

### ANNEXURE-III

#### SCHEME AND SYLLABUS FOR THE POST OF TUTOR (CLINICAL) IN HM & FW DEPARTMENT

##### Scheme of Examination

<b>Part-A:WRITTEN EXAMINATION (Objective Type)</b>	<b>No.of Questions</b>	<b>Duration (Minutes)</b>	<b>Maximum Marks</b>
Paper-I: General Studies and General Abilities	<b>150</b>	<b>150</b>	<b>150</b>
Paper-II: Medical Science & General Medicine (Degree Level)	<b>150</b>	<b>150</b>	<b>300</b>
<b>Part-B:Interview</b>			<b>50</b>
		<b>Total</b>	<b>500</b>

##### Syllabus

#### PAPER-I: GENERAL STUDIES AND GENERAL ABILITIES

1. Current Affairs: International, National and State.
2. Society, Heritage and Culture, Polity, Economy, Human Development Indices and the Development Programmes in India and Telangana.
3. Natural Resources in India and Telangana: their distribution, exploitation, conservation and related issues.
4. Basic concepts of Ecology and Environment and their impact on health and economy; Disasters and Disaster management.
5. Impact of changing demographic trends on health, environment and society.
6. Agriculture, Industry, Trade, Transportation and Service sectors in India and Telangana.
7. Food adulteration, Food processing, food distribution, food storage and their relevance to public health.
8. Recent trends in Science and Technology.
9. Telangana Statehood movement and formation of Telangana State.
10. Moral values and Professional ethics.
11. Logical Reasoning: Analytical Ability and Data Interpretation.

## PAPER-II: MEDICAL SCIENCE & GENERAL MEDICINE

### 1. Anatomy

The subject deals with the structure of human body. The curriculum for subject is as follow:

- a. General Anatomy
- b. Regional Anatomy
  - i. Upper limb
  - ii. Lower limb
  - iii. Abdomen and Pelvis
  - iv. Thorax
  - v. Head & Neck
  - vi. Spinal Cord & Brain
- c. Micro-Anatomy
  - i. General Histology
  - ii. Systemic Histology
- d. Developmental Anatomy
  - i. General Embryology
  - ii. Systemic Embryology
- e. Genetics
- f. Radiological Anatomy, USG, CT, MRI
- g. Surface Anatomy, Living & Marking

### 2. Physiology

- a. General Physiology.
- b. Hematology
- c. Nerve
- d. Muscle
- e. Respiratory Physiology
- f. Cardiovascular Physiology
- g. Renal Physiology
- h. Body Temperature Regulation
- i. Alimentary System
- j. Nutrition
- k. Endocrine System
- l. Reproductive Physiology
- m. Special Senses: Eye, Ear, Taste, Smell
- n. Central Nervous System
- o. Bio Physics
- p. Environmental Physiology

### 3. Bio ChEMISTRY

- a. Molecular and functional organization of a cell and its sub-cellular components.
- b. Chemistry of enzymes and their clinical applications.
- c. Chemistry and metabolism of proteins and related disorders.
- d. Chemistry and metabolism of purines and pyrimidines and related disorders.
- e. Chemistry and functions of DNA and RNA, Genetic code; Protein bio synthesis & regulation (Lac-operon)
- f. The principles of genetic engineering and their applications in medicine.
- g. Chemistry and Metabolism of haemoglobin.
- h. Biological oxidation.
- i. Molecular concept of body defense and their applications in medicine.
- j. Vitamins and Nutrition.
- k. Chemistry and metabolism of carbohydrates and related disorders.
- l. Chemistry and metabolism of lipids and related disorders.
- m. Mineral metabolism: Water and electrolyte balance & imbalance.
- n. Acid base balance and imbalance.
- o. Integration of various aspects of metabolism and their regulatory pathways. Starvation metabolism.

- p. Mechanism of hormone action.
- q. Environmental biochemistry.
- r. Liver function tests, Kidney function tests, Thyroid function tests
- s. Detoxification mechanisms.
- t. Biochemical basis of cancer and carcinogenesis.
- u. Radioisotopes.
- v. Investigation techniques Colorimeter, Electrophoresis, Chromatography & Flame photometer.

#### 4. Pathology

- a. General Pathology
- b. Haematology
- c. Systemic Pathology
- d. Clinical Pathology
- e. Autopsy

#### 5. Microbiology

- a. General Microbiology
- b. Immunology
- c. Systemic Bacteriology
- d. Mycology
- e. Virology
- f. Parasitology

#### 6. Pharmacology

- a. Introduction to Pharmacology
- b. General Pharmacology:
- c. Autonomic Pharmacology:
- d. Cardiovascular System Including Drugs Affecting Coagulation and Those Acting On Kidneys:
- e. Haematinics and Haematopoietic Factors:
- f. Neuropsychiatric Pharmacology Including Inflammation, Pain & Substance Abuse
- g. Chemotherapy Including Cancer Chemotherapy:
- h. Endocrinology:
- i. Agents Used In Gastrointestinal Disorders:
- j. Peri operative Management
- k. Rational Pharmacotherapy:
- l. Miscellaneous Topics:  
Anti Allergies, Immuno modifying drugs, vaccines, Sera, Drugs acting on uterus, Drug interactions, Chelating Drugs, Drugs in extremes of age, Pregnancy, Drugs in organ disfunction, General anaesthetics, ocular and dermatological pharmacology.

#### 7. Forensic Medicine and Medical Jurisprudence and Toxicology

- a. History of Forensic Medicine
- b. Need, Scope, Importance and probative value of Medical evidence in Crime Investigation
- c. Personal identity need and its importance.
- d. Mechanical Injuries And Burns
- e. Medico-Legal Aspects of Sex, Marriage And Infant Death
- f. Medico-Legal Aspects Of Death
- g. Medico-Legal Autopsy
- h. Forensic Psychiatry
- i. Poisons And Their Medico-Legal Aspects
- j. Forensic Science Laboratory
- k. Legal And Ethical Aspects Of Practice Of Medicine
- l. Definition Of Health And Items To Certify About Health
- m. Acts And Schemes Related To Medical Profession

#### 8. Social and Preventive Medicine / Community Medicine

- a. Basic concept of Health and disease
- b. Principles of epidemiology and epidemiological methods
- c. Screening for diseases
- d. Epidemiology of Communicable diseases

- e. Epidemiology of chronic non-communicable diseases and conditions
- f. National Health Programmes of India
- g. Essential medicines and counterfeit medicines
- h. Demography and family planning
- i. Preventive medicine in obstetrics paediatrics and geriatrics
- j. Nutrition and health
- k. Medicine and social sciences
- l. Environment and health
- m. Hospital waste management
- n. Disaster management
- o. Occupational health
- p. Genetics and health
- q. Mental health
- r. Health information and basic medical statistics
- s. Communication for health education
- t. Health planning and management
- u. Health care of the community
- v. NGO's & International health

### 9. Medicine

- a. Principals of Medicine. Good medical practice, Therapeutics, Molecular & Genetic factors in disease, Immunological factors in disease, Environmental & nutritional factors in disease, Principles of Infectious diseases, Ageing & disease.
- b. Practice of Medicine.
- c. Critical Illness, Acute medical care, Emergencies & total management.
- d. Poisoning,
- e. Medical psychiatry,
- f. Oncology,
- g. Palliative care and pain,
- h. Infectious disease,
- i. HIV & AIDS,
- j. STD's,
- k. Clinical Biochemistry & Metabolism, & Lab reference ranges,
- l. Kidney & Urinary tract disease,
- m. Cardiovascular system,
- n. Respiratory diseases,
- o. Endocrine Diseases and Diabetes
- p. Alimentary Tract and Pancreatic Diseases
- q. Liver and Biliary Diseases
- r. Blood Diseases,
- s. Musculo Skeletal Diseases,
- t. Neurological diseases,
- u. Stroke,
- v. Skin diseases,
- w. Geriatrics.

### 10. Paediatrics

- a. Introduction of Paediatrics.
- b. Normal Growth and Normal Development and its disorders.  
Adolescent health and Development
- c. Nutrition, Micro nutrients in health and diseases
- d. New born infant
- e. Immunization and Immuno deficiencies
- f. Infections and infestations
- g. Disorders of gastro intestinal system, liver and Fluid & Electrolyte disturbances
- h. Disorders of Respiratory system, Cardio vascular system, Kidney, Urinary tract, Endocrine, Metabolic, Rheumatological, Genetic and Neuro Muscular
- i. Central nervous system
- j. Inborn Errors of Metabolism
- k. Haematological disorders

- l. Childhood malignancies
- m. Poisonings, injuries and accidents
- n. Paediatric critical care
- o. National Health Programme for Child including Immunization Programmes

### **11. Psychiatry**

- a. Nature and development of different aspects of normal human behaviour like learning memory, motivation, personality and intelligence.
- b. Recognition of differences between normal and abnormal behaviour,
- c. Classification of psychiatric disorders
- d. Organic psychosis,
- e. Functional psychosis,
- f. Schizo-phrenia,
- g. Affective disorders,
- h. Neurotic disorders,
- i. Personality disorders,
- j. Psycho-physiological disorders,
- k. Drug & Alcohol dependence,
- l. Psychiatric disorders of childhood and adolescence
- m. Use of different modes of Therapy in Psychiatric Disorders

### **12. Dermatology and Sexually Transmitted Diseases and Leprosy**

- a. Common skin diseases etiology pathology clinical features complications investigations and complete management
- b. Common sexually transmitted diseases etiology pathology clinical features complications investigations and complete management National AIDS control programmes
- c. Leprosy etiology pathology clinical features investigations complications and complete management, National leprosy eradication programme
- d. Various modes of topical therapy, Commonly used drugs, their doses, side-effects/toxicity, indications and contraindications and interactions common dermatological medical and surgical procedures for various skin diseases and STD's

### **13. Tuberculosis and Respiratory Diseases**

- a. Common chest diseases clinical manifestations, investigations, complications and complete management.
- b. Mode of action of commonly used drugs, their doses, side effects/ toxicity, indications and contra-indications and interactions, common medical and surgical procedures for various respiratory diseases and tuberculosis and National Tuberculosis Control Programmes.

### **14. Radiodiagnosis and Radiotherapy**

#### **Radiodiagnosis,**

- a. Basics of X-Ray production it's uses and hazards.
- b. Identification and diagnosis of changes in bones like fractures, infections, tumour and metabolic diseases.
- c. Identification and diagnosis of various radiological changes in diseases conditions of chest & mediastinum, skeletal system, GIT, Hepatobiliary system, and Genito-urinary system.
- d. Isotopes, Computerised Tomography(CT) Ultrasound, Magnetic Resonance Imaging(M.R.I.) and D.S.A.

#### **Radiotherapy**

- a. Symptoms and signs of various cancers, investigations and management.
- b. Basic principles of Radiotherapy and effect of radiation therapy on human beings
- c. Radio-active isotopes and their physical properties.
- d. Advances made in radiotherapy in cancer management
- e. Radiotherapeutic equipment.

## 15. Surgery

### I. General Principles

- a. Wound healing and management, management of severely injured. Metabolic response to injury
- b. Asepsis, antisepsis, sterilization.
- c. Surgical sutures.
- d. Acute, chronic Surgical infections and their management. Bites and stings.
- e. Hospital infection.
- f. AIDS and Hepatitis B; Occupational hazards and prevention.
- g. Mechanism and Management of missile, blast and gunshot injuries. Trauma and Disaster Management.
- h. Organ transplantation - Basic principles.
- i. Nutritional support to surgical patients.
- j. Diagnostic Imaging
- k. Resuscitation, Fluid electrolyte balance, Shock, Blood transfusion and Common postoperative complications.
- l. Anaesthesia and pain relief
- m. Day care surgery
- n. Principles of Laparoscopic and Robotic surgery
- o. Principles of Oncology
- p. Surgical Audit and Research.

### II. Etiopathology Clinical Features and Management of :

- a. Common skin and subcutaneous conditions.
- b. Disorders of Arteries, Veins, Lymphatics and Lymph nodes
- c. Burns
- d. Disorders of Scalp, Skull and Brain
- e. Disorders of Oral cavity, jaws, salivary glands and neck.
- f. Disorders of Thyroid, Para Thyroid and Adrenal glands
- g. Diseases of Thorax, Heart, Pericardium and Breast
- h. Diseases of Oesophagus, Stomach, Duodenum, Liver, Spleen, Gall Bladder, Bile ducts, Pancreas, Peritoneum, Omentum, Mesentery and Retroperitoneal space.
- i. Diseases of Small Intestine, Large Intestine, Appendix, Rectum, Anal Canal.
- j. Acute Abdomen and Hernias.
- k. Diseases of Genito-Urinary system, Prostate, Seminal Vesicles, Urethra, Penis, Scrotum and Testis.

## 16. Orthopedics

### Applied Anatomy, Etiopathogenesis, Clinical features and Management of:

- a. Bone injuries and dislocations
- b. Common infections of bones and joints,
- c. Congenital and skeletal anomalies,
- d. Common Degenerative and Metabolic Bone diseases in India,
- e. Neoplasms affecting Bones, joints and soft tissues.
- f. Sports injuries.

## 17. E.N.T.

- a. Anatomy and physiology of Ear, Nose, Throat
- b. Diseases of the Ear
- c. Diseases of the Nose and paranasal sinuses
- d. Diseases of the Oral Cavity and Salivary Glands
- e. Diseases of the pharynx
- f. Diseases of the Larynx and Trachea
- g. Diseases of the Oesophagus
- h. Deafness, Audiometry, Hearing Aids, and Rehabilitation

## 18. Ophthalmology

- a. Introduction Anatomy & Physiology of the Eye
- b. Ophthalmic Optics and Refraction
- c. Common Disease of Eye.

- d. Disorders of Ocular Motility
- e. Diseases of the Eye Adnexa
- f. Systemic Ophthalmology
- g. Principles of Management of Major Ophthalmic Emergencies
- h. Ophthalmic Pharmacology
- i. Community Ophthalmology and NPCB
- j. Nutritional Ophthalmology

**19. Obstetrics and Gynaecology**

- a. Anatomy, Physiology, Patho Physiology of Reproductive system, common conditions affecting it and its management.
- b. Normal pregnancy, Labour, Puerperium and the Management of concerned problems.
- c. Causes of maternal and perinatal morbidity and mortality
- d. Principles of contraceptions and various techniques, methods of Medical termination of pregnancy, sterilization and their complications.
- e. Use and abuse and side effects of drugs in pregnancy, pre-menopausal and post-menopausal periods.
- f. National programmes, maternal child health and family welfare and their implementation at various levels.
- g. Common Gynaecological diseases and principles of their management.
- h. Common obstetrical diseases and their medical and surgical management.

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**Syllabus**

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10. Moral values and Professional ethics.
11. Logical Reasoning: Analytical Ability and Data Interpretation.



## **PAPER.II: ANATOMY**

### **General Anatomy**

Tissues of the body;  
 General osteology,  
 Arthrology,  
 Muscle & fascia,  
 Nervous system,  
 Principles governing arterial, Venous and lymphatic pathways  
 Innervation of blood vessels.

### **Gross Anatomy**

- Detailed gross anatomy of the human body, including cross sectional anatomy. Anatomical basis of clinical conditions.
- Embalming and museum techniques

### **Radiological Anatomy**

- Principles involved in plain radiography, Special investigative procedures and newer imaging techniques such as ultrasound, CT-scans, MRI, PET, etc.

### **Embryology**

#### *General embryology*

- Special embryology of all the systems of the body including variations and congenital anomalies.

### **Genetics**

- Structure of chromosomes,
- Structure of gene,
- Karyotype,
- Chromosomal aberrations,
- Inheritance,
- Basic Molecular genetics,
- Common Genetic disorders.

### **Histology**

- Histological and Museum Techniques,
- Microscopes – All Types,
- Care and maintenance of light microscope.
- General histology,
- Special histology of the systems of the body including their electronmicroscopic appearance.

### **Neuroanatomy**

Structural organization of various parts of the nervous system with particular reference to their connections and functions.

Localisation & effects of lesions in different parts of the central nervous system and nerve injuries.

Neuroanatomical techniques for demonstration of Nissl substance, processes myelin sheath.

**Applied Anatomy including Radio Anatomy and Recent Advances**

- a) Applied aspects of Human Anatomy including surgical approaches to various structures and organs.
- b) Principles of Newer Imaging Techniques.
- c) Determination of age, sex, stature and race from skeletal remains.
- d) Determination of age of a living individual.
- e) theoretical aspects of examination of Hair and Nail including difference between human and animal hairs.
- f) Application of Anatomical knowledge of fertility control
- g) Immunological basis of tissue typing and organ transplant
- h) Sectional Anatomy
- i) Principles and Interpretation of CT Scan, Sono Grapy and MRI.
- j) Surface Anatomy
- k) Principles of Physical Anthropology
- l) Museum Techniques
- m) Embalming Techniques including medico-legal aspects.

## **PAPER.II: PHYSIOLOGY**

### **General and Cellular Physiology including Genetic Basic and Historical Perspectives.**

1. Physiology of cell; various cellular mechanisms. Genetic control mechanisms.
2. Various principles involved in physiological phenomenon, e.g. haemodynamics, bio-electrical potentials, body fluids, methods of measurements.
3. Interaction of human body in ambient environment including high altitude and deep sea.
4. Sports physiology
5. Yoga & Meditation.
6. History of Physiology

### **Systemic Physiology (Systems providing Transport, Nutrition & Energy)**

1. Blood & Immunity
2. Cardio Vascular system
3. Respiratory System
4. Gastro Intestinal Tract & Dietary requirements
5. Excretion, pH & water & Electrolyte balance
6. Comparative Physiology

### **Systemic Physiology (Systems concerned with procreation, regulation & neural control)**

1. Reproduction & family planning / foetal & Neonatal physiology
2. Nerve – Muscle Physiology
3. Endocrine Physiology
4. Central Nervous System
5. Special Senses

### **Applied Physiology including recent advances**

1. Patho-physiology pertaining to systematic physiology
2. Physiological basis of various Evaluation tests
3. Statistics
4. Recent advances
5. Growth and development including aging

## PAPER.II: BIOCHEMISTRY

### 1. Physical, Organic aspects of Biochemistry and Biochemical Techniques.

- a) Electrolytes, pH buffer system, colloids, law of mass action, surface tension, osmosis, bioenergetics, diffusion, and molecular weight determination.
- b) Analytical Biochemistry & Instrumentation, Principles & application of colorimetry, fluorometry, spectrophotometry, radio isotopic techniques, atomic absorption, spectroscopy, osmometry centrifugation, nephelometry and chemiluminescence.
- c) Bioseparative techniques:  
Chromatography – Column, TLC, GLC, HPLC, affinity,  
Electrophoresis – Paper, Agarose, SDS, PAGE
- d) Protein conformation, interactions, structure activity relationship
- e) Only the description of accepted structures is required. Structure, physical and chemical properties of the following are required.
  - Ribose, xylose, mannose, galactose, fructose, deoxy sugars, aminosugars, uronic acids, lactose, maltose, sucrose, starch, insulin, glycogen, cellulose, glycoaminoglycans.
  - Saturated & unsaturated fatty acids, their derivatives, triacyl glycerol, phospholipids, glycolipids, sterols, lipoproteins.
  - Amino acids, peptides, polypeptides, hemoglobin, immunoglobins, collagen and proteoglycans, levels of organization of proteins with reference to insulin & Hb. Protein conformation, interaction and structure activity relationship.
  - Purine, pyrimidine, their derivatives, nucleic acids, nucleotide & polynucleotides.

### 2. Bio-Statistics

- a) Basic principles and concepts of biostatistics and applied to health sciences, like concepts of probabilities, mean, standard deviation, law of chance, binomial expression, Bare Heineberg Law st. test/ analysis of variance, coefficient of correlation, evaluation of new diagnostic procedure etc.
- b) Statistical methods in research, mean, SD, SE, P distribution, regression and correlations.
- c) Computer based applications.

### 3. Cell Physiology

- a) Structure of cell, general and specific features, cytoskeleton, nucleus, nucleolus, mitochondria and plasmic reticulum, ribosomes, golgi complex, lysosomes, plasma membranes, gap junctions, cell division – mitosis and meiosis, cell cycle.
- b) Ultra centrifugation, cell fractionation and differentiation of cellular and sub-cellular organelles.
- c) Bio-membranes, receptors, membrane bound substance mechanisms of transport across the cell membranes.

### 4. Molecular Biology and Human Genetics

- a) DNA & RNA as genetic materials, duplication of RNA and DNA, transcription, messenger, transfer and ribosomes, their structure and function regulation and expression of genes, regulation of translation, genetic engineering, molecular biology and viruses, molecular basis of cancer.
- b) Mechanism of action of cytotoxic drugs and antibiotics.
- c) Immunogenetics, cytogenetics, genetic counselling, medical ethics.

### 5. Enzymes

- a) General properties, classification and nomenclature, kinetic model, Km value factors influencing enzyme action, specificity, mechanism of enzyme action, enzyme kinetics, regulation of enzyme action, isolation, isoenzymes, coenzymes, clinical enzymology.
- b) Biological oxidation and reduction, bioenergetics.

- c) Digestion and absorption of food and their nutrients.
  - d) Detoxication/ xenobiotics.
  - e) Chemical anatomy of human body
- 6. Vitamins**
- a) Structure, sources, daily requirements, physiological role and deficiency manifestations of vitamins, hypo and hyper vitaminoses and vitamins.
  - b) Mechanisms of action of coenzymes.
  - c) Mineral metabolism and role of micro and macronutrients.
- 7. Intermediary Metabolism**
- a) Methods of studying intermediary metabolism
  - b) Intermediary metabolism of carbohydrates, lipids, proteins and amino acids, nucleic acids in human system.
  - c) Muscular contraction, nerve conduction, coagulation of blood.
  - d) Metabolism in specialized tissues like erythrocytes, lens nervous tissue etc.
  - e) Metabolic interrelationships and metabolism in starvation.
- 8. Inborn errors of Metabolism**
- Inborn of carbohydrates, lipids amino acids, protein nucleic acids, mineral metabolism.
- 9. Human Nutrition**
- Principal food components, general nutritional requirements, energy requirements, biological value of proteins, specify dynamic action, balanced diet, diet formulation in health and disease, mixed diet, nutritional supplements, food toxins and additives, parental nutrition, disorders of nutrition, obesity, protein and protein energy, malnutrition dietary fibres, under-nutrition, laboratory diagnosis of nutritional disorders, National Nutritional Programme.
- 10. Clinical Biochemistry along with Investigative Aspects**
- a) Diabetes mellitus and secondary degenerative changes associated with diabetes mellitus, glycogenosis, galactosemia educing substances in urine and aids to laboratory diagnosis of these disorders.
  - b) Ketosis, atherosclerosis, fatty liver, lipidoses, hyperlipoproteinemias, hypolipoproteinemias and laboratory diagnosis.
  - c) Aminoacidurias, uremia, phenyl ketonuria, hemoglobinopathies, immunoglobulinopathies, porphyries laboratory diagnosis.
  - d) Mal-absorption syndromes and their laboratory diagnosis.
  - e) Gastric and pancreatic function tests.
  - f) Acid base balance, fluid and electrolyte balance and related disorders; renal function tests.
  - g) CSF in health and disease
  - h) Hepatobiliary function tests and jaundice
  - i) Clinical enzymology
  - j) Endocrinal disorders and laboratory diagnosis
  - k) Diseases of circulatory system, hemopoietic.
  - l) Diseases of heart, kidneys – principles of peritoneal and hemodialysis.
  - m) Diseases of digestive systems and related organs like liver, pancreas etc.
  - n) Diseases of lungs, musculoskeleton system.
  - o) Diseases of central nervous system.
  - p) Hereditary disorders.
  - q) Immunological disorders.
  - r) Radioimmunoassays and enzyme immunoassay and their clinical applications.
  - s) Investigative aspects of all diseases mentioned above in the course content.

**11. Immunology****12. Endocrinology**

- a) Classification and general mechanism of action of hormones.
- b) Biogenesis secretion, control, transport and mode of action of following – hypothalamic peptides, adenohipophyseal and neurohipophyseal hormones, thyroid parathyroid hormones calcitonin pancreatic hormones, adenocortical and meddulary hormones, gonadal hormones, gastrointestinal hormones, opioid peptides, exorphins, parahormones.
- c) Biochemistry of conception, reproduction and contraception
- d) Endocrine interrelationship and their involvement in metabolic regulation.
- e) Neuro modulators and their mechanism of action, physiological significance.

## **PAPER.II: PHARMACOLOGY**

### **General Pharmacological Principles and Applied Sciences:**

Theories and mechanism of drug action, Pharmacokinetic principles and parameters, Factors modifying drug action, Pharmacogenetics, Chrono-pharmacology, Adverse effects of drugs, Drug dependence, Toxicology, Dose-response relationships, structure-activity relationships, Physiological and biochemical basis of drug action, Etiopathogenesis of diseases relevant to therapeutic use of drugs, Basic microbiology, immunology and molecular biology. History of pharmacology, sources of drug information and use of Information Technology.

### **Systemic Pharmacology, Chemotherapy and Therapeutics:**

Pharmacology of drugs acting on autonomic, peripheral and central nervous systems, cardiovascular, endocrine, respiratory, renal, gastrointestinal and haemopoietic systems and treatment of diseases affecting these systems; pharmacology of antimicrobial-Pharmacology of anti parasitic drugs and treatment of infective diseases; cancer chemotherapy, immune-pharmacology, gene therapy and evidence based medicine.

### **Experimental Pharmacology, Bioassay and Statistics:**

Experimental methodologies involved in the discovery of drugs (in vivo, in vitro, ex vivo). Animal handling and animal care. Methods of anaesthetizing animals and methods of euthanasia. Restraining and blood collection methods. Drug screening methods involved in the evaluation of anti-ulcer, antidepressant, anti-anginal, anti-hypertensive, anti-arrhythmic, anti-diabetic, anti-cataract, anti-platelet, anticancer, anti-inflammatory, anti-diarrheal, anti-epileptic, analgesis, anti-thyroid, antipyretic, anti-glaucoma, anti-hyperlipidemia, anti-asthmatics drugs and cough suppressants. Drug screening methods used in screening anti-fungal, anthelmintic, antibacterial and antiviral agents. Drug screening methods for heart failure, posterior pituitary, adrenal steroid (glucocorticoids & mineralocorticoids), testicular, parathyroid, ovarian, thyroid hormones, Methods involved in testing teratogenicity, carcinogenicity and organ toxicities in animals.

### **Clinical Pharmacology and Recent advances:**

Development of new drugs, protocol designing, phases, methodology and ethics of clinical trials, Clinical Pharmacokinetics and Pharmacodynamic studies post marketing surveillance, Therapeutic drug monitoring. Pharmacovigilance, ADR monitoring, Drug information service, drug utilization studies, therapeutic audit, essential drug concept and rational prescribing, GLP and GMP.

Recent advances in understanding of mechanism of drug action and treatment of diseases; new drugs and new uses of old drugs.

## PAPER.II: MICROBIOLOGY

### 1. General Microbiology

- a) History of microbiology
- b) Microscopy
- c) Bio safety including universal containment
- d) Physical and biological containment
- e) Sterilization and disinfection
- f) Morphology of bacteria and other micro organisms
- g) Nomenclature and classification of micro organisms
- h) Normal flora of human body
- i) Growth and nutrition of bacteria
- j) Bacterial metabolism
- k) Bacterial toxins
- l) Bacteriocins
- m) Microbiology of hospital management
- n) Microbiology of air, milk and water
- o) Host-parasite relationship
- p) Antibacterial substances and drug resistance
- q) Bacterial genetics and bacteriophages
- r) Molecular genetics relevant for medical microbiology
- s) Quality assurance and quality control in microbiology
- t) Accreditation of laboratories

### 2. Immunology

- a) Components of immune system
- b) Innate and acquired immunity
- c) Cells involved in immune response
- d) Antigens
- e) Immunoglobulins
- f) Mucosal immunity
- g) Complement
- h) Antigen and antibody reactions
- i) Hypersensitivity
- j) Cell mediated immunity
- k) Cytokines
- l) Immunodeficiency
- m) Auto-immunity
- n) Immune tolerance
- o) MHC complex
- p) Transplantation **immunity**
- q) **Tumor Immunity**
- r) **Vaccines and Immunotherapy**
- s) Measurement of immunological parameters
- t) Immunological techniques
- u) Immuno potentiation and immuno modulation

### 3. Systematic bacteriology

- a) Isolation and identification of bacteria
- b) Gram positive cocci of medical importance including Staphylococcus, Micrococcus, Sterptococcus, anaerobic cocci etc.
- c) Gram negative cocci of medical importance including Neisseria, Branhamella, Moraxella etc.
- d) Gram positive bacilli of medical importance including Lactobacillus, Coryneformorganisms, Bacillus and aerobic bacilli, Actinomyces, Nocardia,



Actinobacillus and other actinomycetales, Erysipelothrix, Listeria, Clostridium and other spore bearing anaerobic bacilli etc.

- e) Gram negative bacilli of medical importance including Vibrios, Aeromonas, Plesiomonas, Haemophilus, Bordetella, Brucella, Gardnerella, Pseudomonas and other non-fermenters, Pasturella, Francisella, Bacteriodes, Fusobacterium, Leptotrichia and other anaerobic gram negative bacilli etc.
- f) Helicobacter, Campylobacter and Spirillum
- g) Enterobacteriaceae
- h) Mycobacteria
- i) Spirochaetes
- j) Chlamydiae
- k) Mycoplasmatales; Mycoplasma, Ureaplasma, Acholeplasma, and other Mycoplasmas.
- l) Rickettsiae, Coxiella, Bartonella etc.

#### 4. Mycology

- a) General characteristics and classification of fungi
- b) Morphology and reproduction of fungi
- c) Isolation and identification of fungi
- d) Tissue reactions to fungi
- e) Yeasts and yeast like fungi of medical importance including Candida, Cryptococcus, Malassezia, Trichosporon, Geotrichum, Saccharomyces etc.
- f) Mycelial fungi of medical importance including Aspergillus, Zygomycetes, Pseudoallescheria, Fusarium, piedra other demarcatioceous hyphomycetes and other hyphomycetes etc.
- g) Dimorphic fungi including Histoplasma, Blastomyces, Coccidioides, Paracoccidioides, Sporothrix, Penicillium marneffeii etc.
- h) Dermatophytes
- i) Fungi causing mycetoma, keratomycosis and otomycosis
- j) Phythium insidiosum
- k) Prototheca
- l) Pneumocystis carinii infection
- m) Rhizosporidium seeberi and Loboia loboii
- n) Actinomycetes and Nocardia
- o) Common laboratory contaminant fungi
- p) Mycetism and mycotoxicosis  
Anti fungal agents and invitro antifungal susceptibility

#### 5. Virology

- a) General properties of viruses
- b) Classification of viruses
- c) Morphology: Virus structure
- d) Virus replication
- e) Isolation and identification of viruses
- f) Pathogenesis of viral infections
- g) Genetics of viruses
- h) DNA viruses of medical importance including Poxviridae, Herpesviridae, Adenoviridae, Hepadna virus, Popova and Parvo virus etc.
- i) RNA viruses of medical importance including Enteroviruses, Togaviridae, Flaviviruses, Orthomyxoviruses, Paramyxoviruses, Reoviridae, Rhabdoviridae, Arenaviridae, Bunyaviridae, Retroviridae, Filoviruses, Human immunodeficiency virus, Arboviruses, Coronaviridae, Calci viruses etc.
- j) Slow viruses including prions
- k) Unclassified viruses
- l) Hepatitis viruses
- m) Viroids
- n) Vaccines and anti viral drugs.

## 6. Parasitology

- a) General characters and classification of parasites.
- b) Methods of identification of parasites
- c) Protozoan parasites of medical importance including Entamoeba, free living amoebae, Giardia, Trichomonas, Lishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Microsporidium, Cyclospora Isospora, Babesia, Balantidium, etc.
- d) Helminthology of medical importance including those belonging to Cestoda (Diphyllobothrium, Toenia, Echinococcus, Hymenolepis, Dipyllidium, Multiceps etc.), Trematoda (Schistosomes, Fasciola, Fasciolopsis, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc.) and Nematoda (Trichiuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus etc.)
- e) Entomology: common arthropods and other vectors viz., mosquito, Sandfly, ticks, mite, Cyclopes, louse, myasis.
- f) Antiparasitic agents.

## 7. Applies Microbiology

- a) Epidemiology of infectious diseases
- b) Hospital acquired infections
- c) Management of hospital waste
- d) Investigation of an infectious outbreak
- e) Infections of various organs and systems of human body viz., respiratory tract infections, urinary tract infections, central nervous system infections, congenital infections, reproductive tract infections, gastrointestinal infections, hepatitis, pyrexia of unknown origin, infections of eye, ear and nose, septicaemia, endocarditis, haemorrhagic fever etc.
- f) Opportunistic infections
- g) Sexually transmitted diseases
- h) Vaccinology: principle, methods of preparation, administration of vaccines
- i) Information technology (Computers) in microbiology
- j) Automation in Microbiology
- k) Statistical analysis of microbiological data and research methodology
- l) Animal and human ethics involved in microbiological work.