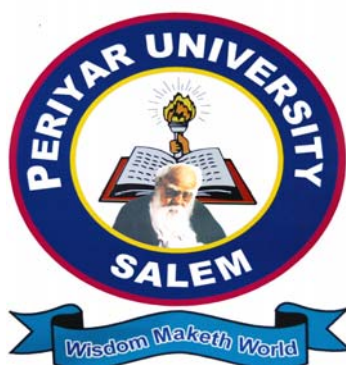


PERIYAR UNIVERSITY
PERIYAR PALKALAI NAGAR
SALEM – 636 011



DEGREE OF MASTER OF SCIENCE
CHOICE BASED CREDIT SYSTEM
SYLLABUS FOR M.SC. MEDICAL BIOCHEMISTRY
FOR THE STUDENTS ADMITTED FROM THE
ACADEMIC YEAR 2012 – 2013 ONWARDS

COURSE OF STUDY

SEMESTER I

| PART | COURSE CODE | | HOURS | CREDIT | MARKS | | |
|-----------|-------------|--|-------|--------|-------|----|-------|
| | | | | | CIA | EA | TOTAL |
| CORE I | 08PMBC01 | PHYSICO CHEMICAL ASPECTS OF BIOMOLECULES | 5 | 5 | 25 | 75 | 100 |
| COREII | 08PMBC02 | BIOMEDICAL TECHNIQUES | 5 | 5 | 25 | 75 | 100 |
| CORE III | 08PMBC03 | MOLECULAR CELL BIOLOGY | 5 | 5 | 25 | 75 | 100 |
| ELECTIVE | 08PMBCE01 | NUTRITIONAL BIOCHEMISTRY AND PHYSIOLOGY | 5 | 4 | 25 | 75 | 100 |
| PRACTICAL | 08PMBCP01 | LAB COURSE -I | 5 | 4 | 40 | 60 | 100 |
| PRACTICAL | 08PMBCP02 | LAB COURSE -II | 5 | 4 | 40 | 60 | 100 |

TOTAL CREDITS – 27

TOTAL MARKS -600

SEMESTER II

| PART | COURSE CODE | COURSE | HOURS | CREDIT | MARKS | | |
|---------|-------------|---|-------|--------|-------|----|-------|
| | | | | | CIA | EA | TOTAL |
| CORE IV | 08PMBC04 | BIOENERGETICS AND INTERMEDIARY METABOLISM | 5 | 5 | 25 | 75 | 100 |

| | | | | | | | |
|--------------|-----------|------------------------|---|---|----|----|-----|
| COREV | 08PMBC05 | CLINICAL ENZYMOLOGY | 5 | 5 | 25 | 75 | 100 |
| CORE VI | 08PMBC06 | ADVANCED ENDOCRINOLOGY | 5 | 5 | 25 | 75 | 100 |
| ELECTIVE | 08PMBCE02 | MEDICAL MICROBIOLOGY | 5 | 4 | 25 | 75 | 100 |
| VALUE EDU | | HUMAN RIGHTS | 2 | 2 | 25 | 75 | 100 |
| PRACTICAL | 08PMBCP03 | LAB COURSE -III | 5 | 3 | 20 | 30 | 50 |
| PRACTICAL | 08PMBCP04 | LAB COURSE -IV | 5 | 3 | 20 | 30 | 50 |

TOTAL CREDITS - 27

TOTAL MARKS - 600

SEMESTER III

| PART | COURSE CODE | | HOURS | CREDIT | MARKS | | |
|----------|----------------|-------------------------------|-------|--------|-------|----|-------|
| | | | | | CIA | EA | TOTAL |
| CORE I | 08PMBC07 | IMMUNOLOGY | 5 | 5 | 25 | 75 | 100 |
| COREII | 08PMBC08 | BIOMEDICAL INSTRUMENTATION | 5 | 5 | 25 | 75 | 100 |
| CORE III | 08PMBC09 | CLINICAL BIOCHEMISTRY | 5 | 5 | 25 | 75 | 100 |

| | | | | | | | |
|-----------|-----------|---|---|---|----|----|-----|
| ELECTIVE | 08PMBCE03 | BIostatistics AND MEDICAL BIOinformatics | 5 | 4 | 25 | 75 | 100 |
| PRACTICAL | 08PMBCP05 | LAB COURSE -V | 5 | 4 | 40 | 60 | 100 |
| PRACTICAL | 08PMBCP06 | LAB COURSE -VI | 5 | 4 | 40 | 60 | 100 |

TOTAL CREDITS - 25

TOTAL MARKS - 600

SEMESTER IV

| PART | COURSE CODE | COURSE | HOURS | CREDIT | MARKS | | |
|----------|----------------|---|-------|--------|-------|----|-------|
| | | | | | CIA | EA | TOTAL |
| ELECTIVE | 08PMBCE04 | MOLECULAR BIOLOGY AND BIOTECHNOLOGY | 5 | 4 | 25 | 75 | 100 |
| ED PAPER | | PAPER CAN BE SELECTED BY THE COLLEGE OR BY DEPARTMENT | 5 | 4 | 25 | 75 | 100 |
| PROJECT | 08PBCP07 | PROJECT | - | 5 | 40 | 60 | 100 |

TOTAL CREDITS - 13

TOTAL MARKS - 300

TOTAL MARKS FOR M.Sc BIOCHEMISTRY -2100

TOTAL CREDITS FOR M.Sc BIOCHEMISTRY –92

SCHEME OF EXAMINATION

| S. NO | SUBJECT CODE | TITLE OF THE SUBJECT | DURATION OF EXAM | CREDITS | MARKS |
|--------------|---------------------|--|-------------------------|----------------|--------------|
| 1 | 08PMBC01 | PHYSICO CHEMICAL ASPECTS OF BIOMOLECULES | 3 | 5 | 100 |
| 2 | 08PMBC02 | BIOMEDICAL TECHNIQUES | 3 | 5 | 100 |
| 3 | 08PMBC03 | MOLECULAR CELL BIOLOGY | 3 | 5 | 100 |
| 4 | 08PMBCE01 | NUTRITIONAL BIOCHEMISTRY AND PHYSIOLOGY | 3 | 4 | 100 |
| 5 | 08PMBCP01 | LAB COURSE -I | 6 | 4 | 100 |
| 6 | 08PMBCP02 | LAB COURSE -II | 6 | 4 | 100 |
| 7 | 08PMBC04 | BIOENERGETICS AND INTERMEDIARY METABOLISM | 3 | 5 | 100 |
| 8 | 08PMBC05 | CLINICAL ENZYMOLOGY | 3 | 5 | 100 |
| 9 | 08PMBC06 | ADVANCED ENDOCRINOLOGY | 3 | 5 | 100 |

| | | | | | |
|----|------------|--|---|---|-----|
| 10 | 08PMBCE02 | MEDICAL MICROBIOLOGY | 3 | 4 | 100 |
| 11 | VAL EDU | HUMAN RIGHTS | 3 | 2 | 100 |
| 12 | 08PMBCEP03 | LAB COURSE -III | 5 | 3 | 50 |
| 13 | 08PMBCEP04 | LAB COURSE -IV | 5 | 3 | 50 |
| 14 | 08PMBCE07 | IMMUNOLOGY | 3 | 5 | 100 |
| 15 | 08PMBCE08 | BIOMEDICAL INSTRUMENTATION | 3 | 5 | 100 |
| 16 | 08PMBCE09 | CLINICAL BIOCHEMISTRY | 3 | 5 | 100 |
| 17 | 08PMBCE03 | BIostatISTICS AND MEDICAL BIOINFORMATICS | 3 | 4 | 100 |

| | | | | | |
|----|------------|-------------------------------------|---|---|-----|
| 18 | 08PMBCEP05 | LAB COURSE -V | 6 | 3 | 100 |
| 19 | 08PMBCEP06 | LAB COURSE-VI | 6 | 3 | 100 |
| 20 | 08PMBCE04 | MOLECULAR BIOLOGY AND BIOTECHNOLOGY | 3 | 4 | 100 |
| 21 | EDC | | 3 | 4 | 100 |
| 22 | 08PMBCEP07 | PROJECT | - | 5 | 100 |

PHYSICO CHEMICAL ASPECTS OF BIOMOLECULES

PAPER CODE- 08PMBC01

UNIT –I

Electrolytic dissociation, law of mass action, acids and base, pH, buffers, surface tension, viscosity, donnan equilibrium Osmosis, Osmotic pressure, colloids, diffusion, dialysis and their applications to biological systems. Structure of cell and its organelles, and fractionation of sub – cellular organelles. Bio- membranes and their transport mechanisms.

UNIT –II

Structure and biological importance of sugar derivatives, phosphate esters, NTPS, amino sugars, sulphate derivatives, sugar acids, lactones, deoxy sugars and glycoside. Structure, occurrence and function of glycosaminoglycans and proteoglycans. Glycoproteins – O – linked and N – linked oligosaccharides, structure and function. Lipopolysaccharides – occurrence, structure and functions.

UNIT – III

Amino acids – Classifications, structure, properties and general reactions. Peptides and their synthesis. Levels of organization (Primary, secondary, tertiary and quaternary). Ramachandran plot. Methods of isolation, purification and characterization of proteins. Conformational study on the structure of lysozyme, haemoglobin, myoglobin, collagen, actin and myosin.

UNIT – IV

Lipids – classification, physico chemical properties and structure of fatty acids, waxes, oils, triacylglycerols phospholipids, glycolipids, glycosphingolipids, role of sphingolipids in biological recognition, intracellular messengers (structure and function), sterols, prostaglandins, thromboxanes, leukotrienes, bile acids, eicosanoids and lipoproteins.

UNIT – V

Nucleosides and nucleotides – structure and functions. Chemical and enzymatic sequencing methods. Nucleic acids – Classification, structure, types and functions of DNA and RNA. DNA – levels of organization (Primary, secondary, tertiary and quaternary). Properties, buoyant density, viscosity, chromic effect, T_m , denaturation, renaturation, hybridization and Cot analysis.

REFERENCE BOOKS

- Lehninger's Principles of Biochemistry (2000) by Nelson, David I. and Cox, M.M. Macmillan/ worth,.NY
- Fundamentals Of Biochemistry (1999) by Donald Voet, Judith G.Voet and Charlotte W Pratt, John Wiley & Sons, NY
- Biochemistry 3rd (1994) by lubert stryer, W H freeman and co, Sanfrancisco.
- Biochemistry 4th edition (1988) by Zubay G L , W M C Brown Publishers.
- Principles of Biochemistry (1994) Garrette & Grisham, Saunders college publishing
- Outlines of Biochemistry (1987) by Eric E.Conn, P.K. Stumpf, G.Brueins and Ray H.Do, John Wiley & Sons, NY
- Text book of biochemistry (1997) 4th edition Thomas M devlin, A John Wiley, Inc publication, New york.

BIOMEDICAL TECHNIQUES

PAPER CODE- 08PMBC02

UNIT – I

General approaches to biochemical investigations. Organ and tissue slice technique, cell disruption and homogenization technique, cell sorting and cell counting of various tissue culture collections. Cryopreservation and manometric techniques. Electrochemical techniques – principles of redox reactions, pH electrode, Clarke's Oxygen electrode and their applications.

UNIT – II

MICROSCOPY : Principles and applications of light, phase contrast, fluorescence, scanning and transmission electron microscopy.

SPECTROSCOPY: Basic laws of light absorption, optical rotatory dispersion, circular dichroism, X-ray diffraction. UV and visible light spectrophotometry, spectrofluorimetry. Atomic flame photometry, Plasma emission spectroscopy, infra – red spectrophotometry. Basic principles, instrumentation and application of mass spectrometry, Tandem mass spectroscopy, ESR and NMR.

UNIT – III

ELECTROPHORESIS: Electrophoretic principles, support media, factors affecting electrophoresis. Types of electrophoretic techniques – zonal and disc electrophoresis. High and low voltage electrophoresis. Principles and applications of PAGE. Isoelectric focusing, Isotachopheresis, PFGE and capillary electrophoresis.

CENTRIFUGATION: Centrifugation principles, basic principles and laws of sedimentation. Preparative and analytical ultracentrifuges. Sedimentation equilibrium methods.

Types of separation method sin preparatives centrifuges. Differntial and density gradient centrifugation. Analsysis of sub cellular fractions. Estimation of purity of macromolecules, detection of conformational changes, Molecular weight determination.

UNIT – IV

CHROMATOGRAPHY:

Chromatography : Theory and practice, column chromatogrpahy, column efficiency and resolution. Types of adsorption chromatography - hydroxyapatite Chromatography (HIC). Types of partition chromatography – normal phase and reverse phase – liquid chromatogrpahy, chiral and counter current chromatogrpahy. Paper chromatography, ion – exchange chromatography. Exclusion chromatography, chromatofocussing, affinity chromatography. Principles and application of GLC, LC, LPLC and HPLC

UNIT – V

TRACER TECHNIQUES : Principles and applications of tracer techniques in biology, measurement of alpha, beta and gamma radiations. Radiation dosimeter, Radioactive isotopes and half life of isotopes, Autoradiography, Liquid Scintillation spectrometry.

- Principles and techniques of practical Biochemistry, Keith Wilson and John Walker, 1995. Cambridge University Press.
- An Introduction to Spectroscopy for Biochemist , Brown. SB Academic Press.
- Introduction to Centrifugation , Ford T.C and Graham J.N., Bioscientific Publishers Ltd, Oxford.

- Biophysical chemistry Principles and Techniques- Avinash Upadhyaye and Nirmalendhe Nath , Himalaya Publishers.
- A Biologist Guide to Principles and Techniques of Biochemistry , Keith Wilson and Kenneth Goulding, Edward Arnold publishers.
- Tools of Biochemistry David Cooper
- Computational Biochemistry C. Stan Tsai

MOLECULAR CELL BIOLOGY

PAPER CODE- 08PMBC03

UNIT I

Introduction : Origin of single cell – theories and concepts. Cell environment : Extra cellular matrix (ECM) glycocalyx, basal lamina, components of ECM – fibronectin laminin, collagen, heparin sulfate proteoglycans, role of ECM in cell growth and survival. Cell – Cell adhesion : Cell junctions – tight junctions, gap junction, desmosomes, connexins selectins, integrins, Ig super family and cell – cell adhesion. Cytoskeleton : Microfilaments, actin cytoskeleton, G and F actin, dynamics of actin assembly and polymerization, myosin and molecular motors. Microtubules : structure and dynamics, micro tubular organizing centres, dynamic instability, microtubule associated proteins (MAPs) Kinesin, Dynein and intracellular transport, Kinetochore architecture and spindle assembly focal adhesion points, microvilli and pseudopodial extension. Intermediate filaments : types and functions.

UNIT – II

Proteins sorting : Golgi and endoplasmic reticulum and lysosome complex in protein targeting, signal recognition particle chaperons and protein folding, GPI anchoring, targeting of proteins to mitochondria, protein glycosylation and post – translational modifications, vesicular transport and secretory pathways basis of lysosomal storage diseases.

UNIT – III

Cell – Cell Communication : Autocrine , paracrine, endocrine, steroids and juxtacrine communication, Nitric oxide and paracrine factors involved in communication – FGF's Hedgehog family Wnt family TGF – beta super family, BMP family. Signal transduction pathways : G – protein, cAMP pathway, IP3 pathway, RTK pathway, Smad pathway, JAK – STAT pathway, Wnt pathway. RTK dimerization and autophosphorylation, SH2 domains. MAP kinase pathway.

UNIT – IV

Cell Cycle : Pro and eukaryotic cell cycle, cell growth and extracellular signal molecular basis of cell cycle regulation, cell cycle checkpoints, cyclin and cyclin dependent kinases, Rb regulation exit from the cell cycle, M-CMPF and M-phase events. Apoptosis: Survival and death factors cell death receptors cell – cell interactions in cell rescue and death, erythropoietin in RBC development. Molecular apoptotic events in *C. elegans* and mammals, bcl family of proteins, caspases, significance of apoptosis.

UNIT – V

Cancer Biology : Etiological factors, primary and secondary tumors benign and malignant forms. Oncogene : proto oncogenes and viral oncogenes, oncogene activation, tumour suppressor genes, DNA tumour viruses, tumour specific antigens and tumour evasion. Metastasis : molecular events in migration – extravasation, chemokines role of ECM IN METASTASIS. Angiogenesis; angiogenetic and antiangiogenetic factors, vasculogenesis.

REFERENCE BOOKS

- Molecular cell biology 3rd (1995) by Lodish H Baltimore & others, Scientific American book.
- Molecular biology of cells by Alberts .
- Cell biology by E S Saedava
- Cell and molecular biology by E D P de Robertis and E M F de Robertes.
- Principles of cell biology by Klein Smith and M Kish
- Molecular cloning , a laboratory manual,J.Sambrook,E.F .Fritsch
- Molecular Cloning: a Laboratory Manual, J.Sambrook, E.F.Fritsch and T. Maniatis, Cold Spring Harbor Laboratory Press, New York, 2000.
- Genes VII Benjamin Lewin (2000) Oxford Univ, Press London.
- Cell and Molecular Biology , 3rd ed., Gerald Karp (2002) John Wiley & Sons Inc.
- Molecular Biology by David Freifelder (1995) Narosa Publishing house. New Delhi.
- Molecular Cell Biology 3rd (1995) by Lodish H. Baltimore and others Scientific American Book.
- Molecular Biology (1999) Weaver R.F. WCB Mc Graw- Hill companies, Inc, New York.
- Brown T A (1995) Essential Molecular Biology, Vol.I, A practical approach, IRL press, Oxford.

NUTRITIONAL BIOCHEMISTRY AND PHYSIOLOGY

PAPER CODE- 08PMBCE01

UNIT – I

Definition for nutrition, nutrients, body weight body composition, measurement of energy expenditure – calorimeter, BMR, SDA and RQ. Physico chemical properties and physiological actions of Dietary fibre protein energy malnutrition.

UNIT – II

Outlines of Vitamins and minerals. Classification of vitamins _ Fat soluble and water soluble. Dietary source, structures, RDA, functions and deficiency states. Macro and micro elements – Dietary source, structures, RDA, functions and deficiency of Iron, calcium, phosphorus, magnesium, iodine, Zinc and copper. Dietary requirement in pregnancy, lactation, infants children and adolescent.

UNIT – III

Dietary management with special reference to *Diabetes mellitus* abesity. Cardiovascular disease, diseases associated with liver, kidney, Gastric (peptic ulcer), intestine (Steatorhoea) and

Cancer. Water and electrolyte balance and regulation. Acid base balance : regulation, acidosis and alkalosis.

UNIT – IV:

Overview of Anatomy – Medical and Anatomical terminology – Sections of the body – Anatomical Variations – Diagnostic Imaging, Introduction to Systemic Anatomy – Types of bone – Joints – Classification of joints – innervations of joints – Muscle tissue and muscular system – Types of Muscular – Blood vessels and cardiovascular system – Lymph and the Lymphatic system – Functions of the Lymphatics.

UNIT – V

Circulatory system – composition and functions of plasma, blood coagulation, transfer of blood gases. Respiratory system components and their functions – Transport of oxygen and CO₂ Digestive system – Composition and functions; Digestion and absorption of carbohydrates, Lipids, proteins etc., Excretory system – Structure of nephron, formation of urine, tubular re-absorption and secretion; Nervous system – organization, nerve impulses and neurotransmission, Action Potential, Visual auditory pathways. Structure and functions of reproductive system. Physiology of pregnancy and lactation.

REFERENCE BOOKS

- Text book of Medical Physiology, Guyton A.C

- Human physiology ,Chaterjee
- Concise human physiology ,Sukkar,M.Y.Munshid and Ardawi
- Review of Medical Physiology Gaanong.W.F
- Food Science Srilakshmi.B
- Modern nutrition in health and disease, Robert. S.Goodhart
- Food Science by Potter,N.W
- Food facts and principles ,Saakuntala Manay

LAB COURSE -I

PAPER CODE 08PMBCP01

PRACTICAL I

1. Microscopy
2. Staining Techniques
3. Microtomy
4. Histochemical Techniques
5. Mitosis and Meiosis
6. Cell Fractionation
7. General reactions of Carbohydrates, Lipids, Amino acids and proteins
8. Iodine Value, Acid Value and Saponification value
9. Estimation of Vitamin A and Vitamin C
10. Preparation of cholesterol from brain

REFERENCE BOOKS

- Laboratory techniques in Biochemistry and Molecular Biology, Work and Work.
- A Biologist's Guide to Principles and Techniques of Practical Biochemistry, K. Wilson and K.H. Goulding, ELBS Edition, 1986.
- *Boyer, R*, Modern Experimental Biochemistry, III edition, Benjamin Cummings Publishers.
- Laboratory manual in Biochemistry Jayaram. J.(1996}, New Age International Ltd, publishers, New Delhi, fifth reprint .
- Biochemical methods, Sadasivam, S and Manickam, A (1991), New Age International Pvt. Ltd, publishers, New Delhi, 2nd edition

LAB COURSE -II

PAPER CODE 08PMBCP02

- i. Analyse the food for the following
Calories, Crude fibre and dietary fibre, Moisture, Nitrogen, Ash content, Calcium, Phosphorus, Iron, Carotene, Thiamine, Riboflavin, Fat, Protein, Estimation of Aminoacids
- ii. Separate the given Amino acids and Sugars by Paper Chromatography (Ascending, Descending and circular).
- iii. Separate the given Amino acids by Paper Electrophoresis
- iv. Separation of Serum Protein by SDS PAGE
- v. Separation of DNA by Agarose Gel Electrophoresis
- vi. Separation of Protein (Hb and cytochrome c) by Molecular sieving Chromatography

REFERENCE BOOKS

- A Manual of laboratory Techniques, National Institute of Nutrition, Raghuramulu, N., Nair, K.M. **an.** Kalyanasundaram, A.(1983), Silver prints, Hyderabad
- Hawke's physiological chemistry, XIV edition Ose 'B.L.(1954), Tata MC Graw Hill publishing company Ltd, Mumbai .
- Laboratory manual in Biochemistry Jayara J.(1996), New Age International Ltd, Publishers, New Delhi, fifth reprint.

- Biochemical methods, Sadasivam, S and Manicka A (1991), New Age International Pvt 'Ltd, publisher, New Delhi, 2nd Edition.

BIOENERGETICS AND INTERMEDIARY METABOLISM

PAPER CODE- 08PMBC04

UNIT I

Bioenergetics : Energy transformation ,Laws of thermodynamics ,Gibbs energy ,Free energy changes and redox potential, Biological oxidation –oxygenases ,hydrolases ,dehydrogenases and energy transducing membranes .Electron transport chain ,oxidative phosphorylation ,Uncouplers ,Inhibitors of ETC,shuttle systems.

UNIT II

Carbohydrate Metabolism

Introduction to metabolism of cells, glycolysis and its regulation ,citric acid cycle , its function in energy generation and regulation of TCA cycle ,Gluconeogenesis and its regulation ,Metabolism of glycogen and biosynthesis of starch..HMP shunt and its regulation ,Uronic acid pathway,Cori cycle, , Interconversion of sugars. Hormonal regulation of Carbohydrate metabolism

UNIT III

Lipid Metabolism :

Fatty acid biosynthesis-Palmitic acid, stearic acid, oleic acid, linoleic acid and arachidonic acid, Oxidation saturated & unsaturated fatty acids. Oxidation fatty acids with even & odd numbered carbon atoms. alpha, beta & omega oxidation. Metabolism of triacyl glycerol, phospholipids & sphingolipids. Cholesterol biosynthesis & regulation. Degradation of cholesterol, cholesterol transport excretion, lipoprotein metabolism. Ketone bodies formation and utilization.

UNIT IV

Aminoacid Metabolism

Biosynthesis and Degradation of Tryptophan, Phenylalanine, Lysine, Methionine and Glutamine. Transamination, oxidative and non-oxidative deamination, decarboxylation- urea cycle and its regulation. Integration of metabolic pathways

UNIT V

Nucleotide Metabolism

Metabolism of nucleotides, de novo synthesis purine nucleotides, salvage pathway degradation of purine nucleotides, de novo synthesis of pyrimidine nucleotides, salvage pathway, degradation of pyrimidine nucleotides.

REFERENCE BOOKS

- Lehninger's Principles of Biochemistry (2000) by Nelson, David L. and Cox, M.M. Macmillan/ worth, NY
- Fundamentals Of Biochemistry (1999) by Donald Voet, Judith G. Voet and Charlotte W Pratt, John Wiley & Sons, NY
- Outlines of Biochemistry (1987) by Eric E. Conn, P.K. Stumpf, G. Brueins and Ray H. Doi, John Wiley & Sons, NY
- Biochemistry 3rd (1994) by Lubert Stryer, W H Freeman and Co, San Francisco.
- Text book of biochemistry (1997) 4th edition Thomas M Devlin, A John Wiley, In
- Biochemistry 4th edition (1988) by Zubay G L , W M C Brown Publishers.
- Principles of Biochemistry (1994) Garrette & Grisham, Saunders college publishing
- Biochemistry (4th edn. 1992) by Lubert Stryer WH Freeman & Co., NY
- Harper's Biochemistry (25th ed) by R.K. Murray and others, Appleton and Lange, Stanford
- Fundamentals of Biochemistry (25th ed) by R.K. Murray and others, Appleton and Lange, Stanford.
- Regulation in Metabolism by E.A. Newshome , C. Start, John Wiley & Sons.

CLINICAL ENZYMOLOGY

PAPER CODE- 08PMBC05

UNIT I

IUB system of classification and nomenclature, mechanism and regulation of enzyme action active site, coenzymes, Isoenzymes and multienzyme complex

Enzyme activity, factors affecting enzyme activity, enzyme assay, Methods for determination of enzyme activity, Enzyme units

UNIT II

Principles of Diagnostic enzymology –Laboratory investigation on serum and urinary enzymes, Intracellular localization of enzymes, Diagnostic and Prognostic importance of plasma and non plasma specific enzymes.

Myocardial enzymes –SGPT, LDH, CPK – their source, properties, function, normal value, diagnostic importance. Significance of enzymes in bone disorder and muscle wasting

UNIT III

Clinical significance of Transaminases, Creatine Kinase, Lactate Dehydrogenase, aldolases, amylases, elastase, Gamma-glutamyl transferase, 5' nucleotidase, Choline esterase, phosphohexokinase, lipoprotein lipase.

Enzyme assay in amniotic fluid and biopsy samples.

UNIT IV

Enzymes in inborn error of metabolism –Phenylketonuria, Alkaptonuria, Tyrosinosis, Albinism, Hartnup's disease, Galactosemia, Tay-Sachs's disease, Niemann Pick's disease, Hunter Syndrome, Lesh-Nyhan Syndrome.

UNIT V

Enzymes in Medicine and diagnosis and normal value of enzymes, Enzymes of detoxication in drug metabolism,

Enzymes in CSF, Antioxidant enzymes –SOD, Catalase, GPX and GSH,

REFERENCE BOOKS

- Enzymes By Dixon , E.C Webb, CJR Thorne and K.F. Tipton, Longmans , London.
- Fundamentals of Enzymology 2 ed., (1998) By Nicholas C.Price, Lewis Stevans, Oxford University Press, First Edition (1990).
- Understanding Enzymes, Trevor Palmer, Ellis Horwood Limited, Third Edition(1991).
- Protein Biotechnology, Gary Walsh and Denis Headon, John Wiley and Sons,1994.
- Protein Biochemistry and Biotechnology, Gary Walsh and John Wiley and Sons Ltd.2002.
- Enzyme kinetics and Mechanism –Paul F.Cook

ADVANCED ENDOCRINOLOGY

PAPER CODE- 08PMBC06

UNIT – I

Definition of Hormone - Chemical Nature of Mammalian hormones- Classification and Mechanism of action of Peptide hormones. Concepts of Receptors – G- protein coupled receptors – Adenylate cyclases. Pharmacological Receptors – Neurotransmitter receptors. Steroid hormones – Structure of Receptors – Functional Domains – DNA binding sites, Nuclear transport mechanisms – Transcriptional and post transcriptional mechanisms.

UNIT- II

Structure, Physiology, Secretions, mechanism of action of Hypothalamo-Hypophyseal complex, thyroid and Parathyroid glands.

UNIT- III

Structure, Physiology, Secretions, Functions and Pathophysiology and Clinical evaluation of Endocrine function of Pancreas and Adrenals, Gonads and Gastrointestinal hormones

UNIT- IV

Dysfunction and Pathophysiology of Hypothalamo-Hypophyseal complex, thyroid , Parathyroid, Pancreas ,Adrenals, Gonads and Gastrointestinal hormones.

UNIT-V

Endocrine system: lab Diagnosis and investigations related to the disorders of Hypothalamo-Hypophyseal complex, thyroid, Parathyroid, Pancreas, Adrenals, Gonads and Gastrointestinal hormones.

REFERENCE BOOKS

- Endocrinology, Mac E. Hadley, Publishers- Prentice Hall International Inc. Fourth Edition

- Textbook of Medical Physiology, Guyton and Hall Tenth, Edition , Saunders Publishing Co.2000.
- Principles of Biochemistry, Emil Smith, Handler Abraham -White, Mcgraw Hill International book company Seventh Edition, 1983.
- Williams textbook of Endocrinology (2003), 10th Edition, P.Reed Larson, HenryM. Korenberg, Shlom Melmed and Kenneth S. Polonsky, Saunder Philadelphia, USA.
- Harpers Biochemistry (2003) Murray *et al.*, 2nd Edition, Mc Graw Hill Publications, USA.

MEDICAL MICROBIOLOGY

PAPER CODE- 08PMBCE02

UNIT- I

Classification of Microorganism, Microbial growth , Growth curve , collection of specimens, Sterilisation, and Disinfection, Inoculation Culture media , culture methods, Isolation and Identification techniques- gram stain , Acid fast stain , Motility test and Biochemical test –IMVIC Test, Starch test, Gelatin test, TSI test , Urease test.

UNIT- II

Bacteriology- Culture characteristics, Biochemical reactions, Mode of transmission , Antigenic structure, Pathogenicity, Lab diagnosis, treatment and control measures of disease caused by Staphylococcus, Streptococcus, Neisseria, Pneumococcus, Bacillus, Clostridium, Enterobacteria (Proteus, Shigella , Salmonella) Vibrio, Pseudomonas, Mycobacterium, Rickettsia, Chlamydiae. Mode of action of antibiotics .

UNIT- III

Medical Mycology- Culture characteristics, Biochemical reactions, Mode of transmission , Antigenic structure, Pathogenicity, Lab diagnosis, treatment and control measures of disease caused by Cutaneous mycosis- Dermatophytosis, Opportunistic mycosis- candidiasis, Subcutaneous mycosis- Mycetoma, Systemic Mycosis- Histoplasmosis, Superficial mycosis- Tinea, Piedia

UNIT- IV

Parasitology –Morphology ,, Mode of transmission ,Antigenic structure,Pathogenicity,Lab diagnosis,treatment and control measures of disease caused by Coccidian – Toxoplasma,Cryptosporidium,Helminthes- Taenia solium,Fasciola hepatica,Ascaris lumbricoides,Trypanosoma ,Giardiasis,Amoebic dysentery. Mode of action of anti protozoan agents

UNIT- V

Virology -Culture characteristics, Biochemical reactions, Mode of transmission, Antigenic structure, Pathogenicity, Life cycle , ,Lab diagnosis, treatment and control measures of disease caused by Herpes virus, Pox virus-Variola,Vaccinia Hepatitis (A,B,C),Orthomyxovirus-Influenza,Paramyxovirus- Para influenza, Mumps,Measles,Rabdovirus, Oncogenic virus reterovirus .Mode of action of anti –viral agents

Test for microbial susceptibility to chemotherapeutic agents and drug resistance.

REFERENCE BOOKS

- Text book of microbiology (2005) , R.C.Dubey & D.K. Maheswari, S.Chand & company LTD, Newdelhi.
- The desk Encyclopedia of microbiology (2004); Moselio schaeutel, ELSEVIER. Academic Press.
- Microbiology (2003) 5th Edition, Michael J.Pell,Jr, E.C.S Chan & Noel R.Kriez, TATA McGRAW HILL.
- Microbiology and infection (2003), 2nd edition, T J J Inglis, Churchill livingstone.

- Foundations in microbiology (2002), 4th edition, Kathleen park talaro, Arthur talaro, McGRAW HILL.
- Medical Microbiology& Immunology (2000), 6th Edition, Warren Livingstone, Ernest jawetz, McGRAW HILL companies. Inc.
- Introduction to microbiology (2000) ,2nd Edition, John L.ingraham, Catherine A.Ingraham, Books/Cole Thomson learning, USA.

LAB COURSE III

PAPER CODE 08PMBCP03

I Enzyme studies:

1. Isolation, purification and kinetic studies of alkaline phosphatase of rat kidney or intestine.
2. Determination of the activity of the following serum enzymes : LDH, phosphatase, Aspartate amino transferase, Alanine amino transferase, creatine kinase (spectrophotometric assay)). Antioxidant enzymes.
3. LDH isozyme separation from serum or liver
4. Kinetic studies of amylase and acid phosphatase

II Endocrine function test:

1. Assay of insulin by ELISA, Estimation of urinary excretion of VMA, 5HIAA, 17 ketosteroids and catecholamines.
2. Plasma level of cortisol
3. Estimation of bilirubins and hepato biliary function tests
4. Thyroid function tests like T3 and T4 assays
5. Analysis of gastric juice

REFERENCE BOOKS

- A Biologist's Guide to Principles and Techniques of Practical Biochemistry, K.Wilson and K.H.Goulding, ELBS Edition, 1986.
- Modern Experimental Biochemistry Boyer, R, III Edition, Benjamin Cummings Publishers.
- A Textbook of Practical Biochemistry by David Plummer.
- Enzyme structure and mechanism, Aln Fersht (1997), Reading, USA.
- Sadasivam.S and Manickam,A. Biochemical Methods II Edition. New Age International Private Ltd. Publishers.

LAB COURSE - IV

PAPER CODE 08PMBCP04

1. Isolation of pure culture – Serial dilution, pour plate spread plate, streak plate
2. Methods and slab culture techniques for long term storage
3. Colony morphology – colony counting
4. Hanging drop technique
5. Staining techniques – Simple, differential, negative aid fast, spore, capsule and fungal staining.
6. Antibiotic sensitivity assay of different microbes
7. Phenol coefficient determination
8. Estimation of bacteria – Growth curve and generation time
9. To identify the microbes – By biochemical tests.
10. Serial dilution of ASO titre, VDRL titre and Rh antibiotic titre

REFERENCE BOOKS

- Laboratory techniques in Biochemistry and Molecular Biology, Work and Work.
- A Biologist's Guide to Principles and Techniques Practical Biochemistry, K.Wilson and K.H.Goulding ELBS Edition, 1986.
- Boyer, R, Modern Experimental Biochemistry, edition, Benjamin Cummings Publishers.

IMMUNOLOGY

PAPER CODE- 08PMBC07

Unit I

Immunity -Types of immunity, components of immune system, haematopoieses. Immune reactive cells- B cells and T cells, mast cell, phagocytic cell, structure and function of primary and secondary lymphoid organs. Antigenicity –Antigens , Autoantigens,blood group antigens, Bacterial , Viral and tumour antigen , chemical nature, , epitope, cross reactivity, adjuvant, super antigen, and mechanism of immunity to infection.

Unit II

Cells of Immune system: T and B lymphocytes ,T cell receptor diversity ,T and B Cell interaction ,Antigen processing and Presentation.Immunological memory,Lymphokines and cytokines.Cytotoxicity ,Immunoglobulins—Basic s-structures,Function ,classification and immunoglobulins.Generation of antibody diversity ,Antigen – Antibody Interactions: Examples of

antitoxins ,opsonins,bacteriolysin,Inflammatory process-Avidity and specificity of antibody,Cross reactivity

Unit III

Complement System – Complement activation and its biological consequences,Allergy and Hyper sensitivity- types 1 to 5, mechanism ,assay and treatment. Transplantation –Immunological response ,HLA and other system of Human major histocompatibility complex ,rejection mechanism.Auto antibodies and autoimmune disease.

Unit IV

Immunological Techniques –Principles and titre of antisera ,Precipitation ,agglutination ,Immunodiffusion,Immune adherence, Immuno electrophoresis, Immunofluorescence, CFT,Widal Test,VDRL Test,Test for AIDS, ,Recombinant antibodies,Radioimmunoassay,Enzyme immunoassay ,ELISA ,Immunotherapy.

Unit V

Hybridoma technology –Monoclonal antibody-Merits and Demerits and their use in diagnosis and treatment .Sexually transmitted disease,Viral disease ,bacterial Infections..

Antigen-Antibody reactions invivo and invitro.

REFERENCE BOOKS

- Immunology (4th edn. 1998) by Ivan Roitt, J. Brostoff. and David Mowbray (4th edn) Mosby
Tilnes Mirror Int. Pub Ltd.
- Immunology, An Introduction, (1995) I.R. Tizard, edition – Saunders's.
- Cellular and molecular immunology by Abbe Lightman and Peter Libby. W.B. Saunders 2nd ed.,
1994.
- Essential Immunology (9th ed. 1997) by Ivan Roitt Blackwell Science Ltd.
- Immunology (1992) by Janis Kuby W.H. Freeman Co. Ltd. USA
- Immunobiology 5th ed., by Charles A. Janeway Jr. Peter Travers Mark Walport, and Mark
J. Shlomick (2001) Churchill Livingstone Garland Publishing Company .
- Basic and clinical Immunology; 16th ed., By David P. Stobo, J.D. Fundanberg H.A and
Wells, J.V. (1999) Los Atlas Appleton Lange.
- Practical Immunology 4th ed., by Frank C. Hay Olywn M.R. Westwood (2002) Blackwell
Science

BIOMEDICAL INSTRUMENTATION

PAPER CODE- 08PMBC08

Unit I

Classification of biomedical equipment. Diagnostic, therapeutic and clinical laboratory equipment, bioelectric signals and their recording. Bioelectric signals (ECG,EMG and EEG) and their characteristics, bioelectrode- types, electrode tissue interfae, contact impedance, electrodes for ECG,EMG,EEG.

Transducers for biomedical application. Types, properties, characteristics and selection of transducers for biological instrumentation.

Unit II

Biosensor-mechanism and types. Autoanalyser- types and application. Automatic tissue processing and application of microtome. Pulse oximetry – Introduction ,principle and clinical application of sphygmomanometer.

Magnetic resonance imaging system, basic NMR components and its application in medicine.

Unit III

X-ray machine, radiography,fluoroscopy. Conventional X-ray imaging . angiography, computer tomography and linear tomography. Ultrasonic imaging system. Physics of ultrasonic waves,

medical ultrasound, different mode of operation of ultrasound – A scan, B scan, application of ultrasound scan, CT scan, MRI scan and echocardiography.

Unit IV

Introduction, characteristics, diagnostics and therapeutic application and advantage of pulsed ruby laser, ND-YAG laser, CO2 laser, argon laser and helium neon laser.

Introduction, types, merits, demerits, limitations, diagnostic and therapeutic application of endoscope, laparoscope and cardio scope.

Unit V

Therapeutic instruments. Introduction, types, life time, classification, power source and electrodes of cardiac pacemaker and defibrillators. Application of surgical diathermy equipment and haeme dialysis in medicine.

Computer application in medicine- computerized catheterization laboratory , computerized patient monitoring system.

References:

- .Handbook of medical instruments by R.S Khandpur.
- .Biomedical instrumentation by Cromwell.
- Medical instrumentation by John G.Webster-John Wiley.
- .Principles of applied Biomedical instrumentation by Goddes and Baker-John Wiley.
- .Biomedical instrumentation and measurement by Carr and Brown-Pearson.
- .Medical electrincs and instrumentation by Sanjay Guha.-University p

CLINICAL BIOCHEMISTRY

PAPER CODE- 08PMBC09

UNIT I

Collection of samples and preservation: Pre-analytical errors in clinical biochemistry, standardization of laboratory methods. Use of pooled serum, acquisition of standards for laboratory estimations, quality control methods, use of reference values. Selection of methods for estimation of common analytes like blood glucose, urea, creatinine plasma proteins. Automation

in clinical biochemistry statistical methods of analysis of results. **Cerebrospinal fluid**
Composition in normal & diseases. Lab findings of CSF constituents in health and disease.

UNIT II

Disorders of carbohydrate metabolism: Blood sugar level, normal regulation of plasma glucose, renal threshold hypo and hyper glycemia, glycosuria, glucose tolerance test. Assay of insulin & C peptide. Complications diagnosis and treatment diabetes mellitus, glycogen storage diseases fructosuria, pentosuria, tests for reducing sugar galactosemia, ketone bodies, mucopolysaccharidosis. Gastro intestinal tract: acidity curves, qualitative & quantitative analysis of gastric contents & duodenal contents.

UNIT-III

Disorders of lipid metabolism: Plasma lipoproteins, hyper & hypo cholesterolemia, triglyceridemia, phosphoproteins in health & diseases, fatty liver, lipidosis. Clinical inter relationship of lipids (sphingolipidosis, multiple sclerosis) apolipoproteinemia hyper & hypolipoproteinemia. Diagnostic tests of apolipoproteins, HDL Cholesterol, LDL cholesterol & triglyceride disorders. Hepatobiliary system: Hepatobiliary function tests, lab findings & diagnosis of jaundice, metabolism of bilirubin, inherited disorders of bilirubin metabolism, cirrhosis hepatic coma, hepatitis, gall stones, cholecystitis & tumors.

UNIT-IV

Disorders of nitrogen metabolism: Assimilation & immonia, cretine creatinnine. Excretion of nitrogenous waste products, uremia, porphyries, porphyrinurias, minoaciduria, gout, hpouricemia, orotic acidurea, emoglobinopathies – path physiology, diagnosis & treatment. Excretory system: Renal function tests, acute & thronic renal failure, clearance tests, urinary calculi, renal hypertension, dialysis, normal & abnormal constituents of urine.

UNIT V

Hepatobiliary system: Hepatobiliary function tests, lab findings & diagnosis of jaundice, metabolism of bilirubin, inherited disorders of bilirubin metabolism, hirosis hepatic coma, hepatitis, gall stones, cholecystitis & tumors.

Fetoplacental functions. Amniocentesi & chordiocentesis

REFERENCE BOOKS

- Tietz Fundamentals of Clinical Chemistry - (5th edn C.A.Burtis, E.R. Ashwood (eds.) Saunders WB Co.,
- Text Book of Medical Physiology (10th ed. 2000) by At Guyton & J.E. Hall, Harcourt Asia
- Fundamentals of Clinical Chemistry, N.W.Teitz, W Saunders Company, 1994.Second Edition.
- Clinical Chemistry in diagnosis and treatment,. Phil D.Mayne, ELBS Publications, Sixth Edition 1994.

- Practical Clinical Biochemistry, volume I and II Harold Varely, et al., CBS Publishers , Fifth Edition
- Clinical Biochemistry- Metabolic and Clinical aspects, William J Marshall and Stephen K Bang Pearson professional Ltd. 1995.
- Tietz Fundamentals of Clinical Chemistry.. Bur Ashwood. 5th ed. Saunders, 2002.
- Clinical Diagnosis and Management by Laboratory Methods. Henry, J.B 20th ed., Saunders 2001

06PMB 20 – BIOSTATISTICS AND MEDICAL BIOINFORMATICS

PAPER CODE- 08PMBCE03

UNIT – I

Biostatistics – basic principles, importance in biological practice, variables – scales measurements, collection of data questionnaire, classification – tabulation, diagrammatic and graphical representation of the biological data.

UNIT – II

Sample, population – sampling methods, survey statistical inference, point of interval estimation, hypothesis simple hypothesis testing, normal, t-test, chi square test ANOVA and interpretation, important non parametric methods.

UNIT – III

Measures of central tendency, variations, standard deviation – standard error of mean, correlation, regression. Simple linear regression. Multiple linear regression. Logistic regression. Introduction to multivariate analysis. Statistical packages (SPSS, STATA etc.,)Prediction and its importance probability, sensitivity, specificity. Efficiency of screening tests, normal distribution - properties and its importance.

UNIT – IV

Bioinformatics : Introduction, objectives and scope of Bioinformatics. Internet and World Wide Web, Search engine, workstation – Unix System, Linux, FTP. Introduction to commercial software's like MOE, TRIPOS, ACCELRYYS. Scripting languages – Perl and its applications to Bioinformatics. Mark up languages – HTML, XML.

UNIT – V

Biological databases, Sequences and structure database, Annotations, Specialized / pathological organism data bases. Sequence retrieval and analysis of sequence, information

retrieval through Entrez and PubMed. Genome napping projects : human genome projects, methods and unsights.

REFERENCE BOOKS

- Biostatistics analysis, Zar,J.H. 1984. Prentice Hat New Jersey.
- Statistical methods for Biologists, Palanichamy,S. and Manoharan.M. 1990., Palani paramount publications
- Statistical methods, S.P Gupta.
- Biostatistics - A foundation for analysis in health science, Daniel.
- Bioinformatics – A practical guide to the analysis genes and proteins. (Ed.Baxevanis and Ouellette Willey Inter Science, 1998.
- Introduction. to Bioinformatics, Dr.S,sundara Raj and R.Bal:aji, Himalaya Publishing House, First Edition, 2002.
- Bioinformatics - Concepts, skills and application S.C.Rastogi, Namita, Menadiratta, Rastogi publishers, First Edition, 2003
- Bioinformatics for beginners, Dr.K.Mani and N.Vijayaraj, Kalaikathir Achagam, Coimbatore, Edition, 2002.

LAB COURSE V

PAPER CODE 08PMBCP05

I.Haematology

1. Enumeration of RBC and WBC
2. Differential count
3. Estimation of Haemoglobin-Colorimetric method and Shali's method
4. Determination of Bleeding time, clotting time
5. ESR,Haematocrit and PCV

II Blood Analysis

1. Estimation of blood sugar,GTT,Glycosylated Hb
2. Estimation of total protein, Albumin, A: G ratio
3. Estimation of urea, Uric acid, creatine and creatinine
4. Estimation of Bilirubin (Conjugated and Unconjugated),Cholesterol,TG,HDL,LDL and VLDL
5. Determination of activity of CPK and LDH
6. Estimation of CU and Fe
7. Estimation of Vit A and Vit C

III.Urine Analysis

1. Estimation of Calcium
2. Analysis of Urinary Calculi.
3. Titrable Acidity of urine
4. Estimation of urea, Uric acid, creatine and creatinine
5. Estimation of phosphate

LAB COURSE VI

PAPER CODE 08PMBCP06

1. Blood grouping and cross matching
2. Immunodiffusion – single and double immunodiffusion
3. Immuno-electrophoresis
4. Rocket immuno electrophoresis
5. Counter current immuno electrophoresis
6. Pregnancy test
7. Agglutination test
8. Immunoprecipitation test
9. VDRL test
10. ELISA

REFERENCE BOOKS

(LAB COURSE V & VI)

- Practical Clinical Biochemistry, Volume I and II –Harold Varley

- Practical Immunology 4th ed by Frank C.Hay Olywn
- Practical Manual of Biochemistry – S.P Singh
- Laboratory Techniques in Biochemistry and Molecular biology ,Work and Work
- Modern Experimental Biochemistry ,Boyer .R
- A text book of Practical Biochemistry by David Plummer
- Laboratory Mannual in Biochemistry by S.Jayaraman
- Biochemical methods by Sadasivam & Manickam
- Laboratory Manual in Biochemistry – T.N .Pattabiraman
- Handbook of Emergency Lab Test –L.I.G.Worthley
- Practical Immunology –Frank L.Hay ,Olwyn.M.R.Westwood
- Bioinformatics –A Practical guide to the analysis of gene and proteins

Introduction to bioinformatics ,Dr.S>Sundararajan and R.Balaji

MOLECULAR BIOLOGY AND BIOTECHNOLOGY

PAPER CODE -08PMBCE04

UNIT - I

Molecular structure of Genes and chromosomes. Molecular definition of Gene- pro and eukaryotic transcription units- Structure of DNA- Organization of genes in prokaryotes and eukaryotes- Messelson and Stahl experiment and semi conservative model-DNA polymerases – DNA damage and repair – Replication and regulation of replication.

UNIT- II

Transcription Structure and Function of RNA polymerase. Fine structure of Gene- Initiation, Elongation and Termination of Transcription. Post transcriptional modifications. Various classes of RNAs – mRNA,tRNA,snRNA and hnRNA. Transcription in eukaryotes.

UNIT – III

Genetic code –Salient features of genetic code ,wobble hypothesis,Decipheration of genetic code ,Natural variation in the genetic code.

Translation : Prokaryotic and Eukaryotic Translation – Inhibitors of Translation- Posttranslational modifications and protein sorting.

UNIT – IV

Animal cell culture ,culture media,role of carbon di oxide ,Serum, growth factor,Glutamine in culture , Types of cell culture –Primary and established culture ,Organ culture ,tissue culture ,Dsaggregation of tissue and primary cell culture ,cell separation ,cryopreservation .Transgenic Animals, Transgenic Plants- monoclonal Antibodies- Vaccines – Production of Vaccines- Interferons- Edible Vaccines, Humulins-

UNIT – V

Stem cells – history – definition- types- Culture of Stem cells- Embryonic stem cells, cord blood, adult stem cells – cloning – Stem cell Banking-Stem cell therapy- Ethics of stem cell culture

REFERENCE BOOKS

- Molecular Cloning: a Laboratory Manual, J.Sambrook E.F.Fritsch and T.Maniatis, Cold Spring Harbc Laboratory Press, New York, 2000.
- Genes VII Benjamin Lewin.. {2000) Oxford Univ, *Pres London*
- Cell and Molecular Biology, 3rd ed., Gerald Karp (2000 John Wiley & Sons Inc.
- Molecular Biology by David Freifelder (1995) Naro Publishing house. NewDelhi.
- Molecular Cell Biology 3rd (1995)by Lodish Baltimore and others Scientific American Book.
- Molecular biology, (1999) Weaver R. F. WCB McGra Hill companies, Inc, New York
- Brown T A (1995) Essential molecular Biology, Vol A practical approach< IRL Press, Oxford.
- Molecular and cellular methods in Biology Medicine, P.B. Kaufman, W.Wu, D.Kim and L.J: Csc CRC Press, Florida 1995
- Genomes, T.A.Brown, John. Wiley and Sons Pvt. Ltd., 1999
- Recombinant DNA, James D. Watson et.al., Scientific American Books. Second Edition 1998.
- DNA Science, A First Course in Recombinant Technology, D.A.Mickloss and G.A.Freyar, Cold Spring Harbor Laboratory Pre s, New York, 1990.
- Molecular Biotechnology (2nd Edition), S.B.Primrose, Blackwell Scientific Publishers, Oxford, 1994.
- Gene Cloning, An introduction, T.A. Brown Chapman and Hall, Third Edition, 1995.
- Genetic Engineering. An introduction to gene analysis and exploitation in Eukaryotes, S.M. Kingsman and A.J. Kingsman, Blackwell Scientific Publications, Oxford, 1998

PAPERS TO BE SELECTED FOR EXTRA DISCIPLINARY

GENETICS FOR BIOLOGIST

PAPER CODE 08PMBC ED01

UNIT – I

Mendelian Genetics: Mendel's works – Monohybrid and Dihybrid experiment .Mendel's Laws, terminology –Back/Test cross problems.Mendels law are Universal-Modification- Complete and incomplete dominance, Co dominance- Lethal factor,Non –allelic gene Interaction-complementary genes ,supplementary genes- inhibitory genes-Epistasis-Biochemical aspects – duplicating genes –Pleotrophism.

UNIT –II

Para sexual process in bacteria; significance transformation, transduction, transfection and Conjugal gene transfer – the phenomena, mechanism and applications, kinetics of mating and transfer. Organization of chromosomes specialized chromosomes. Chromosome abnormalities, Sex –linked hereditary and quantitative inheritance .Gene conservation and generic load.

UNIT –III

Gene linkage –Types of Linkage, Complete and incomplete linkage, Theories and factors affecting Linkage, Linkage groups and Strength of Linkage. Crossing over, three point cross, tetrad analysis. Cytological Basis of Crossing over, Factors affecting crossing over, Significance.Sex determination- Thoeries

UNIT – IV

Genetic counseling: Possible approaches for tackling genetic disorders; Diagnosis of genetic defects; Positive eugenics, Negative eugenics, counseling, Genetic Drift. Principles of plant /animal breeding Techniques of plant breeding Goal and objective of plant breeding.-Methods of crop and livestock improvement

UNIT – V

Population genetics :Gene pool ,gene frequency, Hardy –Weinberg law ,no random mating ,Factors influencing allele frequency ,Hereditability, genetic variation at the molecular level – Polymorphism paternity testing ; Use of VNTR ,Human genome organization ; Human Genome mapping

REFERENCE BOOKS

- Principles of Genetics by Gardner ,E.J.Simmons,M.J amd D.P. Snustard
- Essentials of Genetics by Klug W.S and Cummings
- General Genetics Sub Owen and Edger
- Genetics by Peter .J.Russell
- Principles of Genetics by peter Snustad.D and Michael .J.Simmons
- Principles of Genetics Robert .H. Tamarin

06PMB 19- BIOCHEMICAL PHARMACOLOGY AND TOXICOLOGY

PAPER CODE- 08PMBC ED02

UNIT-I

General principles of pharmacology- Routes of drug administration, Absorption, Distribution, Metabolism and Elimination of drugs, Drug-receptor interaction, pharmacokinetics, Drug safety and effectiveness (Animal studies, Human studies, LD50) and bioavailability and Immunopharmacology.

UNIT – II

General aspects of neuro pharmacology-the chemical neurotransmission concept, site of action receptor concept, site of action, receptor concept in neuropharmacology, synapses and neuropharmacology, synapses and neuromuscular functions, sequence of chemical events in junctional transmission. Drug effect on Central nervous system General Concept, chemistry, mode of action, pharmacological effects, preparations and clinical pharmacology and uses (Cholinergic drugs, Muscle relaxants) General concept Antihypertensive drugs relation of angiotensin and aldosterone to hypertension, classification, Salt excretion, Histamine, anti histamine, Heratonin and antisertonins.

UNIT – III

General concept, classification, chemistry, mode of action, pharmacological effects, preparations and clinical pharmacology and uses of stimulants and depressants of Central nervous system – Hypnotic drugs, Antiepileptic drugs, narcotic drugs, contemporary drug abuse Pharmacology of general and local anesthesia, Drug effect on respiratory tract and gastrointestinal tract.

UNIT – IV

Chemotherapeutic drugs – Principles of antimicrobial therapy, Inhibitors of cell wall and protein synthesis, Antibacterial drugs, Antifungal drugs. Antiprotozoal drugs, Antiviral drugs, Anticancer drugs. Hormones of therapeutic interest (Insulin, Glucagon Growth hormone) Pharmaceutical biotechnology – Production and application – Viral vaccines, Cancer vaccines Interferons, Cytokines, DNA based vaccines, Adjuvant therapy, Gene therapy and Anti sense oligonucleotide technology.

UNIT – V

Toxicology – Introduction to toxicology and its subdivisions, Toxicity, Hazard, Risk, Chemical Toxicants Mechanism of action, Clinical Effects and treatment (Carbon monoxide, sulphur dioxide, Nitrogen oxides Polychlorinated Butyl compounds (PCBs)), solvents (Aliphatic hydrocarbons and aromatic hydrocarbons), Insecticides, Herbicides, chelating agents, Heavy Metal toxicity (Lead, Arsenic, Mercury), Toxicokinetics and Toxicodynamics.

REFERENCE BOOKS

- Biopharmaceuticals Biochemistry and Biotechnology (1999), Gay Walsh, John Willey and Sons, New York.
- Pharmacology (2000), 2nd Edition, Mary J.Mycek, Richard A.Harvey, Pamela C.Champe, Lipincott Williams & Wilkins, New York.
- Basics and Clinical Pharmacology (1995), 6th Edition, Bertram G .Katzung, Prentice - Hall International Inc, USA.

- Pharmaceutical Biotechnology (2002) 2nd Edition, Daan J.A. Crommelin, Robert D.Sindelar, Routledge gray's Taylor & Francis, USA.
- Medical Pharmacology (1981), Andreas Goth, 10th Edition, The C.V. Mosby Company, London.

HOSPITAL MANAGEMENT AND MEDICAL CODING

08PMBC ED03

UNIT –

Introduction on Hospital management: Eligibility and personal skills required for Hospital management .Job opportunities in Hospital management. Important hospital management Institutes in India and World. Hospital management. Concept of Modern Hospital & Privatization in Health Sector, Public Sector Hospitals and Level of care / offered facilities, Effects of Globalization in Health care, Concept of Corporate Hospital in developing countries, Infrastructure and lay out of an ideal corporate hospital, Functioning of modern hospitals & changing need of patients. Hospitality in Hospital Care, Invasive and non-invasive diagnostic facilities in modern hospital. Care offered in Specialty and Super specialty Hospitals

UNIT – II

Hospital management system : Benefits of Hospital management systems ,Modules of Hospital management system .Interfacing of analysert.Pathology lab management.Radiology ,Blood Bank ,Pharmacology management softwares

UNIT – III

History of Medical Transcription: Drawbacks of MRP system, Advent of Medical Transcription .Web friendly operating system, Market information on companies.

What Medical Transcription does? Benefits in a nut shell. Planning on Medical Transcription set up .Induction and orientation

UNIT – IV

Impact of Medical Transcription: Medical Transcription impact on its stack holders .Impact during the implementation process.Impact on Departments,Organisation as whole ,Employment ,Nature of job ,Information access and Individual employees.Advantages in corporate entity ,Disadvantages ,conclusion

UNIT – V

Medical Transcription implementation: Medical Re engineering, Choosing appropriate transcription, Customise to suit the changes. Medical Transcription: Best practices, Costs, Failure, Gap analysis. Implementation, Life cycle. Medical Transcription- Trouble and their solutions.

REFERENCE BOOKS

- Hospital Management module II- NIHFV, New Delhi

- Hospital Administration – G. D. Kunders
- Hospital Administration - Tabish

GENERAL REFERENCE

- Robbins Pathologic Basis of Disease. Cotran, R.S. *et al.*, 5th ed. Saunders, 1994.
- An Introduction to the Principles of Disease. Walter, J.B., 3rd ed. Saunders, 1992.

- Harrison's Principles of Internal Medicine. Wilson, J.D. *et al.*, 14th ed. McGraw Hill, 1997.
- The Metabolic Basis of Inherited Disease. Scriver, C.R., Beaudet, A.L., Sly, W.S., Valle, D., 7th ed. McGraw Hill, 1995.
- Current Diagnosis. Conn, R.B. *et al.*, 9th ed. Saunders, 1997.
- Current Medical Diagnosis and Treatment 1999. Schroeder, S.A. *et al.*, 38th ed. Lange, 1998.
- Williams Textbook of Endocrinology. Wilson, J.D. and Foster, D.W., 9th ed. Saunders, 1998.
- Goodman and Gilman's The Pharmacologic Basis of Therapeutics. Gilman, A.G. *et al.*, 9th ed. MacMillan, 1996.
- Basic and Clinical Endocrinology. Greenspan, F.S. Forsham, P.H. (Eds.), 4th ed. Lange Series, Appleton and Lange, 1997.

JOURNALS

- American Journal of Clinical Pathology
- Annals of Clinical Biochemistry
- Annals of Internal Medicine
- British Medical Journal
- Clinical Chimica Acta
- Clinical Chemistry
- Clinical Biochemistry

- Clinics in Endocrinology and Metabolism
- Clinics in Laboratory Medicine
- Critical Review of Clinical Laboratory Sciences
- Current Clinical Chemistry'
- Endocrinology
- Journal of Bone and Mineral Research
- Journal of Clinical Chemistry and Biochemistry
- Journal of Clinical Endocrinology and Metabolism
- Journal of Clinical and Laboratory Medicine
- Journal of Clinical Pathology
- Lancet
- New England Journal of Medicine
- Pediatric Research
- Therapeutic Drug Monitoring
- Scandinavian Journal of Clinical and Laboratory Investigation .
- Science.
- Online Journals: see the CSCC web site: . www.cscclibrary.com

Web sites

- Medical Biochemistry 8 /19/ 2002
- UMMS - Biochemistry [http:// jwww.ummed.edu/. dept/ courses/weblinksjbiochem.html](http://jwww.ummed.edu/.dept/courses/weblinksjbiochem.html)
- Biochemistry Review Tables 8/19/ 2002
- Glycolysis and the Krebs Cycle 8/19/2002
- KEGG Metabolic Pathways 8/ 19/2002
- Metabolic, Pathways of Biochemistry 8/ 19/2002
- Stryer Biochemistry 8/ 19/2002
- Interactive Biochemistry' Web Links 8 19/2002
- BioChemNet: Biochemistry [http://schmidel.com bionet/biochem.htm](http://schmidel.com/bionet/biochem.htm)
- F1ATPase 8/19/2002
- The F1-ATPase 8/19/2002
- ATPase 8/19/2002
- MITOMAP: A human mitochondrial genome data
- <http://www.gen.emory.edu/mitomap.html> .
- CancerNet-Credible, current, and comprehen cancer information from the National Cancer institute 8/19/2002
- British Medical Journal8/ 19/2002
- Liver Disorders 8/19/2002 .
- CBS Health Watch [http:// /healthwatch.medscape](http://healthwatch.medscape)
- The Nobel Foundation 8/19/2002

- ConsumerLab.com:independent tests of the, vitamin, and mineral supplements <http://www.consumerlab.com>
- NIH Office of Diet. Supplements <http://odp.od.nih.gov/ods/databases/ibids.html>
- Neuromuscular Home Page 8/19/2002
- Harvard Medi School Course Pages8/19/2
- The WWW Virtual Library: Cell Biology: Metabolism and Cellular Respiration 8/19/2002
- bioethics.net <http://www.med.upenn.edu/bioethicsj/index.shtml>
- The Online Ethics Center 8/19/2002
- Food and Drug Administration <http://www.fda.gov>
- healthfinder: a gateway consumer health and human services information web site
- <http://www.healthfinder.gov/>