

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. MEDICAL TECHNOLOGY (MICROBIOLOGY / BIOCHEMISTRY)
Syllabus for M.Sc. Part-II Third and Forth Semester
(To come in force from July 2011)

1. There are four theory papers and corresponding practicals in semester -3. The external examination will be taken at the end of semester. For each semester the ratio between the internal assessment and external assessment will be 30:70.
2. M.Sc. Part-II Sem.-4 is given for project work. The distribution of marks is given in scheme.
3. For internal assessment one test will be held at the end of each semester. In addition to the test, seminars will be conducted for internal assessment in the theory course. In practicals the internal marks will be given based on the test conducted during the semester, regularity and journals.
4. All PG rules of the VNSG University are applicable to students admitted to M.Sc. Medical Technology course.
5. Following is the summary of scheme for M.Sc. Part-II Third & Forth Semester.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. MEDICAL TECHNOLOGY (MICROBIOLOGY / BIOCHEMISTRY)
Syllabus for M.Sc. Part-II Third and Forth Semester
(To come in force from July 2011)

1. Eligibility for Admission: B.Sc. with Microbiology / Medical Technology / Bioscience / Biochemistry subject or PG DMLT of this university or of any other recognized university there to may be admitted to the course.
2. The Institute will conduct an entrance test and admission will be given on the basis of marks obtained at degree examination and in entrance test.
3. There are four theory papers and corresponding practicals in semester -3. The external examination will be taken at the end of semester. For each semester the ratio between the internal assessment and external assessment will be 30:70.
4. M.Sc. Part-II Sem.-4 is given for project work. The distribution of marks is given
5. For internal assessment one test will be held at the end of each semester. In addition to the test, seminars will be conducted for internal assessment in the theory course. In practicals the internal marks will be given based on the test conducted during the semester, regularity and journals.
6. All PG rules of the VNSG University are applicable to students admitted to M.Sc. Medical Technology course.
7. Following is the summary of scheme for M.Sc. Part-II Third & Forth Semester.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. MEDICAL TECHNOLOGY (MICROBIOLOGY / BIOCHEMISTRY) Part-II
(Semester Scheme)
Inforce from June 2011
Teaching and Examination Scheme for Semester - III

| Paper | Teaching Schedule Hrs./wk | University Exam Theory/Practical | Internal Exam Theory/Practical | Total Theory/Practical | |
|--|---------------------------|----------------------------------|--------------------------------|------------------------|------------|
| Duration (hrs) | Mark | | | | |
| Theory | | | | | |
| MT301: Instrumentation & Bistatistics | 3 | 3 | 70 | 30 | 100 |
| MT302: Clinical Bacteriology / MT305 Clinical Biochemistry I | 3 | 3 | 70 | 30 | 100 |
| MT303: Clinical Virology / MT 306 Clinical Biochemistry II | 3 | 3 | 70 | 30 | 100 |
| MT304: Clinical Mycology & Parasitology / MT307: Clinical Biochemistry III | 3 | 3 | 70 | 30 | 100 |
| | | | | | |
| Practical | | | | | |
| MT308: Practical-I Instrumentation MT 309: Practical-II Microbiology & Immunology / MT310: Practical-II Biochemistry | 12 | 21 | 140 | 60 | 200 |
| TOTAL | 24 | | 420 | 180 | 600 |

Teaching and Examination Scheme for Semester – IV

| Paper | Teaching Schedule Hrs./wk | University Exam Theory/Practical | Internal Exam Theory/Practical | Total Theory/Practical | |
|-----------------------------|---------------------------|----------------------------------|--------------------------------|------------------------|------------|
| Duration (hrs) | Mark | | | | |
| MT 401: Project Work | 42 | | 420 | 180 | 600 |

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Syllabus of M.Sc. Medical Technology Part-II Third Semester (Microbiology/Biochemistry)
(In force from June, 2011)
MT 301 INSTRUMENTATION & BIOSTATISTICS

Total Marks : 100 (External 70 + Internal 30) Total Hours : 45

Unit 1

Electrophoresis and HPLC:

Topic-1 Principle of Electrophoresis, Types of Electrophoresis, Techniques and applications of Agarose Gel Electrophoresis, Polyacrylamide Gel Electrophoresis (PAGE), Isoelectric Focussing Electrophoresis, Western Blotting, Southern Blotting, Immuno Electrophoresis and Capillary electrophoresis

Topic-2 Principles of High Performance Liquid Chromatography (HPLC), Lay out of Instrument, Bonded phase supports, Normal phase & Reversed phase LC, Isocratic & Gradient elution, Name and comparison of common detectors (No Working)

Unit 2

Atomic Spectroscopy and Radiometric Techniques

Topic-1 Principles & applications of Flame emission spectroscopy and Atomic Absorption Spectroscopy (AAS), Lay out of Instrument – Components in brief.

Topic-2 Radio isotopes and their applications in medicinal field, Isotope Dilution Analysis, Radioimmunoassay (RIA)

Unit 3

Gas Chromatography and Ion Exchange Chromatography

Topic-1 Lay out of Instrument – Principle of separation, Mobile phase, stationary phase in GLC, Detectors FID & TCD, Applications

Topic-2 Ion Exchange Resins, Principles of ion exchange, Batchwise & continuous detection, Applications

Unit 4

Miscellaneous Techniques

Topic-1 Paper Chromatography, Thin Layer Chromatography, Elementary Idea of HPTLC

Topic-2 Principles and applications of Affinity Chromatography and Gel permeation Chromatography (GPC), Principles & applications of chemiluminiscence

Unit-5

Biostatistics

Introduction to Biostatistics, Preliminary Concepts, Source of data, Primary and secondary data, Accuracy & Precision, Measures of variables, Mean, Median, Range, Average deviation, Standard deviation, variance, coefficient of variation, Introduction to normal distribution curve, correlation and regression, Sample theory & statistical test, Various sampling methods, Student t-test, Chi-square test, Q-test for rejection of data

REFERENCE BOOKS :

1. Introduction to Instrumental Analysis by R.D. Braun; Pub: Pharma Med Press, Hyderabad
2. Instrumental Methods of Chemical Analysis by Chatwal & Anand Pub: Himalya Publishing House
3. Methods in Biostatistics, B. K. Mahajan, Pub: Jaypee Brothers.
4. Instrumental Methods of Chemical Analysis by G. W. Ewing, 6e, McGraw Hill
5. Instrumental Analysis by Skoog, Holler and Grouch Pub: Brooks/Cole-Cengage Learning
6. Practical Biochemistry by Wilson and Walker Pub: Cambridge Press

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Syllabus of M.Sc. Medical Technology Part-II Third Semester (Microbiology)

(In force from June, 2011)

MT 302 CLINICAL BACTERIOLOGY

Total Marks : 100 (External 70 + Internal 30)

Total Hours : 45

Unit-I

1. General Guidelines for specimen selection & collection, specimen transport & preservation, specimen acceptability criteria.
2. Sample collection from different anatomical sites; macroscopic and microscopic observations
3. Processing of clinical samples: cultures techniques, identification techniques - biochemical, serological and molecular biological methods, Antimicrobial susceptibility tests.
4. Bio-waste management

Unit-II

Morphology, cultural characteristics, pathogenesis, pathology, laboratory diagnosis, prevention and treatment of the diseases caused by:

Staphylococcus, Streptococcus, Pneumococcus, Bacillus, Corynebacteria, Clostridia

Unit-III

Morphology, cultural characteristics, pathogenesis, pathology, laboratory diagnosis, prevention and treatment of the diseases caused by:

Neisseria, Escherichia, Salmonella, Shigella, Enterobacter, Klebsiella, Proteus, Providencia, Pseudomonas, Vibrio

Unit-IV

a) Morphology, cultural characteristics, pathogenesis, pathology, laboratory diagnosis, prevention and treatment of the diseases caused by:

M. tuberculosis, M. leprae, Atypical mycobacteria, Chlamydia, Rickettsia, Treponema, Borrelia, Leptospira

- b) 1. Automation in laboratory diagnosis of bacterial diseases
2. Hospital infections

Unit-V

1. Molecular diagnosis of bacterial diseases
2. Drug resistance mechanism
3. Laboratory diagnosis of respiratory track infections, intestinal track infections, bacteremias and septicemias, sexually transmitted diseases

MT 303 CLINICAL VIROLOGY**Total Marks :** 100 (External 70 + Internal 30)**Total Hours :** 45**Unit-I****Clinical Virology**

Collection, transport and laboratory diagnostic techniques in the diagnosis of viral diseases.

Unit-II**Morphology, classification, pathogenesis, clinical manifestations and laboratory diagnosis of the diseases caused by DNA viruses**

1. Pox viruses – Variolla and Vaccinia
 - Cow pox and orf, Molluscum contagiosum
2. Herpes virus – Herpes simplexvirus type 1 and 2
 - Herpes zoaster
 - Varicella
3. Adenovirus
4. Hepatitis B

Unit -III**Morphology, classification, pathogenesis, clinical manifestations and laboratory diagnosis of the diseases caused by RNA viruses**

1. Myxoviruses – Orthomyxovirus - Influenza
Paramyxoviruses – Mumps, Parainfluenza, Measles
2. Polio virus
3. Rhinovirus – Commoncold
4. Hepatitis A
5. Rubella virus

Unit -IV**Morphology, classification, pathogenesis, clinical manifestations and laboratory diagnosis of the diseases caused by:** Rotavirus ,Calcivirus, Astrovirus, Coronavirus and other diarrheic viruses**Unit – V****Morphology, classification, pathogenesis, clinical manifestations and laboratory diagnosis of the diseases caused by:** Hepatitis – C and D, HIV, Rabies, Cytomegalovirus, Infectious mononucleosis, Arboviruses – Chickungunya, Japanese Encephalitis, Yellow fever, Dengue.

MT 304 CLINICAL MYCOLOGY AND PARASITOLOGY

Total Marks : 100 (External 70 + Internal 30)

Total Hours : 45

Unit – I

Clinical Mycology

1. Classification, taxonomy and Clinical significance of human pathogenic fungi.
2. Characteristic of clinically important fungi – Yeasts and Molds
3. Isolation and identification of human pathogenic fungi
4. Laboratory diagnosis of fungal diseases.
5. Invitro techniques for susceptibility of antifungal agents.

Unit – II

Superficial Cutaneous and Sub-cutaneous mycosis

Malassezia infections – Pityriasis versicolor, Tinea Nigra, Piedra, Dermatophytosis, Sporotrichosis, Rhinosporidiosis

Unit – III

Systemic and Opportunistic mycosis

Histoplasmosis, Blastomycosis, Candidiasis, Cryptococcosis, Aspergillosis, Penicilliosis, Pneumocystosis

Unit-IV

Clinical Parasitology -Morphology, classification, pathogenesis, clinical manifestations and laboratory diagnosis of the diseases caused by:

1. Protozoa: *Entamoeba*, *Giardia*, *Trichomonas*, *Plasmodium*, *Leishmania*, *Trypanosoma*.
2. Cestodes: *D. latum*, *Taenia*, *Echinococcus*, *H.nana*.
3. Trematodes: *Systozomia*, *Fasciola*, *Paragonimus*.
4. Intestinal Nematodes: Round worm, Hook worm, Thread worm, Pin worm, *S. stercoralis*.
5. Tissue nematodes: *Filaria*, *Dracunculosis*.

Unit-V

1. Techniques of stool examination for parasitic diseases.
2. Recent advances in the laboratory diagnosis of parasitology.
3. Importance of parasitic diseases in immunocompromised hosts in reference to clinical picture and laboratory diagnosis.

REFERENCE BOOKS :

1. Clinical Microbiology Procedures Handbook, Henry D Isenberg, Vol. 1 & 2, ASM Press, 1994.
2. Essential Procedures for Clinical Microbiology, Henry D Isenberg, ASM Press, 1998.
3. 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 Churchill Livingstone.
4. Diagnostic Microbiology, Finegold and Martin, 6th ed., The C.V. Mosby Co.
5. Bailey and Scott's Diagnostic Microbiology, Sydney M. Finegold and Ellen Jo Baron, 7th ed., The C.V. Mosbey Co.
6. Practical Medical Microbiology, Collee Duguid, Fraser, Marmion, 24th ed., Churchill Livingstone.
7. Microbiology, Davis, Dulbecco, Eisen and Ginsberg, 3rd ed., Harper International Edition.
8. Manual of Clinical Microbiology, Murray, Baron, Pfaller, Tenover, Tenover, Tenover, Yolken, 6th ed., American Society for Microbiology.
9. Topley & Wilson's Microbiology and Microbial Infections, Leslie Collier, Albert Balows, Max Sussman, Vol. 2 & 3, 9th Ed.

10. Prescott/Harley/Klein's Microbiology, by [Joanne Willey](#), [Linda Sherwood](#) and [Chris Woolverton](#), 7th Ed., 2007, McGraw Hill Higher Education.
11. Fundamental of Medical Virology, LS Kucera, QN Myrvik, 2nd Ed. , Lea & Febiger.
12. Molecular Biology, David Freifelder, 2nd Ed. , Jones and Bartlett Pub., Boston
13. Molecular Biology of the Gene, JD Watson, NH Hopkins, JW Roberts, 4th Ed. The Benjamin Cummings Pub. Co.
14. Diagnostics Molecular Microbiology; Principle and Applications, DH Persing, TJ White, 1993, American Society for Microbiology
15. Molecular Diagnostics for the Clinical Laboratory, WB Coleman, GJ Tsongais, 1997, Humana Press.
16. Diagnostics Bacteriology Protocols, Jenny Howard and DM Ehicombe, Humana Press, 1995.
17. Medical Parasitology; A practical approach, SH Gillespie and PM Hawkey, 1995, IRL Press.
18. Medical Parasitology; A self-instructional text, Ruth Leventhal and RF Cheadle, 3rd Ed., 1989, FA Davis Co.
19. Medical Parasitology, EK Markell, M Voge and DT John, 6th Ed., 1986, W.B. Saunders Co.
20. Textbook of Medical Parasitology, CK Panikar, 4th ed.,1999, Jaypee Brothers.
21. An Introduction to Fungi, HC Duby, 1990, Vikas Publishing.
22. Basic Laboratory Procedures in Clinical Bacteriology, J Vandepitte, K Engbaek, 1991, World Health Organization.
23. Clinical Mycology By William E. Dismukes, Peter G. Pappas, Jack D. Sobel Contributor William E. Dismukes, Peter G. Pappas, Jack D. Sobel Published by Oxford University Press US, 2003

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Syllabus of M.Sc. Medical Technology Part-II Third Semester (Biochemistry)

(In force from June, 2011)
MT 305 CLINICAL BIOCHEMISTRY - I

Total Marks : 100 (External 70 + Internal 30) Total Hours : 45

Unit 1.

Metabolism of Carbohydrates :

Introduction of metabolism, absorption of carbohydrates, Formation of & breakdown of glycogen, glycolysis, citric acid cycle, HMP shunt, gluconeogenesis, fate of lactic acid, formation & fate of pyruvic acid, regulation of carbohydrate metabolism, generation of energy in carbohydrate metabolism.

Unit 2.

Regulation of glucose in blood & principles & techniques in carbohydrate chemistry :

Regulation of glucose levels in blood, diabetes mellitus- features & biochemical events in glycosuria- causes & investigations, Principles & techniques in carbohydrate chemistry

- a. Estimation of blood sugar
- b. Glucose tolerance test
- c. Galactose tolerance test
- d. Insulin tolerance test
- e. Glycosylated hemoglobin

Unit 3

Lipid Metabolism :

Absorption & transport of lipids in the body, oxidation of fatty acids, lipogenesis & its regulation, metabolism of cholesterol, phospholipid, lipoprotein, triglycerides, ketosis, fatty liver, atherosclerosis.

Unit 4

Lipids :

Biosynthesis of fatty acids & triglycerides, Diseases associated with lipoprotein metabolism, Principle & techniques for estimation of total lipids, Total cholesterol, HDL cholesterol, Triglycerides, Clinical significance of lipid estimation.

MT 306 CLINICAL BIOCHEMISTRY - II

Total Marks : 100 (External 70 + Internal 30)**Total Hours :** 45

Unit 1**Protein Metabolism :**

Absorption of amino acids & their fate in the body, Formation & fate of ammonia in the body, metabolism of amino acids, formation of urea & its fate.

Unit 2**Proteins :**

Biosynthesis of proteins, DNA replication, DNA recombinant technology & genetic engineering, principles & techniques estimation of protein and urea by different methods.

Unit 3**Mineral metabolism**

Metabolism and importance of the following

Sodium, potassium, calcium, magnesium, iron, phosphorous, iodine, copper and zinc

Unit 4**Metabolism of Purine and Pyrimidine Nucleotides :**

Biomedical importance of purine and pyrimidine nucleotides, Biosynthesis of purines and pyrimidines, regulation of purine and pyrimidine nucleotides.

MT 307 CLINICAL BIOCHEMISTRY - III

Total Marks : 100 (External 70 + Internal 30) **Total Hours :** 45

Elementary Physiology and anatomy :

Elementary physiology and anatomy of a man as a background to laboratory work, Structure and function of specific organs as liver, heart, pancreas, spleen, lymphnodes, bone marrow, kidney etc. and important systems. (not to be asked in examination)

Unit 1

Nutritional Status in Health Disease / Malnutritional disorders:

Marasmus, Kwashiorkor, Nutritional deficiency of Vitamins & minerals, Prescribed diet

Unit 2

Inborn Errors of Metabolism:

Biochemical bases of inborn errors of metabolism

Inborn errors of amino acid metabolism: Phenyl ketonuria, alkaptonuria, albinism, cystinuria, hypertyrosinemia, homocystinuria

Inborn errors of carbohydrate metabolism: Glycogen storage disease, essential pentosuria, fructosuria, galactosemia

Inborn errors of lipids metabolism: Gaucher's disease, Niemann pick disease, Fabry's disease, Tay-sach's disease

Unit 3

Liver Functions :

Functions of Liver: Metabolic functions, excretory functions, protection & detoxification functions, Hematological functions, storage functions

Diseases of Liver – Jaundice, Hepatitis, Drug induced hepatic damage

Principle and clinical importance of ALP, GGT, ACT, AST, Bilirubin, Prothombintime, Total protein & albumin

Unit 4

Kidney Functions :

Formation of urine, Excretory and Reabsorptive functions, Regulatory functions, Water homeostasis, Endocrine functions, Glomerular Filtration Rate

Introduction to disease of kidney:

Kidney profile test, BUN, Serum creatinine, Total protein, Albumins, Globulins, A/G ratio. Serum electrolytes, Creatinine clearance test, Routine urine examination test, Urine dipstick test

Unit 5

Biochemical aspects of Cancer and tumor markers:

Etiology of cancer, Biochemical changes in cancer cells, Role of oncogenes, proto-oncogenes & tumor suppressor genes. Introduction to Apoptosis and Biochemical basis of metastasis. Evaluation of Tumor Markers in cancer management viz. CEA, AFP, CA-15-3, PSA, CA-125, ER and PR

REFERENCE BOOKS

1. Outlines of Biochemistry, Eric E. Conn, Paul K. Stumpf, George Bruening & Roy H. Doi, 5th Ed., John Wiley & sons Inc., N.Y.
2. Textbook of Biochemistry for Medical Students, Vasudevan & Shreekumari S., 5th Ed. 2007, Jaypee Brother Ltd.
3. Biochemistry, Lubert Stryer, 1988, W.H. Freeman & Company, USA
4. Biochemistry, J. David Rawn, 1989, Neil Patterson Publishers (USA).
5. Henry's Clinical Diagnosis and Management by Laboratory Methods, RA McPherson & MR Pincus, 21st, 2007, W.B. Saunders Company.
6. Fundamentals of Clinical Chemistry, Editor Norbert W. Tietz, 3e, W.B. Saunders Company.
7. Text Book of Biochemistry with Clinical Correlations, Editor Thomas M. Devlin, 4e, Wiley Liss.
8. Harper's Biochemistry, Murray, Granner, Mayers and Rodwel, 25th, 2002, McGraw Hill.
9. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics by CA Burtis, ER Ashwood & DE Bruns, 4th Ed., 2007, W.B. Saunders Company.
10. Lehninger Principle of Biochemistry, DL Nelson & MM Cox, 3rd Ed., 2000, Indian Reprint, Macmillan Worth.
11. Fundamental of Biochemistry, Deb, 1996, New Central Book Agency.
12. A Textbook of Medical Biochemistry, Chatterjee and Shinde, 7th Ed, 2008, Jaypee Publication.
- 13.
14. Biochemistry by U. Satyanarayan, 3rd Ed., 2010 (Revised Reprint), Books and Allied (P) Ltd
14. Medical Biochemistry, NV Bhagvan, 4th Ed., 2002, Academic Press
15. Fundamental of Biochemistry, JL Jain, 6th Revised Ed., 2008, S.Chand & Co. Ltd.
16. Clinical Chemistry: Theory, Analysis, Correlation by LA Kaplan, AJ Pesce & SC Kazmierczak; 4th Ed., 2003, Mosby.

M.Sc. Medical Technology Part II Third Semester (Biochemistry)
MT 308 PRACTICAL-I
INSTRUMENTATION

1. Separation of DNA by Agarose Gel Electrophoresis
2. Purification of protein by ion-exchange chromatography
3. Separation of amino acids by paper chromatography
4. Separation of Leishmann's stain by paper chromatography
5. Separation of amino acids and or carbohydrates by TLC
6. Determination of effect of inhibitor on K_m & V_{max} values
7. Estimation of protein by Bradford's method
8. Estimation of protein by Folin-Lawry's method
9. Scanning of absorption spectra of color formed in biochemical assay on single beam spectrophotometer.

Demonstration Experiments

1. Estimation of biochemistry parameter using autoanalyser
2. Scanning of absorption spectra of Threonine (any amino acid) on double beam spectrophotometer
3. Determination of Na^+ & K^+ in blood serum using flame photometer.
4. To measure growth of bacteria using turbidimeter.

M.Sc. Medical Technology Part II Third Semester (Microbiology)

MT 309 PRACTICAL-II
MICROBIOLOGY

Students will perform following experiments.

- 1) Microscopic techniques: Bright field and Dark field
- 2) Measurement of Growth: SPC, MPN and turbidometry
- 3) Cultivation of anaerobic bacteria
- 4) Susceptibility test: Dilution method and Disk diffusion method
- 5) Preservation of cultures: Routine methods and Cryopreservation
- 6) Isolation and identification of pathogenic microorganisms from clinical samples
 - i) Urine
 - ii) Blood
 - iii) Stool
 - iv) Pus
 - v) Aspirates
 - vi) Sputum
- 7) Isolation and identification of Mycobacteria (Demonstration)
- 8) Cultivation of viruses: Bacteriophage isolation
- 9) Isolation and identification of Fungi
- 10) Cultivation and Identification of protozoa

REFERENCE BOOKS FOR PRACTICALS

- 1) Practical Medical Microbiology, Collee Duguid, Fraser, Marmion, 24th ed., Churchill Livingstone.
- 2) Collection and Handling of Specimens; A practical guide, Slockbower and Bhumenfeld, 1983, Lippincott Co. USA
- 3) Laboratory Exercises in Microbiology, 2nd Ed. M Pelczar, McGraw Hill Pub.
- 4) Molecular Diagnostics for the Clinical Laboratory, WB Coleman, GJ Tsongais, 1997, Humana Press.
- 5) Diagnostics Bacteriology Protocols, Haward and Ehicombe, 1995, Human Press.
- 6) Clinical Microbiology Procedures Handbook, Vol.1 & 2, Isenberg, ASM Press.
- 7) Manual of Clinical Microbiology, Murray, Baron, Pfaller, Tenover, Tenover, Yolken, 8th ed., American Society for Microbiology.
- 8) Textbook of Medical Laboratory technology, 2nd Ed., Godkar & Godkar, Bhilani Pub. House, Mumbai.
- 9) Experimental Microbiology, Patel & Patel, 2000, Aditya Pub., Ahmedabad.
- 10) Methods in Microbiology: Microscopy & Staining, Desai & Desai, Prashant Pub., Vidhyanagar.
- 11) Medical Laboratory Sciences: Theory & Practical, Orchel & Kolhatkat, Tata McGraw Hill Pub.
- 12) 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 Churchill Livingstone.

**MT 310 PRACTICAL-II
BIOCHEMISTRY**

Estimation of the following

1. Blood Glucose by GOD-POD method
2. Serum Total Protein by modified by Biuret method and Serum Albumin by BCG method
3. Serum Total Cholesterol by Wybenga & Pileggi method
4. Total & HDL Cholesterol by CHOD-PAP method
5. Serum Triglycerides by GPO-PAP method
6. Serum Urea by DAM method
7. Serum Urea by NED-Dye method
8. Serum Uric Acid by Uricase-POD
9. Serum Uric Acid by Phosphotungstate method
10. Serum Creatinine by Alkaline Picrate method
11. Serum Creatinine by Jaffe's reaction
12. Serum Bilirubin by Malloy & Evelyn method
13. Serum Bilirubin by Jendrassik & Grof method
14. Serum Calcium by OCPC method
15. Serum Phosphorus by Molybdate method
16. Serum Sodium by Trinder methods
17. Serum Potassium by Tetraphenyl Boron method
18. Serum Amylase by Street Close method
19. Serum CPK & CPK-MB by CK-NAC IFCC method
20. ALT by 2-4 DNPH method
21. ALT by IFCC-UVkinetic method
22. AST by 2-4 DNPH method
23. AST by IFCC-UVkinetic method
24. ALP by Kind & King method
25. ALP by pNPP method
26. Colorimetric determination of G6PD
27. Determination of Glycated Hb

REFERENCE BOOKS OF PRACTICALS

1. Medical Laboratory Technology (Methods and Interpretation), R. Sood, 3e, Jaypee Brothers.
2. Medical Laboratory Technology, Vol. I, II & III, K. L. Mukherjee, 1997, Tata McGraw Hill.
3. Ion Exchange Chromatography - Principles & Methods, Pharmacia Biotech.
4. Gel filtration - Principle & Methods, Pharmacia Biotech.
5. Affinity Chromatography - Principle & Methods, Pharmacia Biotech.
6. Instrumental Methods of Chemical Analysis, G. W. Ewing, 6e, McGraw Hill.
7. Practical Clinical Biochemistry, Harold Varley, 5th Edition, 1990, Arnold Heinemann.
8. Practical Clinical Chemistry, Toro & Ackermann, 1985, Little Brown & Company.
9. Handbook of Medical Laboratory Technology, Chitra Bharucha & others, 1987, A. H. Press, Vellore.
10. Tietz Clinical Guide to Laboratory Tests, AHB WU; 4th Ed., 2006, Elsevier
11. Textbook of Medical Laboratory Technology, PB Godkar; 2nd Ed., 2003, Bhalani Publishers
12. Practical Biochemistry: Principles and Techniques, Wilson & Walker, 5th Ed., Cambridge Univ. Press.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. MEDICAL TECHNOLOGY (MICROBIOLOGY / BIOCHEMISTRY)
SYLLABUS FOR SEMESTER – IV
(In force from July 2011)
MT 401 : PROJECT WORK

Marks: 600 (420 Marks Ext. + 180 Marks Int.)

Project:

During this semester, the students will carry out project work. The students will be assigned project either individually or jointly between two students by the qualified teachers. Students are not expected to carry out entirely new work. They can do evaluation of a techniques or can take up project, which has importance in recent time. The students will prepare dissertation which should contain the following;

- a) Introduction to the subject
- b) Objective
- c) Review of Literature
- d) Methods & Materials
- e) Result & Discussion
- f) Conclusion
- g) Bibliography

Above Project work shall be carried out under V.N.S.G.University, Surat.

Review of Research Article:

Besides project work, the students will give seminars regularly during semester on the Project Work and they will be given one or two research articles for study, summary and critical review. Both seminar and review of articles will be assessed continuously by the faculty internally.

Microteaching:

Students will be given one topic, which he/she has to prepare and do teaching for 30-40 minutes.

The report of project work will be submitted well in time before the semester ends.

The Dissertaion will be evaluated by one internal and one external examiner. The candidate/s will prepare report of the project in printed and bound form. The candidate will present his / their project report before the panel of examiners and face Viva to be conducted by the same panel of examiners.

The break up of marks will be as under.

| No. | Subject | External | Internal | Total |
|-----|----------------------------|------------|------------|------------|
| 1 | Dissertation Evaluation | 300 | - | 300 |
| 2 | Presentation of Project | 70 | - | 70 |
| 3 | Viva | 50 | - | 50 |
| 4 | Seminar during Semester | - | 70 | 70 |
| 5 | Review of Research Article | - | 70 | 70 |
| 6 | Microteaching | - | 40 | 40 |
| | TOTAL | 420 | 180 | 600 |