VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Revised Syllabus of M.Sc. (Medical Technology) Part-I
(In force from July 2008)

A student offering Medical Technology will study papers I, II, III and IV and practicals based on these papers.

The teaching hours per week for 4 papers are 12 and there are 12 hours per week of practicals.

The university examination of each paper will be of 3 hours duration. The total marks of papers are 210 for university examination distributed as 52, 52, 52 and 54 of paper no. I, II, III and IV respectively. The internal evaluation is of 90 marks distributed as 22, 22, 22 and 24 respectively. The total 200 marks for practical examination are distributed as 140 marks for university examination and 60 marks for internal evaluation. The university practical examination is of 20 hours distributed over a period of 4 days.

SYLLABUS FOR
M.Sc. MEDICAL TECHNOLOGY PART-I
IN FORCE FROM JULY - 2008
PAPER - I GENERAL MICROBIOLOGY

Total Marks : 74 (52 Marks Ext. + 22 Marks Int.)

Unit-1

(a) History

History of bacteriology, Immunization, Medical Microbiology, Asepsis and Chemotherapy, Contribution of Nobel laureates in the development of Microbiology

(b) Cellular Microbiology

Cellular Organelles of Prokaryotic and Eukaryotic,
Morphological changes during growth of bacteria - Cell division, Cell grouping, Life cycle changes, Transport of nutrients, Endocytosis and Exocytosis

Unit-2

Methods of studying Microorganisms

Design and Operation of various types of Microscopes –Dark field Microscope, Phase contrast Microscope, Fluorescence Microscope, Electron Microscope, Atomic Force Microscope, Scanning Tunneling Microscope, Interference Microscope, Confocal Scanning Tunneling Microscope.

Enrichment culture techniques, Microbial growth kinetics, Factors affecting microbial growth, Technioques to measure growth, Microbial Culturing Techniques
Bacteria: Aerobic, Anaerobic and Fastidious,
Fungi and Yeast, Protozoa and Viruses

Unit-3

Microbial Taxonomy

Bacterial Taxonomy: Bacterial Nomenclature and Classification, Phylogenetic Relationships, Bergey's Manual of Systematic Bacteriology

Identification of Bacteria – Phenotypic based, metabolic activity based, chromatography, Molecular methods: Phylogenetic methods

Unit-4

(a) Principles of Parasitology

Characteristics and Classification of Protists, Fungi, Helminthes and Arthropods

(b) General Virology

Bacterial Viruses: Structure and Functions, Mode of Multiplication, Classification and Naming

Animal Viruses: Structure and Functions, Mode of Multiplication, Classification and Naming

Medical Importance of Viruses, Virus like Agents – Satellite, Viroids, Prions

Unit-5

(a) Principles of Disease

Host Parasite Relationships, Indigenous Flora of Human Host, Kinds of Diseases
Progress of Disease- Signs, Symptoms and Syndrome
Establishments of Diseases and Pathogenicity Islands
Non-Specific Defense Mechanisms: Predisposing factors of host resistance
Physical Barriers, Chemical Barriers and Biological Mechanisms

(b) Epidemiology and Nosocomial Infections

Epidemiology of infectious diseases: Epidemiological techniques, Role of host in infectious disease, Transmission of diseases through - air, water, food, arthropod and direct contact, Lab procedure for epidemiologic analysis of microorganisms

Nosocomial Infections: Sources, susceptibility and transmission, Surveillance and control, Handling and disposal of biohazard

REFERENCE BOOKS:

1. General Microbiology, Roger Y. Stanier, Edward A. Adelberg and John L. Ingraham, 4th ed., Prentice Mall, Inc.
2. Mackie and McCartney Medical Microbiology, Aguide 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.
3. Fundamentals of Microbiology, Frobisher, Hinsdill, Crabtree and Goodheart, 9th ed., W.B. Saunders Company.
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. Microbiology, Pelzar, Reid, Chah, 4th ed., Tata McGraw Hill Publishing Co. Ltd.
7. Practical Medical Microbiology, Collee Duguid, Fraser, Marmion, 24th ed., Churchill Livingstone.
8. Microbiology, Davis, Dulbecco, Eisen and Ginsberg, 3rd ed., Harper International Edition.
9. Manual of Clinical Microbiology, Murray, Baron, Pfaller, Tenover, Yolken, 6th ed., American Society for Microbiology.
10. (Brock) Biology of Microorganisms by Paulette W. Royt and George And rykovitch, 2004.
11. Bergy's Manual of Determinative Bacteriology by D. Bergy, Williams, James Staley, Noel R. Kreig and Peter Sneath, 9th ed., 1994, Lippincott Williams & Wilkins
12. The Physiology and Biochemistry of Prokaryotes by David White, Third Edition, Oxford University Press.
13. Microbial Physiology by Albert G. Moat (Editor), John W. Foster and Michael P. Spector, 2002.

M.Sc. (MEDICAL TECHNOLOGY) PART-I
Syllabus for Practicals of General Microbiology
(In force from 2008-09)

1. Basic microbiological techniques
2. Cleaning and sterilization of glass wares
3. Study of bacterial motility
4. Methods of sterilization
5. Negative staining
6. Gram staining
7. Acid fast staining
8. Spirochete staining
9. Cell wall staining
10. Endospore staining
11. Capsule staining
12. Metachromatic granule staining
13. Flagella staining
14. Preparation and sterilization of media (solid and liquid)
15. Cultivation and isolation of bacteria (streak, spread and pour plate techniques)
16. Cultivation and isolation of fungi
17. Cultivation and isolation of yeast
18. Cultivation and isolation of anaerobic bacteria
19. Effect of chemicals and antibiotics on bacterial growth
20. Antibiotics sensitivity tests
21. Different biochemical tests for identification of pathogens
22. Isolation and identification of microorganisms
23. Sterility testing of pharmaceutical products
24. Cultivation of bacteriophage - λ Phage
25. Microbial growth curve

REFERENCE BOOKS:

1. Clinical Laboratory Methods, 9th ed., 1982 by J.D. Bauer, C.V. Mosby Company, St. Louis, Toronto, Landon.
2. Clinical Diagnosis by Laboratory Methods by Davidson Henry, 15th ed. (S.G. Wasaniper, Macmillan Company St. Lousis, Toronto, London.
3. Clinical Laboratory Methods and Diagnosis, Vol.I & II, 8th ed. by Sonnenwirtn and Barett, The C.V. Mosby Company, St. Louis, Toronto, Landon.
4. Collection and Handling of Laboratory Technology Specimens by Slockbower.
5. Handbook of Medical Laboratory Technology, Chitra Bharucha, 1987.
6. Medical Laboratory Technology, Methods & Interpretations, R. Sood, 3rd ed., Jaypee Brothers.
7. Methods in Microbiology, Microscopy & Staining, J.D. Desai and A.J. Desai, Prashant Publishers, Vallabh Vidyanagar.
8. Medical Laboratory Technology, Vol. I-III, K.L. Mukherjee, Tata McGraw-Hill Publishing Company Ltd.

SYLLABUS FOR
M.Sc. MEDICAL TECHNOLOGY PART-I
IN FORCE FROM JULY - 2008
PAPER - II GENERAL BIOCHEMISTRY

Total Marks : 74 (52 Marks Ext. + 22 Marks Int.)

Unit-1

a) Basic Concepts of Biochemistry
Units of measurements, CGS, MKS and SI systems, Solutions, Acid base aspects, Ion product of water, pH and pK, Hendersen Hasselbalch equation (no derivation), Buffers and buffer action, Fundamental principles of pH meter, colorimeter and spectrophotometer.

b) Specimen Collection and Preservation
Types of body fluids used for analysis, Anticoagulants, Types, Mode of action, Selection of appropriate anticoagulant, Application, Changes in blood on keeping, Collection, preservation and other aspects of other fluids

c) Acid Base Metabolism
Acids and bases and conjugate acid-base pairs, Buffers, Mechanism action of buffer system, Major body buffers, Maintenance of acid base balance- role of lungs and kidney, Acid base disorders

Unit-2

a) Carbohydrates
Definition, Classification, Monosaccharide, Structural aspects and functional aspects, Reactions of monosaccharides, Isomerism, Importance of various monosaccharides, Disaccharides, Homo and heteropolysaccharides

b) Lipids
Definition, Classification, Biomedical importance, Structural and functional aspects of simple, compound, derived and miscellaneous lipids, Eicosanoids (Prostaglandins)

Unit-3

a) Amino Acids
Amino acids, Classification, Structural and functional aspects of various amino acids, Physical properties of amino acids, Reactions of amino acids,

b) Proteins
General nature and Structural aspects of Proteins, Primary structure, Secondary structure, Tertiary structure, Quaternary structure, Denaturation and renaturation of proteins, Classification of proteins, Determination of primary structure, Plasma proteins, Types of plasma proteins, Importance of plasma proteins, Immunoglobulins, Fractionation of proteins

c) Enzymes

Introduction, Nomenclature and classification, Coenzymes and cofactors, Enzyme specificity, Mechanism of enzyme action, Factors affecting enzyme catalyzed reactions, Enzyme inhibition in brief, Enzymes in clinical diagnosis

Unit-4

a) Nucleic Acids and Nucleoproteins

Introduction, Various types nitrogenous bases and their structural aspects, Nucleosides, Nucleotides, Synthetic nitrogenous bases, nucleosides and nucleotides and their importance, Structural and functional aspects of DNA, Structural and functional aspects of RNA, Messenger RNA, Transfer RNA, Ribosomal RNA, Other types of RNA and Ribonucleoproteins, Retrovirus and adenovirus, Nucleosomes, Chromosomes

b) Molecular Biology and Bioinformatics

Introduction to terminology of molecular biology, Introduction to bioinformatics

Unit-5

a) Nutrition

Nutritional importance of Carbohydrates, fats, proteins, Calorific values, Respiratory quotient, Basal metabolic rate, its measurement and factors affecting it, Specific dynamic action, Biological value, Balanced diet, Obesity, Nutritional implications of disease

b) Vitamins

General nature, structural, functional aspects, requirement and deficiency manifestations of Water Soluble vitamins (Thiamin, Riboflavin, Niacin, Pyridoxine, Pantothenic acid, Folic acid, Cobalamin, Biotin, Ascorbic acid,Vitamin like substances) and Fat soluble vitamins (Vitamin A, Vitamin D, Vitamin K, Vitamin E

c) Hormones

Brief introduction to hormones, Mechanism of hormone action, Different types of hormones

M.Sc. (MEDICAL TECHNOLOGY) PART-I
Syllabus for Practicals of General Biochemistry
(In force from 2008-09)

PRACTICALS

1. Basic Aspects of Practical Laboratory

Hazards from dangerous chemical in the clinical chemistry laboratory, Precautions to take to avoid the accidents, Fire, infection, Corrosive chemicals, Toxic fumes, Broken glassware, Burns caused by heat, Carcinogens

2. Basics of laboratory techniques

Methods of measuring liquids, Cleaning glassware, Methods of weighing, Chemical and reagents, pH, Buffers and preparation of buffers, Measurement of pH of a solution, Indicators, Titration

3. Specimen Collection and Handling

Anti coagulants, Collection and preservation of urine samples, Cerebrospinal fluid and other fluids

4. Estimations Based on Spectrophotometry

1) Estimation of glucose by Chemical methods and enzymatic methods. Advantages and disadvantages of these methods
2) Estimation of total proteins and albumin and calculation of A/G ratio
3) Estimation of serum cholesterol by Chemical methods and enzymatic methods. Advantages and disadvantages of these methods
4) Estimation of HDL Cholesterol, triacylglycerol and calculation of VLDL and LDL
5) Estimation of LDL cholesterol by direct method and comparison with the results obtained with Freidewald's formulae
6) Estimation of total lipids by Phosphovanillin method
7) Estimation of Calcium by Trinder's method, Cresolphthalein complexone method and Alizarin method. Advantages and disadvantages of these methods
8) Estimation of Phosphorous by the phosphomolybdic acid method
9) Estimation of Iron and & TIBC by the ferrozine method
10) Estimation of serum Creatinine by End point method and Kinetic method
11) Estimation of blood urea by DAM method and Enzymatic method. Advantages and disadvantages of these methods
12) Estimation of Bilirubin by Modified diazo method and DMSO method
13) Estimation of uric acid
14) Estimation of microprotein in urine
15) Estimation of Glycated haemoglobin

REFERENCE BOOKS:

1. Lehninger's Principles of Biochemistry by Nelson & Cox, 3rd Ed., 2000, MacMillan Press.

2. Biochemistry by L Stryer, 3rd ed., W.H. Freeman & CO.

3. Harper's Biochemistry by RK Murray, DK Granner and PA Mayes, 25th Ed., 2002, McGraw Hill.

4. Principles of Biochemistry by R Horton, LA Moran and D Rawn, 4th Ed., 2005, Prentice Hall.

5. Textbook of Biochemistry by TM Devlin, 4th Ed., 1997, John Wiley & Sons.

6. Fundamental of Clinical Chemistry by NW Tietz, 3rd Ed., W.B. Saunders.

SYLLABUS FOR
M.Sc. MEDICAL TECHNOLOGY PART-I
IN FORCE FROM JULY - 2008
PAPER - III GENERAL IMMUNOLOGY

Total Marks : 74 (52 Marks Ext. + 22 Marks Int.)

Unit-1

(a) Introduction to immunology

Introduction: Terminologies, History of Immunology, immunity – types of immunity – innate and acquired.

(b) Immune system and immune response

Immune system: Anatomy of lympho- reticular system – Primary lymphoid organ. Secondary lymphoid tissue, cells of the immune system – detailed aspects of T and B cells, receptors, activation and function

(c) Antigen

Antigen: Types, properties, haptens, epitopes, adjuvants

(d) Immunoglobulin

Immunoglobulin - Structure, types and properties. Organization and expression of Immunoglobulin genes, generation of antibody diversity, Monoclonal antibodies and their applications

Unit-2

(a) Antigen - antibody interactions

Antigen - antibody reactions: Principles and application of Agglutination, Precipitation and Complement fixation

(b) Complement and inflammation

Functions and components, complement activation pathways, complement activation regulation, consequences of complement activation and complement deficiencies, chemokines and other mediators of inflammation, inflammatory process

(c) Major histocompatibility complex

Major histocompatibility complex: Major histocompatibility complex genes and molecules and their functions, various groups of HLA system, HLA typing and applications

(d) Antigen processing and presentation

Antigen presenting cells and antigen processing pathways

Unit-3

(a) T cell receptor
Structure of T cell receptor, T cell receptor complex, T cell accessory membrane molecules, TCR Peptide MHC ternary complex

(b) T cell
T cell maturation, Activation and Differentiation, effector T cells, cytotoxic T cells, NK T cells

(c) B cell maturation and response
B cell maturation, activation and proliferation, Humoral response

(d) Cytokines
Properties, Receptors, Cytokine antagonists, Cytokine secretion and Cytokine related diseases

Unit-4

(a) Immunity to infection

Viral infections, Bacterial infections, Protozoan infections and Helminthes infections

(b) Vaccines development
Active and Passive immunization, Types of vaccines – whole organisms, Purified macromolecules, recombinant vector vaccines, DNA vaccines, Multivalent subunit vaccines

(c) Immunity to tumors and transplants
Cancer, oncogenes, tumor antigens, cancer immunotherapy

(d) Immunodeficiency
Primary immunodeficiency, AIDS and other acquired or secondary immunodeficiency

Unit-5

(a) Hypersensitivities - Mechanisms and Detection

IgE mediated (Type I) Hypersensitivity, Antibody mediated (Type II) Hypersensitivity, Immune complex mediated (Type III) Hypersensitivity,
Delayed type (Type IV) Hypersensitivity

(b) Autoimmunity
Organ specific and systemic autoimmune diseases

(c) Immunohematology
Blood cells and their generation, blood groups ABO Rh system, blood typing and cross matching test Coombs test, Rh incompatibilities, blood banking

d) Laboratory techniques

Cell culture, Western blotting, Immuno fluorescence, Chemiluminescence, ELISA, EIA, RIA, r DNA technology, microarrrays, Flow cytometer, in vivo methods- Skin tests

REFERENCES.

1. Kuby Immunology, Richard A. Goldsby, Thomas J. Kindt, Barbara A. Osborne, Janis Kuby, W H Freeman & Co.; 4th edition, 2000

2. Cellular and Molecular Immunology, Abul K. Abbas, Andrew H. Lichtman, Jordan S. Pober, Abdul K. Abbas. W B Saunders Co; 4th edition, 2000

3. Immunobiology, Charles Janeway (Editor), Paul Travers, Garland Pub; 5th edition, 2001

4. Roitt's Essential Immunology, Ivan M. Roitt, Peter J. Delves, Blackwell Science Inc; 10th edition, 2001

5. Immunology: A Laboratory Manual, Richard L. Myers, McGraw-Hill 2nd edition, 1994

6. Manual of Immunological Methods, P. Brousseau (Editor), M. Beaudet (Editor), Yves Payette, Barry R. Blakely, CRC Press; 1998

7. Immunology (The Clinical Laboratory Manual Series), Juanita A. Smith, Delmar Learning; 1st edition, 1995

M.Sc. (MEDICAL TECHNOLOGY) PART-I
Syllabus for Practicals of General Immunology
(In force from 2008-09)

1. Widal latex agglutination qualitative and quantitative tests
2. Mantoux test
3. Anti Streptolysin O (ASO) test
4. Toludine Red Unheated Serum Test (TRUST)
5. C-Reactive Protein (CRP) test
6. Rheumatoid Arthritis (RA) test
7. Rapid Plasma Reagin (RPR) test
8. Dot immunoassay for Tuberculosis
9. Dot immunoassay for HIV 1+2
10. One step pregnancy test
11. One step Hepatitis test
12. Flow through HCV test
13. Flow through HIV 1+2 test
14. Gel precipitation tests
15. Counter immunoelectrophoresis (CIEP) - Demonstration only
16. Elisa for T3/T4/TSH (Quantitative)- Demonstration only
17. Elisa for HIV 1+2
18. Elisa for HBsAg
19. Elisa for HCV
20. ABO grouping
21. Rh grouping
22. Total count of blood cells
23. Differential count of leucocytes
24. Hemoglobin, ESR, PCV determination
25. Titration of anti A, anti B and anti D
26. Direct and indirect Coombs test

REFERENCE BOOKS:

1. Illistrated Laboratory Techniques, Nozoma Kasaki, 2nd ed., Igaku Shoin Ltd, Tokyo

2. A Handbook of Practical Immunology, G.P. Talwar, Vikas Publishing House Ltd.

3. Medical Laboratory Technology, Vol. I-III, Kanai L. Mukherjee, Tata McGraw-Hill Publishing Co. Ltd.

SYLLABUS FOR
M.Sc. MEDICAL TECHNOLOGY PART-I
IN FORCE FROM JULY - 2008
PAPER - IV MICROBIAL GENETICS

Total Marks : 78 (54 Marks Ext. + 24 Marks Int.)

Unit-1

(a) Introduction of Microbial Genetics
Mendelian genetics: Law of segregation, independent assortment,dominance, Co-dominance, semi-dominance, Epitasis, Lethal genes, Pleiotropic genes, Linkage, Crossing over, One gene -one polypeptide hypothesis, Chromosomal theories of inheritance, Genetic mapping

(b) Structure and Function of Chromosomes and Nucleic Acids
Structures and functions of Bacterial, Viral and Eukaryotic chromosomes, DNA as a genetic material, Plasmids, transposons, chloroplasts and mitochondrial DNA and their functions

Unit-2

DNA Replication
Introduction, enzymes involved in replication, molecular mechanism of bacterial replication, replication of ssDNA, dsDNA, ssRNA and dsRNA viruses, molecular basis of Lytic and Lysogenic cycle

Unit-3

Gene expression and its regulation
Transcription, genetic code, translation, molecular mechanism of transcription and translation, regulatory mechanisms of Gene expression in microbes and Operon concept, effect of antimicrobials on translation

Unit-4

(a) Gene Mutation
Types of mutation, induction of mutation, molecular basis of mutation, effects of mutation on the translation process and phenotype selection, DNA damage and repair mechanisms, restriction modification system and restriction enzymes

(b) Recombination:
Recombination in bacteria (Gene transfer mechanisms - transformation, conjugation, transduction and transfection with examples), recombination in viruses, site-specific recombination, illegimate recombination

Unit-5

(a) Basic tools and technique in genetic engineering

DNA and RNA extraction, introduction to cloning, gel electrophoresis, PCR, RT-PCR, Real-time PCR, blotting techniques (southern, Northern, western blotting), DNA Micro Array, fluorescent based in situ hybridization (FISH), DNA finger printing

(b) Gene Technology

DNA as a probe in diagnostic tests, Role of chromosomes, Plasmids and other genetic materials in diagnosis

REFERENCE BOOKS

1. Genomes, 3rd Edition by Terry Brown, Published by Garland Science, 2007
2. Gene IX by Benzamin Lewin, Published by Pearson Education, Inc., 2007
3. Modern Microbial Genetics, 2nd Edition by Uldis N. Streips & Ronald E. Yasbin, Published by Wiley & Sons, Inc., 2002
4. Molecular Biology of the Gene 5th Edition by James D Watson, Published by Pearson Education, Inc. 2003
5. Principles of Genetics, Eighth Edition by Gardner, Published by Wiley & Sons, Inc., 2005
6. Molecular Biotechnology, Third Edition by Bernard R Glick and Jack J Pasternak, Published by ASM Press, Washington, 2007
7. Essential Molecular Biology Vol. I & Vol. II, Second edition by TA Brown, Published by Oxford, 2000.
8. Microbial Genetics by D Freifelder, JE Croman and SR Maloy, 2nd Ed., 1994, Jones & Bartlett.
9. Molecular Biology by D Freifelder, 1987, Jones & Bartlett.

M.Sc. (MEDICAL TECHNOLOGY) PART-I
Syllabus for Practicals of Microbial Genetics
(In force from 2008-09)

1. Extraction of Genomic DNA from Bacteria
2. Purification of DNA
3. Estimation of DNA on Spectrophotometer and determination of quality of DNA
4. Agarose Gel electrophoresis and determination of molecular weight of isolated DNA
5. Isolation of Total RNA
6. Purification of DNA fragments of desired size from agarose gel
7. Extraction of Plasmid
8. Transformation
9. Restriction Digestion
10. Amplification of target DNA using PCR (Only demonstration)
11. Physical mutagenesis -
    a) Effects of Ultra violet light on survival of *E.coli* (tube- OD; plate-SPC) and repair by photoreactivation.
    b) Pigmentless mutants of *Serratia marcescens* (plate-SPC) and repair by photoreactivation.
    c) Production of antibiotic resistant mutants by UV irradiations.
12. Chemical mutagenesis -
    a) Chemical mutagenesis by EtBr (Lactose fermenting to non- fermenting -Mc. Conkey agar plate).
    b) Drug resistant mutants by gradient plate technique (Rifampicin plate).

REFERECE BOOKS

1) Essential Molecular biology, T A Brown, Vol 1 & 2, 2nd edition, Oxford Publications

2) Experimental Microbiology, R J Patel and K R Patel, Vol 1 & 2, 4th edition, Aditya Publications

3) Laboratory Exercises in Microbiology, M J Pelczar jr, 2nd edition, McGraw Hill Publications

SYLLABUS FOR
M.Sc. MEDICAL TECHNOLOGY PART-I
IN FORCE FROM JULY - 2008
PAPER - IV ENZYMOLOGY & ENDOCRINOLOGY

Total Marks : 78 (54 Marks Ext. + 24 Marks Int.)

Unit-1

a) General Aspects of Enzymes
Definition, Protein enzymes, Non protein enzymes, Distribution of enzymes in cells, Enzyme extraction, isolation, purification and characterization: Concept, Methods, Immobilized enzymes, Enzymes as probes in biochemical studies and investigations, Coenzymes

b) Properties of Enzymes
Nature and function as a catalyst, Nomenclature, Classification, Enzyme specificity, Substrate specificity, Stereo specificity, Reaction specificity

Unit-2

a) Enzyme Kinetics
Energy barriers for chemical reactions, Role of catalysis, Catalytic site, Principles of kinetics, Chemical kinetics, Enzyme kinetics, Michaelis-Menten equation, Derivation of the Michaelis-Menten equation, Meanings of Km, Kinetic constants regarding enzyme, activity and Specificity, Measurement of Km and Vmax, Measurement of Multisubstrate reactions

b) Ezymes Involved in Biological Oxidation
Oxidases, Aerobic dehydrogenases, anaerobic dehydrogenases, Hydroperoxidases, Oxygenases

c) Enzyme Inhibition
Reversible enzyme inhibition, Competitive inhibition, Uncompetitive inhibition, Non competitive inhibition, Irreversible enzyme inhibition, Allosteric inhibition, Suicide inhibition, Uses of enzyme inhibition, Factors affecting enzyme catalyzed reactions

Unit-3

a) Regulation of Enzyme Activity
Allosteric regulation, covalent modification, Regulation by induction and repression, Regulation by proteolytic cleavage, Difference between various types of regulation

b) Multienzyme Complexes and Multifunctional Enzymes

c) Isoenzymes

Unit-4

Clinical Enzymology

Enzymes as diagnostic reagents, Measurement of enzyme activity, Basis of modern diagnostic kits development, Enzymes as diagnostic markers, Diagnosis and prognosis of disease, Factors affecting presence and removal of intracellular enzymes from plasma, Acid Phosphatase, Alkaline Phosphatase, 5'Nucleotidase, Alanine transaminase, Asparatate transaminase, Gamma glutamy transferase, Creatine kinase, Alchohol dehydrogenase, Lacatate dehydrogenase, Alpha hydroxyl butaryl dehydrogenase, Glutamate dehydrogenase, Glucose 6 phosphate dehydrogenase, Amylase, lipase, Ceruloplasmin, Cholinesterase, Aldolase, Leucine amino peptidase, Chymotrypsin, Trypsin, Ornithine transcarbamoylase, Isocitrate dehydrogenase, Enzymes as therapeutic agents

Unit-5

Hormones

General characteristics of hormones, Hormone receptors, Mechanism of action of hormones, Action of hormones, Hypothalamus-Pituitary system, Hypothalamic hormones, Thyrotropin releasing hormone, Corticotropin releasing hormone, Gonadotropin releasing hormone, GHRH,GRIH and PRIF, Anterior pituitary hormones, Growth hormone, Prolactin, Thyroid stimulating hormone, Adrenocorticotropin, Hormones of posterior pituitary, Oxytocin, Vasopressin, Hormones of thyroid gland, Hormones of adrenal cortex, Hormones of adrenal Medulla, Gastrointestinal Hormones, Gastrin, Secretin, Cholecystokinin, Gastric inhibitory peptide, Insulin, Glucagon, Hormones of Gonads, Androgens, Estrogens

M.Sc. (MEDICAL TECHNOLOGY) PART-I
Syllabus for Practicals of Enzymology & Endocrinology
(In force from 2008-09)

1. Estimation of Following Enzymes by Various Methods

1) Alkaline phosphatase
2) Acid phosphatase
3) Alanine transaminase
4) Aspartate transaminase
5) Lactate dehydrogenase
6) Creatine phosphkinase
7) Amylase
8) Lipase
9) Gamma gultamyl transferase
10) Alpha hydroxyl butyrate dehydrogenase
11) Psuedo cholinesterase
12) Aldolase
13) Ceruloplasmin
14) 5' Nucleotidase

2. Estimation of Isoenzymes

1) LDH
2) CPK
3) Alkaline phosphatase
4) Acid phosphatase
5) Aldolase and others

3. Hormones

1) Study of Elisa and radio immunoassay techniques
2) Estimation of thyroid hormones
3) Estimation of steroid hormones

REFERENCE BOOK:

1. Harper's Biochemistry by RK Murray, DK Granner and PA Mayes, 25th Ed., 2002, McGraw Hill.
2. Medical Biochemistry by NV Bhagwan, 4th Ed., 2001, Academic Press.
3. Enzyme Structure and Mechanism by A Fersht, 2nd ed., 1985, W.H. Freeman & Co.
4. Enzyme Chemistry by Sucking CJ
5. Medical Biochemistry by JW Baynes and MH Dominiczek, 2nd ed., 2004, Mosby.
6. Manual of Endocrinology and Metabolism by N Levin, 3rd Ed., 2002, Lippincott Williams & Wilkins.
7. Clinical Chemistry; Theory, Analysis, Correlation by LA Kaplan, AJ Pesce and SC Kazmierczak, 4th Ed., 2003, Mosby.
8. Fundamental of Clinical Chemistry by NW Tietz, 3rd Ed., W.B. Saunders.