

ML 1811 FUNDAMENTALS OF MEDICAL LABORATORY TECHNOLOGY

SEMESTER : I **CREDITS** : 03
CATEGORIES : MC **NO. OF HOURS/ WEEK** : 03

***Objectives:** To impart basic knowledge on laboratory principles, procedures and techniques*

UNIT: I

Basic laboratory principles - Code of conduct of medical laboratory personnel - Organization of clinical laboratory - Role of medical laboratory technician - Safety measures - Medical laboratory professional and professionalism in laboratory workers - communication between physician and lab technician - hospital and clinic borne infection and personnel hygiene

UNIT: II

Common glass wares in clinical laboratory - care and maintenance - Calibration of pipettes and volumetric apparatus - Cleaning and sterilization methods - antiseptics and disinfectants - Principle, care, maintenance and application of Light - Fluorescent - Phase contrast - Electron microscope – staining techniques – vital stains

UNIT: III

Laboratory instruments: Introduction - Chemical balance: types, principle and practice -- Photometry- Principles and use- Beer Lambert law – Wavelength, transmittance and absorbance – Centrifuges - Water bath – Refrigerator – Autoclave - Hot air oven – Mixer – Laminar air flow - Water distillation unit (De ionized and double distilled water)- Automation.

UNIT: IV

Clinical samples and specimens - Specimen collection, transport, storage and disposal –common laboratory infections - Anticoagulants: EDTA, Di-potassium salts of EDTA, double oxalate, single oxalate, sodium citrate and sodium fluoride.

UNIT: V

Acid - Base balance – Electrolytes - Buffer and pH- Preparation of solution : Normal , per cent and Molar solution - normal saline -Methods of measuring liquids- Clinical laboratory records- Modern laboratory set up - Quality control: Accuracy, Precision, and Reference values.

REFERENCE

1. Fischbach, 2005. Manual of lab and diagnostic tests, Lippincott Williams Wilkins, New York.
2. Gradwohls, (ed) Ales C. Sonnenwirth and Leonard Jarret, 2000. Clinical laboratory methods and diagnosis. M.D.B.I., New Delhi.
3. J Ochei & Kolhatkar, 2002. Medical laboratory science theory and practice, Tata McGraw- Hill, New Delhi.
4. Kanai L. Mukherjee, 2007, Medical laboratory technology Vol.1.Tata McGraw Hill.

ML 1812 HUMAN ANATOMY AND PHYSIOLOGY

SEMESTER	: I	CREDITS	: 03
CATEGORIES	: MC	NO. OF HOURS/ WEEK	: 05

Objective: To understand the anatomical organization of organs, coordination and integrated functions and disorders in human body.

UNIT I:

Human Body an overview- Directional and regional terms - Cavities and planes, Tissues: Structure, function and locations of epithelial, connective and nerve tissues. Skin: Structure, function and pigmentation- Skeletal System: axial and appendicular skeleton functions, anatomy, histology, Structural and functional classification of joints and movements.

UNIT II: Digestive System: Gross anatomy, gastrointestinal secretions and function- Respiratory system: Anatomy of respiratory organs and functions, mechanism and regulation of respiration, respiratory volumes and capacities- Circulatory system: Functions of circulatory system, Heart structure, Circulatory routes (systemic, pulmonary, coronary and portal circulation) and Blood vessels- Lymphatic system: structure and function.

UNIT III: Endocrine System: Basic anatomy and physiology of the Pituitary, Thyroid, Parathyroid, Adrenals, Pancreas, Testes and ovary, their hormones, functions and disorders.

UNIT IV: Central nervous system: Brain- structure, location and functions- Spinal Cord: Anatomy, functions, reflex- arc- meninges- Peripheral nervous system – Cranial and spinal nerves- Autonomic nervous system (Physiology and functions)- structure of neuron- synapse- transmission of nerve impulse- Sense Organs: Basic anatomy and physiology of eye, ear, taste buds, tactile and olfactory sense organs- Muscular system: Types of muscles, Mechanism of muscle contraction.

UNIT V: Excretory system: structure and function - Physiology of urine formation. Reproductive System: structure and function of testis, ovary and associated glands- spermatogenesis and oogenesis- hormonal regulation of reproduction.

REFERENCE

1. Arthur C Guyton and John Edward Hall, 2006, Textbook of Medical Physiology 11th Ed, Elsevier Saunders.
2. Leonard R. Johnson, 2003, Essential Medical Physiology 3rd Ed, Elsevier, Academic Press.
3. Linda S. Costanzo, 2007, Physiology, Lippincott Williams & Wilkins.
4. Gerard J. Tortora, Bryan H. Derrickson, 2008, Principles of Anatomy and Physiology, 12th Edition, John Wiley and Sons.
5. Cindy L. Stanfield and William J Germann. 2010, Principles of Human Physiology, Pearson/Benjamin Cummings.
6. Gary A. Thibodeau & Catherine parker anthony, 2006, Anthony's Text book of Anatomy & Physiology, 17th edition, Elsevier.

ML 1813 MOLECULAR BIOLOGY AND CLINICAL BIOCHEMISTRY

SEMESTER	: I	CREDITS	: 03
CATEGORIES	: MC	NO. OF HOURS/ WEEK	: 05

Objective: To provide a foundation in molecular biology with a broad conceptual approach that transcends all sections of anatomical and biochemical abnormalities.

UNIT: I

Chemistry of Nucleic acids: DNA Structure and function, RNA Types: Structure and function. Replication – Transcription – genetic code - Translation -Regulation of transcription and translation - Ageing – malignant transformation of cells and role of oncogenes. Apoptosis -cell regeneration.

UNIT: II

Molecular diagnostics: Recombinant DNA Technology, Polymerase chain reaction, application of PCR in diagnosis of pathogens - Site directed mutagenesis - DNA finger printing - DNA Foot Printing – antisense RNA technology - chromosomal walking – inherited genetic disorders in man and gene therapy

UNIT: III

Metabolic disorders and Diagnostic enzymology: Disorders of metabolism: carbohydrate – Lipids – Amino acids and Nucleic acids. Diagnostic enzymes: Role of Enzymes in Clinical Practice: Marker enzymes in myocardium, liver and pancreas. Tumour markers - Radio isotope techniques

UNIT: IV

Organ function tests: Liver function tests - Bile pigment metabolism - tests for liver function. jaundice and its type — Functions of Kidney, Urine formation and renal function tests disease of kidney - Renal Calculi : Theory of formation and analysis - Gastric Analysis - Composition of gastric juice, concepts of free and bound acid, Fractional Test Meal

UNIT: V

Hormones: Hypothalamus and pituitary hormones: Hormonal disturbances, Thyroid function –

Endocrine disorders. Non-protein nitrogenous compounds, Principles of Urea, Creatinine and Uric acid formation

REFERENCE

1. David L. Nelson and Michael M. Cox, 2008. Lehninger Principles of Biochemistry 5th Ed, WH Freeman and Company.
2. LSP Davidson, J MacLeod and CRW Edwards, Davidson's Principles and Practice of Medicine: A Textbook for Students and Doctors (Hardcover) 15th Ed. Churchill Livingstone.
3. Voet & Voet, 1999. Fundamental of Biochemistry. John Wiley and Sons
4. Jeoffrery Zubay, 1995. Principles of Biochemistry, Wm C. Brown Publ.
5. MN Chatterjea and Rana Shinde, 2005. Textbook of Medical Biochemistry, Jaypee Brothers.
6. De Roberties,E.D.P & De Robertis, 1996, E.M.F. Cell and molecular biology, B.I.Waverly Pvt.Ltd, Philadelphia.
7. Richard M. Twyman, 1999, Advanced molecular Biology, Bios Scientific, Oxford, UK.

ML 1814 HAEMATOLOGY

SEMESTER	:I	CREDITS	: 03
CATEGORY	:MC	NO. OF HOURS/ WEEK	: 05

Objective: *To understand the mechanism of blood formation and their abnormalities in various types of disorders.*

Unit I :

Blood components, Blood functions, Plasma proteins, Hemoglobin –derivatives, synthesis, destruction, estimation techniques, red cell indices, red blood cells and hemoglobin-physiological variation, pathological variation, variation in the size, estimation of red cells, fragility of red cells

Unit II:

Haemopoietic system – erythropoiesis, thrombopoiesis and leucopoiesis. Anaemia – symptoms, diagnosis, classification, causes, treatment. Genetic disorders

Unit III : Hemostasis, Fibrinolysis, Blood clotting factors, mechanism of coagulation, tests of blood coagulation, bleeding disorders, Quality control and quality assessment, anticoagulants

Unit IV : Clotting time, Bleeding time, Haemoglobin estimation, Erythrocyte Sedimentation Rate, microhematocrit, macrohematocrit, red cell indices, Differential count, Total Red Blood cell count, Total White blood cell count, Platelet count, Eosinophilic count, Reticulocyte count

Unit V : Osmotic fragility, Heinz body preparation, Sickle cell preparation, Lupus erythematosus (LE) cell preparation, NESTROF,

REFERENCE

1. Ronald Hoffman, Edward J Benz, San ford J.Shattil, Beuce Furie Harvey J. Cohen, Leslie E. Silberstein and Philip McGlave, 2005. Haematology-Basic principles and practice. 4th edition, – Elsevier Churchill Livingstone.
2. A. Manoharan & S.Sethuraman. Jaypee brothers, 2003. Essentials clinical heamatology, New Delhi.
3. Richard A, McPherson, Matthew R. Pincus, 2007. Clinical Diagnosis and management by Laboratory methods, 21st edition, Elsevier.
4. Ramnik Sood, 2009, Medical laboratory technology methods and interpretations, 5th edition, Jaypee Brothers.
5. Praful B Godkar and Darshan P .Godkar, 2011, Textbook of medical laboratory technology, 2nd edition, Bhalani Publishing house, Mumbai.

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ML 1815 MOLECULAR BIOLOGY AND BIOCHEMISTRY LAB COURSE

SEMESTER	: I	CREDITS	: 04
CATEGORIES	: MC	NO. OF HOURS/ WEEK	: 06

Objective: *To impart skills to analyze various biochemical products in normal and abnormal conditions.*

UNIT: I

Laboratory instruments- (Photometry, Centrifuge, Water bath). Medical laboratory professional - professionalism in biochemistry laboratory. Calibration of pipettes and other volumetric apparatus. General approach to specimen collection, transport and disposal. Anticoagulants

UNIT: II

Estimation of blood sugar, Glucose tolerance tests(GTT), Glycosylated haemoglobin(HbA1C). Lipid determination of serum lipids – cholesterol, triglycerides and lipoprotein fractionation

UNIT: III

Liver function tests: Estimation of Total Protein, Albumin & A/G ratio, Estimation of Bilirubin – total and conjugated. Renal function test: Estimation of NPN substances a) Blood Urea, b) Serum Creatinine. c) Serum Uric acid.

UNIT: IV

Enzymes: Determination of Alkaline Phosphates, Acid phosphates, S G O T, SGPT, salivary Amylase. Cardiac markers: Creatine phosphokinase, Lactate dehydrogenase(LDH). Inorganic ions – Determination of calcium in serum and urine, serum phosphates, chloride sodium and potassium

UNIT: V

Agarose gel electrophoresis – SDS-PAGE – Isolation of DNA from whole blood sample – restriction digestion of lambda DNA using Eco RI and Hind III – Restriction fragment length polymorphism – Isolation of RNA – Quantification of DNA by diphenyl method- PCR.

REFERENCE

1. Fischbach, 2005. Manual of lab and diagnostic tests, Lippincott Williams Wilkins, New York.
2. Gradwohls, 2000. Clinical laboratory methods and diagnosis. (ed) Ales C. Sonnenwirth and leonard jarret, M.D.B.I., New Delhi.
3. J Ochei and Kolhatkar, 2002. Medical laboratory science theory and practice, Tata McGraw-Hill, New Delhi.
4. Kanai L. Mukherjee, 2007, Medical laboratory technology Vol.1.Tata McGraw Hill.
5. MN Chatterjea and Rana Shinde, 2005. Textbook of Medical Biochemistry, Jaypee Brothers.
6. De Roberties,E.D.P & De Robertis, 1996, E.M.F. Cell and molecular biology, B.I.Waverly Pvt.Ltd, Philadelphia.

4. J. Ochei & Arundhati Kolhatkar, Medical Laboratory science- Theory and practice, 2000, Tata McGraw-Hill publishing company Ltd, New Delhi.
5. Monica Cheesbrough, 2006, Medical Laboratory Manual for Tropical Countries Vol. I and II, Cambridge University Press; UK

ML 2814 – MEDICAL MICROBIOLOGY

SEMESTER : II

CREDITS : 5

CATEGORY : MC

NO. OF HOURS / WEEK: 6

***Objective:** To introduce basic principles and many etiological agents responsible for global infectious diseases and to impart the knowledge of microbiology which can be used in variety of clinical settings to solve diagnostic problems*

Unit I: Introduction

Definition and scope of Microbiology - History and recent developments - spontaneous generation - Biogenesis-contributions of Louis Pasteur - Leewenhoek, Lazaro Spallanzani, John Tyndall, Joseh Lister - Robert Koch. Microbial kingdoms - Five kingdoms - cell theory - Binomial nomenclature of microbes. Anatomy of prokaryotes and eukaryotes - structure and function of cell wall, cilia, flagella, slime layer, capsule, pili, cytoplamic membrane and cytoplasmic inclusions, sporulation. Kingdom prokaryotes - classical techniques of microbial identification - morphological, physiological and biochemical properties.

Unit II: Medical Bacteriology

Classification and general properties of medically important bacteria. Recommendation for collection, transport of specimens, isolation of bacteria from clinical specimens. Staphylococcus streptococcus Neisseria and Bordetella. Corynebacterium, Listeria, Mycobacetrium.Bacillus, Vibrios, Aeromonas, Campylobacter, Helicobacter, Pseudomonas, Brucella, Haemophilus, Enterobacteriaceae, Salmonella, Shigella, Proteus, Escherichia, Klebsiella, Clostridium, Mycoplasma, Rickettsiae, Spirochaetes, Treponema and Leptospira .

Unit III: Medical Virology

General Properties of viruses - Detection of viruses and antigens in clinical specimens - Serological diagnosis of virus infections. Cultivation of viruses.Arthropod borne and rodent borne virus diseases - Picorna viruses and diseases. Hepatitis viruses: Rabies and other neuro viruses: Orthoinyxo and paramyxo viruses. Pox, Adeno, Herpes, Reo, Rota and HIV Virses, Oncogenic viruses, Viral

vaccines, their Preparation and their immunisation schedules. Viruses of importance to bacteria - Bacteriophages - Their structure, types - Typing and application in bacterial genetics.

Unit IV: Medical Mycology

Morphology, Taxonomy, classification of fungi, detection and recovery of fungi from clinical specimens. Dermatophytes and agents of superficial mycoses. Trichophyton. Epidermophyton and Microsporium. Yeasts of medical importance- Candida, cryptococcus. Mycotoxins, Dimorphic fungi causing systemic mycoses, Histoplasma, Coccidioides, Opportunistic fungi. Diagnosis of fungal infection. Immunity to fungal infections. Antifungal agents, testing methods and quality control

Unit V: Medical parasitology

Introduction to medical Parasitology - Classification, Protozoa - Entamoeba - Plasmodium, Leishmania - Trypanosoma - Giardia Trichomonas - Balantidium. Platyhelminthus -- Taenia - Fasciola - Paragonimus - Schistosoma. Nematohelminthes - Ascaris - Ankylostoma - Enterobius – Trichuris - Wuchereria - Dracunculus. Laboratory techniques in Parasitology. Examination of faeces for ova and cysts - Concentration methods. Blood smear examination for Parasites. Cultivation of Protozoan Parasites.

REFERENCE

1. Dubey RC and Maheswari DK , 2005. A text book of Microbiology, Revised Multicolour edition, S.Chand Publishers, New Delhi.
2. Purohit SS , 2005. Microbiology - Fundamentals and Applications. Student Edition Publishers, Jodhpur.
3. Pelczar & Kreig , 2006. Microbiology, 5th edition. Tata McGraw Hill, New Delhi
4. Powar & Dagainawala , 2005. General Microbiology, Vol.I & II 8th Edition, Himalaya Publishing House, Mumbai.
5. Salle, A.J., 2001. Fundamentals & Principles of Bacteriology. 7th edition. Tata McGraw-Hill.
6. Delbecco, Eisen & Ginsburg , 1990. Microbiology, 5th Edition Harper & Raw, New York.
7. Alexopoulos CJ and C W. Mims, 1993. Introductory Mycology (3rd edition) Wiley Eastern Ltd, New Delhi
8. Elizabeth Moore-Landecker, 1996. Fundamentals of the fungi (4th Edition). Prentice Hall International, Inc, London.
9. 11. Jawetz, Melnick, & Adelberg, 2010. Medical Microbiology, Mc Graw Hill New Delhi.

ML 2815 IMMUNOLOGY

SEMESTER: II	CREDITS	:	5
CATEGORY: MC	NO. OF HOURS / WEEK:		6

Objective: *To understand the immune components, their organisation and measures to gain immunity against infections.*

Unit I: Immune components and their functions

General concepts of immune system, Innate and adaptive immunity; Inflammation-general properties. Structure, properties and functions of the immune cells & organs: T and B-lymphocytes, NK cells; Monocytes and macrophages; Neutrophils, eosinophils, and basophiles. Mast cells and dendritic cells, Thymus and Bone marrow; Lymph nodes, spleen, MALT, GALT and CALT

Unit II: Chemical aspects of immunology

Antigens - properties (foreignness, molecular size, heterogeneity). B and T cell epitopes. T-dependent and T-independent antigens. Haptens. Antibodies - Structure, function and properties of the antibodies; Different classes and biological activities of antibodies; Antibody as B cell receptor, antigenic determinants on antibodies (isotype, allotype and idiotypic). Hybridoma technology, monoclonal antibodies. Organization of MHC. Structure and cellular distribution of HLA antigens. Components of the complement system, Biological consequence of complement activation and complement deficiencies,

Unit III: Applied Immunology

Hypersensitivity - immediate and delayed type hypersensitivity reactions. Forms of Immunity - nonspecific resistance, Tumor immunology. Immunological tolerance and immunosuppression. Immunotherapy of infectious diseases; Types and principles of immunization; vaccinoprophylaxis, vaccinoimmunotherapy, serotherapy. Types of grafts, immunologic basis of graft rejection, properties and types of rejection, tissue typing, immunosuppressive therapy

Unit IV: Autoimmunity and Immunodeficiency disorders

Mechanisms of induction of organ specific (Hashimoto's thyroiditis, autoimmune anemias, Good pasture's syndrome, IDDM), and systemic (SLE, multiple sclerosis and rheumatoid arthritis) autoimmune diseases. Animal models of primary immunodeficiency (nude mouse and SCID mouse). Specific impaired functions in lymphoid lineage (SCID, Waldenstrom agammaglobulinemia, DiGeorge syndrome, common variable immunodeficiency), myeloid lineage (CGD, congenital neutropenia, Chediak-Higashi syndrome and leucocyte adhesion deficiency)

Unit V: Immunological principles of various reactions and techniques:

Affinity and avidity, cross reactivity, precipitation, agglutination, immunodiffusion, immunoelectrophoresis, ELISA (indirect, sandwich, competitive, chemiluminescence, ELISPOT assay), western blotting, immunofluorescence, flow cytometry and fluorescence, and immunoelectron microscopy

REFERENCE

1. Peter J. Delves, Seamus J. Martin, Dennis R. Burton, Ivan M. Roitt, 2011. Roitt's Essential Immunology, John Wiley & Sons.
2. Peckman, M and D. Vergain, 1997. Basic and Clinical Immunology, Churchill Livingstone. N.Y.
3. Playfair, J.H.L, 2001. Immunology at a glance, 7th edition. Blackwell Scientific Publications, Oxford.
4. Stewart, S, 2001. Immunology, Immunopathology and Immunity, 6th edition. ASM Press Washington D.
5. Thomas J. Kindt, Richard A. Goldsby, Barbara Anne Osborne, Janis Kuby - W.H. Freeman, 2007. Immunology, 6th edition, W H Freeman & Co.
6. Richard Coico, Geoffrey SunShine, 2009. Immunology : A Short Course, 6th edition, John Wiley & Sons.
7. Gabriel Virella, 1998. Introduction to Medical Immunology, 4th edition, Marcel **Dekker**, Inc.

ML 2816 - SEROLOGY AND BLOOD BANK LAB COURSE

SEMESTER	: II	CREDITS	: 05
CATEGORIES	: MC	NO. OF HOURS/ WEEK	: 06

Objective: To impart hands - on training on the methodologies for identification of infectious human diseases.

Unit I:

Widal for Typhoid and RPR (Rapid Plasma Reagin)

Unit II:

Inflammatory Disorders, General inflammatory marks and specific therapeutic bioindicators. CRP (C reactive protein), RA (Rheumatoid Arthritis), ASO (Anti- Streptolysin O)

Unit III:

Immunological test for pregnancy, Haemagglutination, Compliment fixation, Precipitation and Immunodiffusion

Unit IV:

Basic principles involved in Immunohaematology as prior to blood transfusion, Blood collection procedure, Blood grouping (Slide method , tube method), Rh typing, Forward and Reverse grouping techniques, Cross matching(Major and Minor types), Separation of Blood components, Coombs test

Unit V:

HbsAg, HCV, HIV (ELISA, Western Blot tests), TPHA (Treponema pallidum haemagglutination), Malarial parasites.

REFERENCE

1. Henry., Bernard, J., Sanford, T and Davidson, 2002. Clinical diagnosis and Management by laboratory methods. W.B. Saunders, New York.
2. Gradwohl, 2000. Clinical Laboratory Methods and Diagnosis. (ed) Ales C. Sonnenwirth and Leonard jarret, M.D. B.I. Publications, New Delhi.

3. Richard, R, 1989. Clinical Laboratory Medicine, Medical Publication, Chicago.
4. Williams and J. William, 1990. Haematology. Mc Graw Hill, New York.

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ML 2817 - MICROBIOLOGY LAB COURSE

SEMESTER : II **CREDITS** : 5
CATEGORY: MC **NO. OF HOURS / WEEK: 6**

OBJECTIVE : *To impart skills in essential microbiological techniques related to human samples.*

UNIT I:

Sterilization of glasswares, preparation of culture media, establishing pure cultures

Unit II:

Preparation of wet mount, motility test, Staining techniques – Simple, Gram's, Acid Fast, capsule

Unit III:

Physiological reaction of Bacteria – Catalase, coagulase, oxidase, urease, nitrate, carbohydrate fermentation, IMViC, TSI, esculin hydrolysis

Unit IV:

Identification of unknown organisms from skin, throat swab, urine and stool. Antibiotic sensitivity test

Unit V:

Examination of fungi-KOH method, saline wet mount, LPCB and Nigrosin staining, Germ tube test

REFERENCE

2. Cappucino, 2007. Microbiology a laboratory Manual, 8th edition. Benjamin-Cummings Publishing Company
3. Monica Cheesebrough, 2006. Medical laboratory Manual for tropical Countries, Volume 1 & 2. Cambridge University Press, Cambridge, UK.

4. J. G. Collee, Thomas Jones Mackie, James Elvins McCartney, 1996. Practical Medical Microbiology, Churchill Livingstone, USA
5. Fischbach, F.T., Dunning, M.B, 2002. A manual of Laboratory and Diagnostic Tests. Lippincott Williams and Wilkins, Baltimore.

6.

ML 2955 RESEARCH METHODOLOGY

SEMESTER : II **CREDITS : 03**
CATEGORIES : MC **NO. OF HOURS/ WEEK : 04**

Objective: *To elaborate the importance of scientific research in laboratory techniques through systemic and experimental approach.*

UNIT- I

Research: Meaning – Purpose- Types of research-significance of research in social and health sciences - Steps in Research: Identification - selection and formulation of research problem – types and review of literature - Research design- Formulation of hypothesis – preparation of questioner

UNIT-II

Sampling Technique: Sampling theory-Types of sampling-Steps in sampling-Sampling and Non-sampling error-Sample size–Advantages and limitations of sampling. : Primary data: Meaning-Collection-methods-Observation–Interview-questionnaire-Schedule-Pretest-Pilot study –Experimental and case studies-Secondary data: Meaning – Relevance, limitations and cautions

UNIT-III

Processing Data: Checking- Editing-Coding- transcriptions and Tabulation- Data analysis- Meaning and methods- Quantitative and Qualitative analysis. Structuring the Report: Chapter format - Presenting footnotes – abbreviations- bibliography - Documentation-Use and format of appendices- Indexing - Contents-Styles of reporting- Steps in drafting reports-Editing the final draft-Evaluating the final draft. Thesis writing – preparation of manuscript for scientific publications – impact factors

UNIT IV:

Collection and representation of data- tabulation and diagrams – scatter diagram – histogram – bar diagram – frequency curve – frequency polygon – ogives – logarithmic curve – tridimensional graph – pie diagram

UNIT V:

Research Proposal: Contents-Preamble, the problem, objectives, hypothesis to be tested, study, design, setup, measurement procedures, analysis of data, organization of report; Displaying data tables, graphs and charts – preparation of project proposal: Thrust area – funding agencies (National and International) – kinds of research program in India and abroad – career development in laboratory research – principle and method of patenting.

REFERENCE

1. Kothari, C.R., 1985. Research Methodology (Methods and Techniques), New Age Publisher
2. Gurumani N. 2006. Research methodology for biological sciences. MJP. Chennai.
3. *Rand R. Wilcox*, Fundamentals of modern statistical methods
4. *R. Barker Bausell, Yu-Fang Li*, Power Analysis for Experimental Research a Practical Guide for the Biological, Medical and Social Sciences, Cambridge University Press
5. *Robert O. Kuehl Brooke/Cole*, Design of Experiments: Statistical Principles of Research Design and Analysis

ML 2956 COMMUNITY MEDICINE

SEMESTER : II

CREDITS : 3

CATEGORY: ES

NO. OF HOURS / WEEK: 4

***Objective :** To recognize the importance of community medicine in the context of the health needs of the community and national priorities in the health sector.*

Unit I: Basic Epidemiology

Epidemiology: definition, concepts, uses and its role in health and disease. Use of basic epidemiological tools to make a community diagnosis of the health situation. Modes of transmission and measures for prevention and control of communicable and non-communicable diseases. Principal sources of epidemiological data. Definition, calculation and interpretation of morbidity and mortality indicators. Need, uses and evaluation of screening tests. Application of computers in epidemiology

Unit - II: Environment and health

Water: Concepts of safe and wholesome water, sanitary sources of water, waterborne diseases, water purification processes, water quality standards. Physical and chemical standards of drinking water quality and tests for assessing bacteriological quality of water. Concepts of water conservation and rainwater harvesting. Concepts of solid waste and human excreta and sewage disposal. Awareness of standards of housing and the effect of housing on health. Health hazards of air, water, noise, radiation pollution. Role of vectors in causing diseases. Identifying features of vectors and their control measures. Life cycles of vectors and advantages and limitations of various vector control measures. Mode of action, application cycle of commonly used insecticides and rodenticides

Unit - III: Genetics and community health

Basic principles of Genetics. Chromosomal Disorders. Genetic predisposition in Common disorder. Preventive and social measures - Eugenics & Euthenics, Genetic counseling . Early diagnosis, treatment and rehabilitation. Occupational Health – Definition, Classification of Occupational Hazards and Diseases, Preventive measures for Occupational Diseases

Unit IV: Reproductive and child health

Current status of Reproductive and Child Health. Screening of high risk groups and common health problems. Reproductive child health (RCH) components, including child survival and safe motherhood, Universal Immunization Programme, Integrated Child Development Services Scheme (ICDS), Integrated Management of Neonatal and Childhood Illness (IMNCI) and other existing Programmes. Organization, implementation and evaluation of reproductive and child health program components. Various family planning methods, their advantages and shortcomings. Gender issues and Women empowerment Organizations, technical and operational aspects of the National Family Welfare Programme

Unit - V: Health education

Approaches in health education. Methods of Health Education. Barriers to effective Communications. Principles of Health Education. International Health Organisations – WHO, UNICEF, Red Cross, Voluntary Health Organisation, International Health Regulations

REFERENCE

1. Hiremath DA, 2004. Essential of community medicine and practical approach, Jaypee brothers publishers
2. Jana Balaram, 2003. Community medicine: preventive and social medicine, Jain Publishers (P) Ltd
3. Robert H. Fletcher, Suzanne W. Fletcher, 2005. Clinical Epidemiology The Essentials, 4th edition, Lippincott Williams & Wilkins
4. Robert B Wallace, 2008. Public health and preventive medicine, McGraw-hill
5. Gupta & Mahajan, 2003. Textbook of preventive and social medicine, Jaypee brothers
6. Dhaar, G.M., Robbanni,I., 2008. Foundations of Community medicine, Elsevier

ML 2301 CLINICAL TECHNOLOGY

SEMESTER :II	CREDIT	:	1
CATEGORY :EG1	HOURS / WEEK	:	3

Objectives: To impart knowledge on medical lab technology to the students of non biology course.

Unit I: Selection, procurement and care of equipment, power supplies, microscope, centrifuges, autoclave, incubator, water bath, colorimeter, general laboratory ware

Unit II: Common causes of accidents in lab, code of safe lab practice, safe lab premise, personal safety measures, decontamination of infectious material and disposal of lab waste, chemical and reagent hazards, equipment and glassware hazards, fire safety, emergency first aid

Unit III: Collection of blood, Blood Pressure, Pulse rate, Clotting time, Bleeding time, Haemoglobin estimation, Erythrocyte Sedimentation Rate, hematocrit

Unit IV: Anemia, STD, diabetes, hypertension, bacterial infection, fungal infection, parasitic infection

Unit V: Chromatography, PCR, stem cell therapy, clinical chemistry analysers, immulite automated immunoassay analyzer

REFERENCE

1. Praful B Godkar and Darshan P .Godkar, 2011, Textbook of medical laboratory technology, 2nd edition, Bhalani Publishing house, Mumbai.
2. Kanai L. Mukherjee, 2010, Medical laboratory technology, Tata McGraw-Hill publishing company Ltd, New Delhi.
3. Ramnik Sood, 2009, Medical laboratory technology methods and interpretations, 5th edition, Jaypee Brothers.

4. J. Ochei & Arundhati Kolhatkar, Medical Laboratory science- Theory and practice, 2000, Tata McGraw-Hill publishing company Ltd, New Delhi.
5. Monica Cheesbrough, 2006, Medical Laboratory Manual for Tropical Countries Vol. I and II, Cambridge University Press; UK