :-

i)Introduction of lipids and lipoproteins
ii)Essential fatty acids
iii)Determination of Cholesterol
iv)Triglycerides and lipoproteins
v)Clinical significance of lipids and lipoproteins

4) ENZYMES:

a. Introduction to enzymes, as catalysts, nomenclature, classification,properties, factors affecting enzyme activity,isoenzymes and coenzymes.
b. Clinical Enzymology
i)Therapeutic, diagnostic and analytical uses of enzymes
ii)Enzyme assays in clinical Biochemistry
iii)Conventional methods and Kinetic methods of determination and their clinical significance for,
1. Phosphatases
2. Transminases
3. Lactate dehydrogenases
4. Creatine Kinase
5. Amylase
6. Gama glutamyl Transferase

5) HORMONES:

i) Introduction to Thyroid and parathyroid hormones,
ii) Adrenal Hormone,

iii) Pituitary hormones and sex hormones.
iv) Determination of T_3, T_4, TSH, β-HCG.

6) VITAMINS:

i) Introduction
ii) Determination of Vit. B_{12} & Vit. D_3

7) ELECTROLYTES AND BLOOD GASES:

i) Introduction of electrolytes,
ii) Determination of sodium, potassium, serum calcium, urinary calcium, phosphorus, Chloride, iron and their clinical significance.

8) FUNCTION TESTS:

i) Liver function test
ii) Renal function tests
iii) Pancreatic function tests
iv)Cardiac function tests.

9) MEDICO LEGAL ASPECTS IN LABORATORY FUNCTIONS.

REFERENCE BOOKS:

1. Outlines of Biochemistry. E.Conn, K.Stumf, G.Bruening & H.Dol, 5/E, John Welley & Sons.

2. Practical Clinical Biochemistry. Horald Varley, 4/E, CBS Publishers.

3. Clinical Chemistry – Interpretation & Techniques, 2nd ed., Kaplan & Lavarnel szabo, Lea & Febiger Publication.

4. Medical Laboratory Technology, 5th reprint 1999, Vol. I, II & III, K.L.Mukharjee, Tata McGraw Hill.

5. Medical Laboratory Technology – Methods & Interpretation, Sood, 4th ed., Jaypee Brothers.

6. Textbook of Medical Laboratory Technology, P.B.Godkar, 1994,Bhalani Publishing House, Mumbai.

7. Hand Book of Medical Laboratory Technology. Chitra Bharucha, H.Meyer R.H.Carman, C.M.College & Hospital, Vellore.

8. Fundamental of Biochemistry A.C.Deb, New Central Book Agency.

9. Clinical Biochemistry. 3rd ed., L.A.Kaplan & A.J.Pesce, The C.V.Mosbey Co.

10. Fundamental of Clinical chemistry.4th ed., Edited by N.W.Tietz, W.B.Saunders Company.

11. Clinical guide to laboratory Tests. 3rd ed., 1995, Tietz.

12. Tietz Text Book of Clinical Chemistry, 2nd., 1994,Burtis, W.B.saunders Company.

13. Basic Techniques in Clinical Laboratory Science.3rd ed., 1992, Linne, Mosbey Publication.

14. Lynch's Medical Laboratory Technology, 4th ed., Raphael, Asian Edition, Saunders Company Publication.

15. Textbook of biochemistry for medical students, 4th edition, D.M.Vasudevan, Shreekumari S. Jaypee brothers medical pub.ltd,Newdelhi.

16. Biochemistry, 3rd edition, U. Satyanarayan, U. Chakrapani, Books & Allied Pvt Ltd Kolkatta.

17. Textbook of medical biochemistry, 5th edition, M.N.Chatterjee, Rana Shinde, Jaypee brothers Medicalpub Ltd,New delhi.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

PROPOSED MODIFIED REVISED PRACTICAL SYLLABUS OF DIPLOMA IN MEDICAL TECHNOLOGY

(Effective from July-2014)

PRACTICALS BASED ON PAPER – 1

SECTION – I MICROBIOLOGY

1. Study of Compound Microscope.
2. Cleaning, Neutralization and preparation of glassware for sterilization.
3. Examination of living Bacteria.
   a) Wet mount preparation
   b) Hanging – drop technique.
   c) Semisolid stab agar test.

3. (A) Staining of the bacterial cell:
   a) The Simple Stain
   b) The Negative Stain.

   (B) Differential Staining
   a) The Gram Stain
   b) The Acid fast Staining.

   (C) Special Staining
   a) The Spirocheate Stain
   b) The Metachromatic Granules Stain.
   c) The spore Stain
   d) The Capsule Stain
   e) The Flagella Stain

4. Study of some important biochemical reactions.
   a) Indole Test.
   b) Methyl red Test.
   c) V.P. Test.
   d) Citrate Utilization Test.
   e) H_2S Production (2% peptone)
   f) Study of TSI slants with different
   g) Fermentation of Sugars
   h) Test for enzyme activity-Oxidase, Catalase, Coagulase, Urease,

5. Preparation of media, pH adjustment and preparation of buffers

(A) Bacteriological Media

a) Nutrient agar
b) MacConkey' agar — For Enteric Bacteria
c) EMB agar
d) Wilson & Blair's agar for Salmonella sp.
e) CLED medium for Urinary Tract Infection.
f) King's medium for Pseudomonas sp.
g) Manitol Salt agar for Staphylococcus sp.

(B) Mycological Media

a) Potato – dextrose agar.
b) Glucose Yeast Extract agar.
c) Sabouraud'agar

6. PURE CULTURE STUDY OF THE FOLLOWING CULTURES.

(i) *Bacillus cereus*
(ii) Staphylococcus aureus
(iii) Escherichia coli
(iv) Enterobacter aerogenes(Klebsiella mobillis)
(v) Klebseilla pneumoniae
(vi) Proteus vulgaris
(viii)Salmonella typhi / paratyphi A / paratyphi B
(ix) Pseudomonas aerugenosa

7. Demonstration of common fungi - Penicillin, Aspergillus, Rhizopus, Mucar, Yeast.

8. Isolation and identification of aerobic and anaerobic bacterial / pathogens from pathological specimens.

SECTION – 1I IMMUNOLOGY

Diagnostic tests:

1. ICT/Dot immunoassay/ Flow through assay for HIV Ab
2. ICT/Dot immunoassay/ Flow through assay for HBs Ag
3. ICT/Dot immunoassay/ Flow through assay for HCV Ab
4. Slide / Tube/ Strip / Cassette, Dot immunoassay test for typhoid
5. Slide test for syphilis/Flow through /Spot/ Immunodot for Syphillis
7. Slide / Strip / Cassette test for Pregnancy
8. Latex test for Rheumatoid arthritis
9. Latex test for C-Reactive protein
10. Latex test for Anti Streptolysin O(ASO).
11. Immunoassays for Tuberculosis
12. Leptospirosis ICT (Demonstration)
13. Chickungunya ICT (IgG,IgM) (Demonstration)
14. Mantoux test. (Demonstration)

REFERANCE BOOKS :

1. Medical Laboratory Technology. 5th Reprint 1999, Vol. I,II & III, K.L.Mukharjee Tata McGraw Hill.
2. Text Book of Medical Laboratory Technology, P.B.Godkar, 1994, Bhalani Publishing House.
3. Medical Laboratory Technology, Ramnik Sood 4th ed., 1994, Jaipee brothers.
4. Hand book of Medical Laboratory Technology.Bharucha, Meverm, Mody Carman.

5. Lynch's medical Laboratory Technology,3rd ed., Stanley S. Raphael, W.B.saynders Company, Asian Edition.
6. Practical Medical Microbiology. Collee, Duguid, fraser, Marmlom,24thed.,Churchill Livingstone.
7. Laboratory Exercises in Microbiology, 2nd ed., Michael J. Pelczer,Macgraw Hill Book Company.
8. A Hand book of Practical Immunology. G.P.Talwar, Vikas Publishing House Pvt. Ltd.

9. Collection and Handling of Laboratory Specimen – A Practical guide,1983,Editor T.M.Slockbower and T.A. Bhumenfeld,L.B.Lippincott Company,USA.

10. Crown & Steel's Mannual for the Identification of medical Bacteria.3rd Ed, Edited by G.I. Barrow and R.K.A. Felthan, Pub. Cambridge University Press.

PRACTICALS BASED ON PAPER – II

SECTION – 1 CLINICAL PATHOLOGY

1. Urine Analysis: Physical, Chemical, Microscopic examination.
2. Stool Analysis: Physical, Chemical, Microscopic examination.
3. Cerebrospinal Fluid: Physical, Chemical, Microscopic examination.
4. Sputum examination: Physical, Microscopic
5. Gastric Analysis: Chemical examination of gastric juice.
6. Semen examination: Physical, Chemical, Microscopic examination.
7. Body fluids (each separately): Physical, Chemical, Microscopic examination.
8. Cutting, Fixation and processing of tissues (Demonstration).
Staining – (i) Haematoxylin and Eosin for paraffin sections.
(ii) PAP Stain for cytology.

SECTION – 1I PARASITOLOGY

1. Test for malarial parasite: 1.Thin smear, Thick smear
2. ICT

2. Test for Filarial parasite: (slide)

3. Dehaemoglobinization techniques for Malaria & Filaria.

REFERENCE BOOK:

1. Medical Laboratory Technology, 5th reprint 1999, Vol. I, II & III, K.L.Mukharjee.Tata McGraw Hill.

2. Text Book of Medical Laboratory Technology P.B.Godkar, 1994,Bhalani Publishing House,Mumbai.

3. Medical Laboratory Technology, Ramnik Sood,4th ed., 1994,Jaypee Brothers.

4. Hand Book of Medical Laboratory Technology, Bharucha, Meyerm, Mody, Carman.

5. Lynch's Medical Laboratory Technology, 3rd ed., Stanley S.Raphael,W.B.Saunders Company, Asian edition.

6. A Hand Book of Clinical Pathology,Chakraborthy & Bhattacharya, Academic Publishers.

7. Parasitology, K.D.Chatterjee,Cheterjee Medical publishers.

8. Collection and Handling of Laboratory Specimens – A Practical Guide, 1988 Editor T.M.Slockbower & T.A.Bhumenfeld, J.B.Lippincott Company,USA.

9. Basic laboratory Method in Medical Parasitology, WHO, 1991.

PRACTICAL BASED ON PAPER III

SECTION – 1 HAEMATOLOGY

1. Methods of Blood Collection and Anticoagulants
2. Haemoglobin estimation: Sahli's method and Cyanmethaemoglobin method.
3. Total R.B.C.
4. Total W.B.C. Count.
5. Differential Count.
6. Platelet Count.
7. Reticulocyte Count
8. E.S.R.
9. Packed cell volume/ Determination of Haematocrit.
10. Bleeding time, Whole Blood Coagulation time and Prothrombin time.
11. Osmotic fragility test (Demonstration).
12. Preparation of various stains & reagents for hematology test
13. Sickling test.
14. Immature cells of leukemia (Demonstration).
15. Interpretation of Automated strips in various clinical condition.

SECTION – 1I BLOOD BANKING.

1. ABO cell grouping and serum grouping by slide and tube method.
2. Rh typing – Various Techniques.
3. Anti A/ Anti B titer
4. Anti D titration by albumin and indirect antiglobulin technique
5. Test for HBsAg (Hepatitis B surface Antigen) ELISA and Rapid Test (Demonstration).
6. Test for HIV Antibodies (ELISA and Rapid Test) (Demonstration).
7. (a) Cross matching procedures.
   (b) Direct Antiglobulin (Coomb's) Test.
   (c) Indirect antiglobulin test.

REFERENCE BOOKS:

1. Medical Laboratory Technology,5th reprint 1999,Vol.I,II & III, K.L.Mukharjee, TataMcGraw Hill

2. Text book of Medical Laboratory Technology, P.B.Godkar, 1994,Bhalani Publishing House, Mumbai.

3. Medical Laboratory Technology, Ramnik Sood, 4th ed., 1994,Jaypee Brothers.

4. Hand book of Medical Laboratory Technology, Bharucha, Meyerm, Mody, Carman.

5. Lynch's Medical Laboratory Technology, 3rd ed., Stanley S. Raphael, W. B. Saunders Company, Asian edition.

6. Practical Haematology. J. A. Dacie & S. M. Lewis, The English Language Book Society, 8th ed., ElBS

7. Collection and Handling of Laboratory Specimen – A Practical Guide, 1983,Editor T. M. Slockbower & T.A. Bhumenfeld, J. B. Lippincott company, USA

PRACTICAL BASED ON PAPER IV

SECTION – I INSTRUMENTATION

1. Operation of pH meter, Single pan Balance, Spectrophotometer,Colorimeter, Autoanalyzer, Electrophoresis. (Demonstration)

SECTION – 1I CLINICAL BIOCHEMISTRY

Preferably all the test should be done on semi Auto analyser.

1)Blood Glucose/Sugar estimation and GTT.
2) Blood Cholesterol – Free & Total HDL Cholesterol, LDL Cholesterol.
3) Serum Triglyceride
4) Serum Total Protein and Serum Albumin and A/G ratio
5) Microalbumin test
6) Blood/Urine Urea.
7) Blood /Urine Creatinine.
8) Blood /urine Uric Acid
9) Serum Calcium / Ionized Calcium
10)Serum potassium
11)Serum Sodium
12)Serum Chloride
13)Serum Iron, and TIBC (Total Iron Binding Capacity)
14) Serum Bilirubin.
15)Serum Alkaline Phosphatase.
16)Serum Acid Phosphatase.
17)S.G.O.T
18)S.G.P.T.
19)Serum Amylase.
20)Serum Lipase
21)Serum Protein Electrophoresis and Lipoprotein electrophoresis (Demonstration).
22)Cardiac Troponin T (Demonstration)
23)Cardiac Troponin I (Demonstration)
24)T3 ,T4, TSH ELISA (Demonstration)

----------xxx----------