

**SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Deemed to be University)
PORUR, CHENNAI - 600116.**

SYLLABUS FOR Ph.D. ENTRANCE EXAMINATIONS

**SECTION A
(Common to all Faculties)**

Research Methodology, Biostatistics, Research Ethics and Publication Ethics

UNIT I: Process of selection of research question including prioritization and feasibility, process of writing a research proposal, scientific writing for thesis and research publications. Review of literature, need for review of literature, primary and secondary sources for review, bibliographic databases, electronic databases, information retrieval, information processing, critical evaluation, organization of materials collected and writing of review, methods of writing references and bibliography.

UNIT II: Scales of measurement: Basic concepts in response scales, types of scales, categorical scales, nominal scales, ordinal scales and interval or ratio scales, visual analogue scales, Likert scale, composite scales, Guttman scale, combination scores, Criteria for a satisfactory scale, Appropriate selection of scale for measuring a variable, Appropriate use of different statistical procedures for different kinds of scale, Principles and approaches in questionnaire development. Open ended and closed ended questions, Questionnaire validity and reliability.

UNIT III: Measures of disease frequency and association, prevalence, incidence, crude, specific and adjusted (standardized) rates, relative risk, odds ratio, standardized mortality ratios, attributable risk and interpretation of measures of association. Descriptive epidemiological studies: correlational studies, case reports and case series, cross sectional studies, hypothesis formulation from descriptive studies. Case control studies, Design and conduct of case control studies, analysis and interpretation of results, bias in case control studies.

UNIT IV: Cohort studies: Types of cohort studies, design and conduct of cohort studies, analysis and interpretation of results, bias in cohort studies, Retrospective cohort studies, Bias in epidemiological studies, Types of bias, control of bias, evaluation of role of bias and confounding, nature of confounding, methods of controlling confounding. Statistical association and cause effect relationship, Evaluation of the presence of valid statistical association, Epidemiological approach to causation, judgment of a cause-effect relationship.

UNIT V: Interventional studies, Types of interventional studies, design and conduct of randomized controlled trials, blinding in randomized controlled studies, analysis and

interpretation of results. Non- randomized studies, Drug discovery and evaluation: Historical approaches in drug discovery, pharmacological approaches of modern medicine, new approaches in drug discovery, pharmacological evaluation of acute, sub acute, chronic toxicity studies, pharmacological evaluation methods, and OECD guidelines.

UNIT VI: Sources of data, Presentation and summarization of data, qualitative or discrete data, Quantitative or continuous data, Types of variables, Dependent and independent variables, Selection of variables, Clarifying variables, data presentation, tables, Frequency distribution drawings charts and diagrams. Measures of central tendency and location, Mean, median, mode, position average, and percentile. Measures of dispersion, Range, inter-quartile range, mean deviation, standard deviation and coefficient of variation.

UNIT VII: Probability: Probability scale, measurement of probability, laws of probability for independent events, conditional probability, Bayes' theorem. Additional law of probability, Multiplication law of probability, Probability distribution, Probability chance from shape of normal distribution or normal curve, binomial distribution, Poisson distribution, normal distribution, Standard normal deviate, Asymmetrical distribution, t distribution.

UNIT VIII: Statistical sampling, Population, sample, sampling variations and bias, probability sampling methods, Simple random sampling, Systematic random sampling, Stratified random sampling, Multistage sampling, Multiphase sampling, Cluster sampling, Advantages and disadvantages of different types of sampling, Appropriate use of different types of sampling, Non probability sampling methods, Sample size, Concepts in calculation of sample size.

UNIT IX: Evaluating role of chance, Normal distribution, inferential statistics, hypothesis testing, p value, confidence intervals. Confidence interval for mean, statistical test of significance for difference between two means and more than two means (ANOVA). Confidence interval for proportion, statistical test of significance for difference between two proportions and more than two proportions (chi-squared test).

UNIT X: Correlation, Correlation coefficient, Positive correlation, Negative correlation, Rank correlation, Linear regression, Simple and multiple regression and logistic regression. Non parametric methods, Sign test, Wilcoxon signed-rank test, median test, Mann-Whitney test, Kruskal-Wallis test, Friedman test, Spearman rank correlation coefficient. Advantages of non-parametric methods over parametric methods, disadvantages of non-parametric methods over parametric methods, and applications of non- parametric tests.

UNIT XI: Ethics and biomedical research: General principles on ethical considerations involving human subjects, ethical review procedures, Institutional ethics committee, its organization and functions, general ethical issues. Specific principles for clinical evaluation of drugs / devices / diagnosis vaccines / herbal remedies, specific principles in epidemiological studies, specific principles in human genetic research, specific principles for research in transplantation including fetal tissue implantation, Publication ethics.

UNIT XII: Ethical guidelines for experimental animals: Sources of experimental animals, Lab. Animal husbandry and management, anesthesia and euthanasia, laboratory animal ethics, institutional animal ethics committee, its organization and functions and responsibilities, ethical guidelines for use of animals for scientific research, The 3 R's (Replacement, Reduction, Refinement), CPCSEA guidelines, Ethical principles adopted by CPCSEA for use of animals in scientific experimentation, in-vitro system to replace animals, legal provisions for experimentation of animals.

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SYLLABUS FOR Ph.D. ENTRANCE EXAMINATIONS
SECTION - B

FACULTY OF MEDICINE

UNIT I: Cell structure and function, nucleic acid structure and function, biomedical importance of chromosomes, nucleosomes, DNA organization, DNA replication, RNA synthesis and regulation of gene expression. Development of organs & systems and common teratogens. Body fluid compartments & measurements, electrolyte balance, acid base balance, composition & functions of blood, plasma protein synthesis & functions, structure & functions of RBC, WBC, Platelets. Blood groups, lymph composition & functions.

UNIT II: Cardiac cycle, heart sounds, electrocardiogram, arterial blood pressure measurement. Regulation of respiration, pulmonary function tests. General principles of gastrointestinal function, gastrointestinal hormones, digestion and absorption. Regulation of body temperature. Nerve structure and properties, conduction of impulses. Spermatogenesis, ovarian cycle, endometrial cycle, puberty & menopause. Physiology of pregnancy, parturition & lactation. Mechanism of urine formation, endocrine functions of kidney.

UNIT III: Metabolism of carbohydrates, lipids & proteins. Metabolic functions of vitamins & vitamin deficiency. Metabolism of calcium, phosphorous, magnesium, iron, iodine & copper. Acid base regulation. Response to cell injury, disorders of metabolism & homeostasis, ischemia, infarction & shock, immunology & immune pathology, inflammation & repair, carcinogenesis & neoplasia, ageing & death. Hemorrhagic disorders. Use of blood and blood products, benefits and risk of blood transfusion, blood banking.

UNIT IV: Drug absorption & routes of administration of drugs, bioavailability, therapeutic index, rational use of drugs, drug-drug interaction, drug resistance, gene therapy, clinical trials, critical evaluation of drug promotional literature and pharmacoeconomics. Immunity, natural defense mechanism, acquired immunity, antigen, antibodies, their formation and reactions, hypersensitivity, auto immunity, transplantation and tumor immunology. General properties of bacteria, viruses and fungi.

UNIT V: Epidemiology and sociological factors of infections, common tropical infections. Congestive cardiac failure, cardiac arrhythmias, rheumatic heart disease, coronary heart disease, hypertension and vascular disorders, diseases of myocardium and pericardium, congenital heart disease. Acute respiratory infections and chronic respiratory infections, tuberculosis, bronchial asthma, restrictive lung disorders, suppurative lung diseases, lung tumors, lung cancer occupational lung disorders.

UNIT VI: Acid peptic disease, malabsorption syndrome, intestinal infections, inflammatory bowel diseases, viral hepatitis, chronic liver disorder, hepatic failure, portal hypertension, and pancreatic disorders. Acute and chronic renal failure, disorders, nephritic syndrome, urinary tract infections, dialysis, renal transplantation. Diabetes mellitus, dyslipidemias, pituitary disorders, thyroid disorders, diseases of the parathyroid and calcium metabolism, adrenal disorders. Anemia, leukemia, lymphomas, platelet disorders and coagulation disorders.

UNIT VII: Stroke syndrome, movement disorders, cerebellar disorders, seizure disorders, diseases of spinal cord, nervous system infections, muscular dystrophies and disorders of sleep. Oncogenes, tumor markers, pain management, breast cancer, other common cancers in India, cancer prevention. Cancer screening, palliative care. Common psychiatric diseases, Classification of mental illness, delirium, schizophrenia, mood disorders, neurotic disorders, psychosomatic disorders, psychotherapy.

UNIT VIII: Birth injuries, birth asphyxia, prematurity, low birth weight, neonatal sepsis. Growth & development normal and abnormal, growth monitoring, growth chart, infant feeding, baby friendly hospital, immunization, immunization schedule, protein energy malnutrition, failure to thrive. Common infectious diseases in children, upper respiratory infections, helminthiasis, malaria, typhoid, dengue and other viral hemorrhagic fevers, convulsive disorders. Psychological problems in children.

UNIT IX: Structure and functions of skin, eczema, scabies, pediculosis, bacterial infections of skin, mycotic infections of skin, viral infections of skin, tuberculosis of skin, urticaria, connective tissue disorders. Healing and management of wounds, wound infection, infection and injuries of hand and feet, head injuries. Acute & chronic infections of bone & joints, acute osteomyelitis & chronic osteomyelitis, chronic infections of spine, tuberculosis of hip, knee, spine. Tumors involving musculosystem. Osteoarthritis & rheumatoid arthritis.

UNIT X: Diseases of conjunctiva, diseases of cornea and prevention of corneal morbidity, blindness and eye banking, diseases of lens and its management, medical retinal problems and its management, glaucoma, ocular injuries and its prevention & management, community ophthalmology and prevention of blindness. Acute and chronic otitis media, complications of CSOM, non-suppurative otitis media, deafness & hearing test, vertigo, epistaxis, sinusitis, strider, tracheostomy.

UNIT XI: Antenatal care, ante partum hemorrhage, pregnancy induced hypertension, preeclampsia, eclampsia, anemia complicating pregnancy, obstructed labor, intrauterine growth retardation, perinatal mortality. Postnatal care, maternal mortality and morbidity. Menstrual disorders, puberty, adolescence, sex hormones, benign lesions of female genital tract, methods of detection of genital tract malignancies. Temporary and permanent methods of contraception and family planning.

UNIT XII: Epidemiology of communicable diseases and prevention & control, modes of transmission of diseases, disinfection, levels of prevention and modes of intervention of diseases, epidemiology of non-communicable diseases and prevention & control, concept of screening for disease and screening tests, occupational hazards, ESI, social security, principles of communication and health education, primary health care, universal health coverage,

health care delivery, National health programs, fertility rates, demography & family planning, environment & health.

FACULTY OF DENTISTRY

UNIT I (A) Cranial nerves - III, IV, V, VI, VII, IX, XII in detail., Parotid gland. Temporo mandibular joint, muscles of mastication, infratemporal fossa, pterygo - palatine fossa. Submandibular region. Walls of the nasal cavity, paranasal air sinuses, Palate. Oral cavity, Tongue. Osteology, The Cell: Basic tissues - Epithelium, Connective tissue including cartilage and bone, Muscle Tissue, Nervous tissue, Medical Genetics: Mitosis, meiosis, Chromosomes, gene structure, Mendelism, modes of inheritance

(B) Homeostasis, Composition & functions of blood, Body temperature, Functions of skin, General endocrinology - Enumeration of endocrine glands & hormones, Cardio vascular system, Digestive system

UNIT II : Carbohydrates: Lipids: Aminoacids: Classification., Introduction to peptides. Proteins: Simple and conjugated; globular and fibrous. Outlines of glycolysis, pyruvate oxidation and citric acid cycle. Introduction to glycogenesis, glycogenolysis, fatty acid synthesis, lipogenesis and lipolysis., Gluconeogenesis. Enzymes: Definition, classification, specificity and active site, Cofactors. Collagen and elastin, Glycosaminoglycans, Bone structure, Membranes.

UNIT III: Human dentition, types of teeth, & functions, Palmer's & binomial notation systems. Epithelial mesenchymal interaction, detailed study of different stages of development of crown, root & supporting tissues of tooth & detailed study of formation of calcified tissues. Detailed microscopic study of Enamel, dentine, Cementum & Pulp tissue. Age changes. Detailed microscopic study of Periodontal ligament & alveolar bone, Detailed microscopic study of Oral Mucosa, Salivary Glands: TM Joint : Maxillary Sinus: Saliva: Calcium, Phosphorous & fluoride metabolism: Physiology of Taste:

UNIT IV : (A) Cell Injury & change, Cell death & Necrosis, Inflammation, Healing, Ischaemia and infarction, Derangements of body fluids, Disorders of circulation, Cancer, Anaemias & leukaemias, Common diseases of Bones, Haemorrhagic Disorders

(B) Morphology and, Physiology of bacteria. Detail, account of Sterilisation and Disinfection. Brief account of Culture media and Culture techniques. Basic knowledge of selection, collection, transport, processing of clinical Specimens and identification of bacteria. Bacterial Genetics and Drug Resistance in bacteria. Infection - Definition, Classification, Source, Mode of transmission and types of Infectious disease. Immunity, Structure and functions of Immune system. The Complement System, Immune response, Immuno deficiency disorders - a brief knowledge of various types of immunodeficiency disorders, Autoimmune disorders

(C) Pyogenic cocci - Staphylococcus, Streptococcus, Pneumococcus, Gonococcus, Meningococcus, Corynebacterium diphtheriae, Mycobacteria - Tuberculosis and Leprosy, Clostridium - Gas gangrene, food poisoning and tetanus, Non-sporing Anaerobes, Spirochaetes - Treponema pallidum - detailed account of Oral Lesions of syphilis, Borrelia vincentii, Actinomycetes, Herpes Virus, Hepatitis B Virus - brief about other types, Human Immunodeficiency Virus (HIV), Candidosis - in detail. Brief introduction - protozoans and helminths

UNIT V :General principles of pharmacology; pharmacokinetics ,CNS drugs, Autonomic drugs; Cardiovascular drugs ,Gastrointestinal tract drugs,hormones,chemotherapy - Implications of these drugs in clinical dentistry, Autocoids:Histamine, antihistamines, prostaglandins, leukotriens,,Drugs acting on blood: coagulants and anticoagulants, hematinics, Implications of these drugs in clinical dentistry. Vitamins: water soluble vitamins, Vito D, Vit K. and Vit E, Implications, of Vitamins in clinical dentistry. Anti-septics, astringents, obtundents, mummifying agents, bleaching agents, styptics, disclosing agents, dentifrices, mouth washes, caries and fluorides.

UNIT VI: A bird's eye view of the different pathological processes involving the oral cavity & oral cavity involvement in systemic diseases, Developmental disturbances of teeth, jaws and soft tissues of oral & paraoral region, Microbial infections of oral soft tissues: Common non-inflammatory diseases involving the jaws. Cysts of the Oral & Para oral region: Tumours of the Oral Cavity: Traumatic, Reactive & Regressive lesions of Oral Cavity: Non neoplastic Salivary Gland Diseases: Systemic Diseases involving Oral cavity: Mucocutaneous Lesions : Diseases of the Nerves: Pigmentation of Oral & Paraoral region & Discolouration of teeth:

UNIT VII: Dental caries: Treatment Planning For Operative Dentistry: gnathological Concepts Of Restoration: Physiology of occlusal rehabilitation and restoration. Amalgam Restoration: Pulp Protection: Anterior Restoration; Direct Filling Gold Restorations: Hyper Sensitive Dental And Its Management. Cast Restorations, Vitality tests, Diagnosis and Treatment Planning and Preparation of Case Sheet. Dental porcelain, Aesthetic Dentistry, Endodontics

UNIT VIII: Principles of infection control and cross-infection control, Principles of Oral Surgery ,Asepsis: Sterilization of instruments, Local anaesthesia General anaesthesia Exodontia: Diseases of the maxillary sinus, Disorders of T.M.Joint, Infections of the Oral cavity Benign cystic lesions of the jaws, Tumours of the Oral cavity, Fractures of the jaws, Salivary gland diseases, Jaw deformities, Oral Implantology

UNIT IX: Teeth: Development abnormalities, causes of destruction of teeth and their sequelae and discoloration of teeth. Disease of bone and Osteodystrophies, Common cysts of soft tissue & bone, Tumours, Infections of oral and paraoral structures: Bacterial: Fungal; Candida albicans Virus: Important common mucosal lesions, Cervico-facial lymphadenopathy Facial pain: Altered sensations: Cacogeusia, halitosis. Tongue in local and systemic disorders: Oral manifestations of systemic diseases, Disease of salivary glands: Dermatological diseases with oral manifestations: Allergy: Foci of oral infection and their ill effects on general health Management of dental problems in medically compromised persons, Precancerous lesions , Nerve and muscle diseases: Therapeutics: Gene, Drugs commonly used in oral medicine, Physics of radiation: Biological effects of radiation

UNIT X :Growth and Development, Morphologic Development of Craniofacial Structures, Functional Development of Dental Arches and Occlusion, Clinical Application of Growth and Development Malocclusion-In General, Classification of Malocclusion Normal and Abnormal Function, Stomatognathic System , Etiology of Malocclusion, Diagnosis and Diagnostic Aids, Removable orthodontic appliances, Fixed orthodontic appliances, Extraoral appliances, Myofunctional appliances

UNIT XI: Development of periodontal tissues-anatomy,histology, Defensive mechanisms in the oral cavity Age changes in periodontal structures, Classification of periodontal diseases, Gingival disease, Epidemiology of periodontal disease, Periodontitis 8. Periodontal Therapy, Implants, Maintenance phase, Periodontal management of medically compromised patients. Systemic effect of periodontal disease in brief

UNIT XII: Complete Dentures, Removable partial denture, Fixed Partial Dentures, Implants

UNIT XIII: Introduction to pedodontics & preventive dentistry, Growth & development, Development of occlusion from birth through adolescence, Dental anatomy and histology, Dental radiology related to pedodontics. Oral surgical procedures in children, Dental caries, Gingival & periodontal diseases in children. Child psychology, Behaviour management, Pediatric operative dentistry, Traumatic injuries in children, Preventive & interceptive orthodontics, Oral habits in children :Dental care of children with special needs: Congenital abnormalities in children: Dental emergencies in children & their management Dental materials used in pediatric dentistry. Preventive dentistry, Dental health education & school dental health programmes. Fluorides:

FACULTY OF PHYSIOTHERAPY

Unit I: Gross anatomy and functional anatomy: Cardiovascular system, respiratory system, central and peripheral nervous system, musculoskeletal system.

Unit II: Physiology and applied physiology of: Cardiorespiratory system, central and peripheral nervous system, special senses, muscles and blood.

Unit III: Physical agents: Low frequency currents – types of low frequency currents used for therapeutic purposes including electrodiagnostics, Medium frequency currents, High frequency Modalities - ultrasound, wax bath, infrared radiations, ultraviolet radiations, shortwave diathermy, microwave diathermy, LASER, cryotherapy.

Unit IV: Therapeutic exercises and massage: Basics of mechanics of human body, types of movements, muscle grading, types of strengthening exercises, exercises for joint mobility, suspension therapy, hydrotherapy, crutch walking, types of massage manipulations including physiological effects and limitations.

Unit V: Biomechanics and pathomechanics of: Spine, TM joint, upper extremity, lower extremity, posture, gait, respiration.

Unit VI: Physiotherapy in neurological conditions: Principles of assessment and treatment for motor system, sensory system, higher mental functions, perception in central nervous system pathologies, peripheral nervous system pathologies and myopathies. Concepts: motor relearning program, bobath approach, brunnstrome approach, proprioceptive neuromuscular facilitation, roods approach and neurodevelopmental therapy.

Unit VII: Physiotherapy in orthopaedic conditions: Principles of assessment and treatment in fractures, soft tissue injuries, post operative conditions including joint replacements, joint and spinal pathologies. Concepts: Cyriax, Mackenzie and Maitland

Unit VIII: Physiotherapy in cardiopulmonary conditions: Principles of assessment and treatment in cardiac rehabilitation and pulmonary rehabilitation, stress testing and exercise prescription, Principles of assessment and treatment in intensive care unit setting and post operative conditions.

Unit IX: Physiotherapy in Gynecological & Obstetrical conditions: Principles of assessment and treatment in antenatal and post natal period. Fitness in women's health.

Unit X: Rehabilitation medicine and community based physiotherapy: Concept of rehabilitation and team approach, disability evaluation, architectural barrier, orthotics and prosthetic services.

FACULTY OF PHARMACY

UNIT I: Properties of matter, micromeritics, surface and interfacial phenomenon, viscosity, rheology, dispersion systems – principles, properties and applications, classification, preparation, analysis and applications of complexes, kinetics and drug stability. Stoichiometry, Importance of unit processes in manufacturing – fluid flow, heat transfer, evaporation, distillation, drying, size reduction, mixing, filtration and centrifugation, crystallization, humidity control, refrigeration and air conditioning. Materials of plant construction, material handling systems, automated reactors, computer aided manufacturing, industrial hazards and safety systems.

UNIT II: Basic terminologies and essentials of anatomy and physiology of the osseous system, skeletal muscle, haemopoietic system, lymph and lymphatic system, cardiovascular system, digestive system, central nervous system, urinary and endocrine system. Basic principles and mechanism of cell injury, adaptation, process of inflammation, pathophysiology of diabetes, peptic ulcer, asthma, hepatic disorders, rheumatoid arthritis, congestive heart failure, tuberculosis, renal failure, AIDS and common types of neoplasms. Classification, identification and control of microbes, methods of sterilization, principles of immunity, types of immunological products, genetic recombination, microbial transformation, methods of - enzyme, plant cell and bacterial immobilization, antimicrobial spectrum and fermentative production of antibiotics.

UNIT III: Design, formulation, packaging and evaluation of liquids, semi-solid dosage forms, galenicals, suppositories, pharmaceutical aerosols, ophthalmic preparations, capsules, micro capsules, tablets, parenterals, cosmetics, blood products, plasma substitutes and surgical products. Pre-formulations parameters, ICH guidelines for stability testing, performance evaluation methods. Elementary introduction to novel drug delivery systems.

UNIT IV: Prescription handling, recording and reporting procedures, posology, allegation and alcohol dilution. General dispensing procedures, physical and chemical incompatibilities between drug substances, their rectification, therapeutic incompatibilities. Community pharmacy units, Organization and structure of hospital pharmacy, hospital formulary, drug inventory control, hospital drug distribution systems, central sterile supply unit management, drug information services and nuclear pharmacy. Roles and responsibilities of community and hospital pharmacist. Pharmacy and Therapeutics Committee – Composition and functions, Medication errors.

UNIT V: Drugs and Cosmetics Act 1940 and Rules 1945, Drugs Prices Control order, Patents Act 1970, Pharma marketing, elements of market research, materials and production management, GMP, GLP, Quality assurance, TQM, validation - equipment, process and analytical methods, basics of drug regulatory affairs.

UNIT VI: Methods of preparation, uses, sources of impurity, tests for purity and limit tests for the following classes of inorganic pharmaceuticals of Indian Pharmacopoeia: Gastrointestinal agents, electrolytes, essential and trace elements, topical agents, oxygen,

anaesthetics, dental products, buffers and radiopharmaceuticals. Fundamentals of physical chemistry of importance to pharmacy – Kinetic theory of gases, colligative properties, partition coefficient, thermochemical equations, photochemistry, chemical kinetics, thermodynamics and quantum mechanics.

UNIT VII: Fundamentals of organic chemistry of importance to pharmacy: Atomic structure, orbital theory, wave equation, types of orbitals and bonds, polarity of molecules, intermolecular forces, acids and bases, isomerism and stereo isomerism, stereo specific reactions, nucleophilic and electrophilic – addition and aromatic substitution reactions, elimination reactions and neighboring group effects.

UNIT VIII: Bioenergetics and ATP production, enzymes, co-enzymes, iso-enzymes and co-factors. Carbohydrate and lipid metabolism, citric acid cycle, biological oxidation, metabolism of ammonia and nitrogen containing monomers, formation of deoxy ribonucleotides, purine, pyrimidine and nucleic acid biosynthesis, mutation, genetic code and protein synthesis.

UNIT IX: Methods of synthesis, physico chemical properties, mode of action and structure activity relationships of the following classes of drugs: Cholinergics, anti-cholinergics and cholinesterase inhibitors, adrenergics, antispasmodics, anti ulcer drugs, local anaesthetics, neuromuscular blocking agents, autocooids, steroids, diuretics, cardiovascular drugs, thyroid and anti thyroid drugs, insulin and oral hypoglycemic agents, CNS drugs, anti-metabolites, anti-neoplastic agents, anti-viral agents, immunosuppressives, diagnostic agents and pharmaceutical agents. Bio isosterism, drug-receptor interactions, drug metabolism, pro-drug concept, Approaches to drug design – analog based, mechanism based and QSAR based. Computer aided drug design and molecular modeling.

UNIT X: Types of errors, statistical treatment of data, precision and accuracy, fundamentals of volumetric analysis, acid-base titrations, oxidation-reduction titrations, precipitation titrations, gravimetric analysis, non-aqueous titrations, complexometric and diazotization titrations. Potentiometry, conductometry, coulometry, polarography, amperometry, gasometry and chromatography. Principles, instrumentation and applications of UV-VIS, IR, NMR and Mass spectrophotometry, flame photometry, fluorimetry, atomic absorption spectroscopy, x-ray diffraction analysis and radio immunoassay.

UNIT XI: Routes of drug administration, mechanism of action of drugs, tolerance, dependence, ADME of drugs, bioassays and biological standardization, principals of basic and clinical pharmacokinetics, bioavailability and bioequivalence. Pharmacology of drugs acting on peripheral nervous system, central nervous system and cardiovascular system, hemopoietic system, urinary system, respiratory system, gastrointestinal system, endocrine system and autocooids. Basic concepts of toxicology and pharmacotherapy, general principles of chemotherapy –antibiotics, anti infectives, anthelmintics, anti-neoplastics and immunosuppressants. Drug delivery systems and their biopharmaceutic, therapeutic considerations, individualization of drug therapy – infants, elderly and in pregnancy, drug induced diseases, drug interactions, common clinical laboratory tests and their interpretation, management of important disorders of organs and systems.

UNIT XII: Natural sources of drugs, their classification, factors influencing crude drug cultivation, collection, processing and storage, WHO guidelines for quality control of crude drugs, classification, properties and general methods of isolation of plant active constituents. Systematic pharmacognostic study of crude drugs under the following categories: carbohydrates, lipids, resins, tannins, volatile oils, fibers, saponins, cardioactive glycosides, anthraquinone cathartics, miscellaneous glycosides and alkaloid containing drugs. Holistic concept of drug administration in Traditional medical systems, introduction to ayurvedic dosage forms and traditional drugs. Role of plant-based drugs in the national economy, Indian institutes and industries working on medicinal and aromatic plants, worldwide trade, production and utilization of - quinine, sennosides, digoxin, tropane alkaloids, diosgenin, papain, liquorice, ginseng, aloe, valerian, rauwolfia, plant based laxatives, sandalwood oil, lemon grass oil and eucalyptus oil. Biogenesis of secondary metabolites of pharmaceutical importance, principles of plant tissue culture, marine pharmacognosy, herbs as health foods and herbal cosmetics.

FACULTY OF NURSING

UNIT I: Infection control in Clinical settings: Nature of infection, Chain of infection transmission, Defenses against infection: natural and acquired, Hospital acquired infection, Concept of asepsis, Universal precautions, Transmission based precautions, Biomedical waste management, Nursing management of common Communicable diseases in clinical and community settings , National health and family welfare program, Delivery of community health services: rural, and urban, Health schemes: ESI, CGHS, Health insurance

UNIT II: Nursing Management of patients with respiratory and cardiovascular problems: Acute and chronic infections, Asthma, Chronic Obstructive Pulmonary Diseases, Bronchiectasis, Pneumonia, Tuberculosis, Lung abscess, Pleural effusion, pulmonary embolism, Tumors – Larynx and lung. Hypertension, Arteriosclerosis, Coronary artery diseases: Angina pectoris, Myocardial infarction, Endocarditis, pericarditis, Myocarditis, Valvular disorders, congenital disorders, Cardiac dysrhythmias, Congestive cardiac failure, Anaemia, Cardio Pulmonary Resuscitation, Leukemia

UNIT III: Nursing Management of patients with digestive system problems: Peptic and Duodenal ulcer, pyloric stenosis, Small and large intestinal disorders-inflammation and infection, enteritis, mal-absorption, obstruction, and perforation, Hernias, Liver: inflammation, abscess, cirrhosis, portal hypertension, hepatic failure, pancreatitis, Gall bladder: inflammation, obstruction, stones, Tumours - oral, stomach, colon, Liver

UNIT IV: Nursing Management of patients with genito-urinary problems: Urinary tract infections Nephritis, Nephrotic syndrome, Renal calculus, Acute and chronic renal failure, Dialysis, renal transplantation, Benign prostate hypertrophy, Tumours - Renal, Bladder, Prostate

UNIT V: Nursing Management of patient with disorders of endocrine system: Thyroid and Parathyroid Disorders, Diabetes mellitus, Adrenal disorders, Pituitary disorders

UNIT VI: Nursing Management of patient with musculoskeletal problems: Bones-inflammation, infection, dislocation, fracture, Osteomalacia and osteoporosis, Arthritis, Amputation, Prosthesis, Congenital deformities, Spinal column- defects and deformities, Prolapsed inter vertebral disc, Rehabilitation

UNIT VII: Nursing management of patient with neurological disorders: Congenital malformations, Head injuries, Spinal injuries, Infections: Meningitis, encephalitis, Brain abscess, Brain tumours, Epilepsies, Cerebro Vascular Accidents (CVA), Management of unconscious patients, Rehabilitation

UNIT VIII: Nursing management of patient with disorders of reproductive system: Menstrual disorders, Pelvic Inflammatory Disease, Endometriosis, polyps, Tumours - Cervix, Ovary, Uterus and breast, Fibroids, uterine displacement, Cystocele, Urethrocele, Rectocele, Vaginal

disorders; Infections, Fistulas, Diseases of breasts; Deformities, Infections, Cysts, Menopause and Hormonal Replacement Therapy, Infertility, Contraception

UNIT IX: Nursing management of patient in critical care units: Nursing assessment-history and Physical assessment, Classification, Principles of critical care nursing, Organization: Physical setup, Policies, staffing norms, protocols, equipment and supplies, special equipments: ventilators, cardiac monitors, defibrillators, Resuscitation equipments, Nursing management of critically ill patient, CPR –Advance Cardiac Life support, Treatments and procedures

UNIT X: Nursing care of a normal neonate, Neonatal resuscitation, Low birth weight baby, Integrated management of neonatal and childhood illnesses (IMNCI), Nursing management of childhood diseases: Nutritional deficiency disorders, Respiratory disorders and infections, Gastrointestinal infections, infestations and congenital disorders, Cardio vascular problem: congenital defects, rheumatic fever, rheumatic heart disease, Genito-urinary disorders: acute glomerulo nephritis, Nephrotic syndrome, Neurological infections and disorders: convulsions, epilepsy, meningitis, hydrocephalus, spina-bifida, Orthopedic disorders: club feet, hip dislocation and fracture

UNIT XI: Nursing management of patient with Schizophrenia, Mood disorders: Bipolar affective disorder, Mania depression and dysthymia: neurotic, stress related and somatization disorders: Anxiety disorder, Phobias, Dissociation and conversion disorder, Obsessive compulsive disorder, somatoform disorders, post traumatic stress disorder, substance use disorders, mental retardation

UNIT XII: Assessment and nursing management of normal pregnancy, labour and puerperium, High risk pregnancy :abortion, ectopic Pregnancy, Ante-partum haemorrhage, Pregnancy induced hypertension & diabetes, Rh incompatibility, Multiple pregnancy, Intra-uterine growth-retardation, obstructed labour, postpartum complications

FACULTY OF ALLIED HEALTH SCIENCES

UNIT I: Divisions and functions of the nervous system, nerve fibres and synapse, Structure of brain and its divisions, planes, Cerebrum, lobes of the brain, structures and functions, Cerebellum, neurotransmitters, Brainstem and cranial nerves – origin and insertion, CSF – secretion, absorption, pathway and its composition, Blood supply to central nervous system, blood brain barrier, circle of Willis, Neuromuscular junction, Brodmann's area, motor and sensory homunculus, Spinal cord, reflex arc

UNIT II: Cells, tissues and cartilages of head and neck, Muscles of neck and face – An introduction – Muscles of lips, cheek, and muscles of mastication, physiology of swallow, Muscles of tongue – Intrinsic and extrinsic muscles – origin, insertion, functions and nerve innervations, Muscles of palate, origin, insertion and nerve innervations, muscles of pharynx, Velo-pharyngeal mechanism and function larynx, cartilages (paired and unpaired), connections and nerve innervations, vocal fold physiology, Para nasal sinuses (frontal, maxillary, ethmoidal and sphenoidal), blood supply, venous drainage of head and neck, Anatomy of ear, parts of external, middle and inner ear, blood supply, venous drainage and nerve supply, Physiology of hearing and balance, Anatomy of eye, gland, blood supply and optic nerve, eye function, Anatomy of tooth, types of teeth, parts of tooth, structure, arterial supply and lymphatic drainage

UNIT III: Introduction to Myology – Types of muscle tissues, Introduction to skeletal muscles – General functions, muscle contraction and relaxation, Muscle tone, strength and conditioning, Brief anatomy of heart, chambers of heart, Cardiac cycle, Blood vessels, blood composition, Upper and lower respiratory tract, Mechanism of respiration – internal and external influence, Brief anatomy of diaphragm, anatomy of intercostal muscles, Blood pressure and Electrocardiogram

UNIT IV: Development of brachial arches, pouches and their derivatives, Stages of neural tube development, Monthly fetal development, Factors affecting the fetal growth, Effects of drugs, hormone and chemical agents contributing to human birth defects, Basic cell biology, structure and functions of genes and chromosomes, Autosomal dominant and recessive inheritance, Sex linked and non-traditional models of inheritance, Genetic testing: Karyotyping, structural aberrations, gene therapy, Clinical genetics and genetic counselling

UNIT V: Cell injury, adaptation and death, Inflammation: Acute and chronic inflammation, Tissue repair: cell regeneration and fibrosis, Hemodynamic disorders, Thrombosis and shock, Neoplasm: Characteristics of benign and malignant neoplasms, tumors of the head and neck, Obstructive and restrictive lung diseases, Acute and chronic restrictive lung disease – Lesions of upper respiratory tract, Diseases of the larynx and oro pharynx, voice and speech disorders, Infections of the ear (otitis externa otitis media), hearing loss – sensory and conductive, Endocrine disorders, Infections and tumors of nervous system, stroke and aphasia, dysarthria

UNIT VI: Early motor development – Stages in motor development and manipulative behaviour, Development of complex motor skills, handedness, Motor development during later childhood, Evolutionary growth of intelligence, Emotional and social development in children,

Role of perception and memory in development, Development of sensory systems (vision and hearing), Early language development and language development in infancy through childhood, Development of feeding and eating behaviours from birth through childhood, Developmental disorders in children

UNIT VII: Definition of psychology, historical development, modern history of clinical development, Scope of clinical psychology in health science, Concepts of normality and abnormality, Methodology in clinical psychology (case history, interview and observation), Psychology of learning (classical and operant conditioning), reinforcement and strategies, Piaget's theory of cognitive development and Sigmund Freud's theory of psychosexual developments, DSM and ICD classification of abnormal behaviour, Assessment of Primary mental function – Attention, concentration, memory, intelligence (verbal and non verbal), Assessment of personality and interpersonal relationship, Introduction to cognitive behaviour therapy and counselling

UNIT VIII: Introduction to food, nutrition and health. Definition of nutrition, health, good nutrition and Malnutrition, Diet and health: Problems of deficiency, disease of affluence, food safety: additives and contaminantion, Digestion and absorption of Carbohydrates, fats, proteins, vitamins and iron, Overweight and obesity: Cause and treatment , Nutrition and dietary consideration at different stages of life, Nutrition in deficiency and diet related diseases, Water and electrolyte balance, Food security, organic foods and technologies for food and nutrition security, Nutrition and health significance of food ingredients, Nutritional implications of food processing and packing

UNIT IX: Introduction to counselling, definition, scope of counselling practise, origin and history of counselling, Phases of counselling – assessment, initiation and termination, Different facets of counselling: Individual and group counselling, skills in counselling – observation, questioning,, communication, making notes and reflections, Hospital counselling: Counselling to terminally ill, pain management, rehabilitation counselling in hospitals, Cultural issues in counselling, Counselling intellectual exceptionality – superior and mental retardation, Counselling sensory handicaps – visual, hearing, speech, motor, Family, personal and educational counselling, Ethical codes & guidelines – right of clients, dimensions of confidentiality, Ethical and legal responsibilities

UNIT X: Current, electricity, static electricity, voltage, current, resistance, effects of electricity on human body (electric shock), causes, precautions, Basic electronics, conductors, insulators, semiconductors, passive circuit devices, diodes, transistors, voltage stabilizers. Amplifiers and oscillators, classifications, types, working principles, applications, Transducers, microphones, bio-sensors, piezo-electric transducers, construction, working and uses, Measuring instruments, multimeter, cathode ray oscilloscope, sound level meter, integrated sound level meter, audio frequency oscillator, Sound , production and propagation of sound, transmission of sound, reflection, diffraction, interference, application of sound, Light, nature of light, reflection, refraction, defects of vision and correction. Heat, nature of heat, types of heat transfer, regulation of body temperature and applications. Electromagnetism in diagnosis, Magnetism and electricity, basic procedures involved in ECG, EEG, EMG, EGG, CT, MRI. Electronic equipment in patient care, use and precautions

UNIT XI: Maintenance of human body :- Cardiovascular system, Lymphatic system, Respiratory system Endocrine system, Digestive system, Urinary system, Reproductive system- Organs and functions. Classification and metabolism of carbohydrates, lipids, proteins, enzymes, vitamins and minerals. Basic concepts about infection, immunity and standard precautions. Sterilization, Disinfection procedures and its applications. Concepts of diseases, classification of lesions and inflammation and repair. Systemic disorders: coronary heart disease, bronchial asthma, emphysema, bronchiectasis, auto-immune disease, diseases of urinary system, reproductive system and central nervous system. Hospital acquired infection, source, routes of spread, preventive measures and precautions. Hospital waste management, handling, treating of health care waste and disposal. Important communicable diseases:- Tuberculosis, Leprosy, HIV-AIDS, Hepatitis-B and C, Food poisoning- risk factors and prevention. Non communicable diseases:- CHD, Obesity, Diabetes, Hypertension, Cancer- risk factors and prevention.

FACULTY OF BIOMEDICAL SCIENCES

UNIT I: Cell biology and developmental biology: Eukaryotic and Prokaryotic cell, cell divisions, cell cycle, cell organelles, cytoskeleton and cell signaling & signal transduction. Gametes and gametogenesis, Fertilization and zygote formation, Early development and germ layers, Organogenesis.

UNIT II: Biochemistry: Enzymes and coenzymes, enzyme kinetics, carbohydrate metabolism, lipid metabolism, amino acid and protein metabolism, nucleic acid & nucleotide metabolism and the urea cycle, the citric acid cycle (Kreb's cycle / TCA cycle), vitamins and minerals, electron transport and oxidative phosphorylation.

UNIT III: Genetics: Transmission and distribution of genetic materials, dominance relations and multiple alleles. Quantitative inheritance, elements of population genetics. Mendelian and non-Mendelian inheritances, nucleic acids, DNA replication, RNA transcription, central dogma – genetic code/translation, DNA condensation and structural organization, regulation of gene expression, mutations and DNA repair mechanisms.

UNIT IV: Bioinformatics: Gene bank databases, structure databases, genomic mapping, sequence search databases, multiple protein sequences and their alignment, predictive modeling and comparative genome analysis.

UNIT V: Microbiology and Immunology: Principles of microscopy, microbial taxonomy and diversity, evolution and genomics. Bacterial cell structure and function, bacterial physiology and nutrition. Understanding and combating bacterial pathogenesis, antibiotics, mechanisms of drug resistance. Innate Immune System, Adaptive Immune System, Antigens, Antibodies, Humoral and Cell Mediated Immune Mechanisms, Antigen-Antibody Interactions, Vaccines.

UNIT VI: Laboratory practices: Units and calculations used in the laboratory, measurements of pH, buffers, precautions in the use of radioactive materials, principles and operation of instruments used in biochemical research, spectro-photometers, centrifuges, scintillation counters, protein estimation. Preparation of bacteriological media, sterilization growth and characterization of bacteria. Introduction to UV spectroscopy, CD spectroscopy and electrophoresis, protein and nucleic acid model building.

UNIT VII: Biotechnology: Industrially relevant organisms, approaches to obtain industrially relevant organisms, primary and secondary metabolites, fermentation and fermenters, industry relevant biotech products.

UNIT VIII: Plant and Animal Biology: Classification and phylogeny of plants and animals, evolution, levels of organization, tissue and organ systems, animal physiology, concepts of regeneration and reproduction, plant anatomy, reproduction, photosynthesis - light and dark reactions (Calvin cycle), respiration and photorespiration, phytohormones and phytochemicals.

FACULTY OF MANAGEMENT SCIENCES

UNIT I: Management Process and Organizational Behaviour

Evolution of management thought : Systems and contingency approach for understanding organizations; Managerial processes, functions, skills and roles in an organization; Social Responsibility of Business; Understanding and Managing individual behaviour; Personality; Perceptions; Attitudes; Learning; Decision-making; Management by Objectives; Understanding and managing group processes- interpersonal and group dynamics; Applications of Emotional Intelligence in organizations. Leadership and influence process; Work Motivation. Understanding and Managing organizational system—Organizational design and structure, Work stress, Organizational Change and development; Conflict Management; Stress Management.

UNIT II: Managerial Economics

Nature and scope of Managerial Economics. Importance of Managerial decision-making; Marginal analysis; Objective of a firm, Demand function, Elasticity of demand and its significance in Managerial decision-making; Consumer equilibrium-utility and indifference curve approach; Price, income and substitution effects; Fundamentals of demand estimation and forecasting; Short-run and long-run production functions; Cost curves and economics of scale; Price and output determination under perfect competition, monopoly, monopolistic, competition, and oligopoly; Pricing strategies and tactics; National Income— alternative concepts and measurement of National income; Inflation—types, measurement and control; Balance of Payments; Monetary and Fiscal Policies.

UNIT III: Accounting for Managers

Financial Accounting - Meaning, scope and importance; Accounting concepts and conventions; Formation and importance of accounting Standards; Accounting process; Depreciation accounting and policy, Preparation of final accounts of non—corporate entities, Proforma of Balance Sheet of Joint—stock Companies, Cost-accounting : nature and scope of costing; Cost concepts and Classifications; Usefulness of Costing to Managers; Preparation of Cost-Sheet. Management Accounting: Nature, scope and tools of Management Accounting; Management Accounting vs. Financial accounting; Financial analysis, Ratio analysis, Funds-Flow Statement, Cash-flow Statement Budgeting: Types of budgets and their preparation, Performance budgeting and Zero-base budgeting. Marginal costing: Break—even analysis. Decision involving alternative choices. Standard Costing: An Overview

UNIT IV: Management Science

Management Science - Basic concepts and its role in decision- making; Linear programming, meaning, scope & assumptions. Formulation of linear programming problem & solution by graphical & simplex methods. Sensitivity analysis. Integer programming, goal programming, dynamic programming and non-linear Programming. Transportation and Assignment models

including trans-shipment and routing problems; Some special cases like minimization, unbalanced problems, degeneracy in transportation models. Queuing theory; Inventory management techniques; PERT/CPM; Decision theory and decision trees; Game theory; Simulation.

UNIT V: Marketing Management

Nature, scope and concept of marketing, Corporate orientations towards the marketplace; The Marketing environment and Environment scanning; Marketing information system and Marketing research; Understanding consumer and Industrial markets; Market segmentation, Targeting and positioning; Product decisions –product mix, product life cycle, new product development, branding and packaging decisions; Pricing methods and strategies; Promotion decisions— promotion mix, advertising, sales promotion, publicity and personal selling; Channel management - Types and functions, Selection, Cooperation and conflict management, vertical marketing implementation and systems, Marketing Logistics; Organizing and implementing marketing in the organization; Evaluation and control of marketing efforts; Ethics in Marketing; New issues in marketing - Globalization, Consumerism, Green Marketing, Direct Marketing, Network Marketing, Event Marketing.

UNIT VI: Human Resource Management

Concepts and Perspectives on Human Resource Management; Human Resources Management in a changing environment; Corporate objectives and Human Resource Planning; Career and succession planning; job analysis; Methods of manpower search; Attracting, Selecting and retaining human resources; Induction and socialization; Manpower training and development; Performance appraisal and potential evaluation; Job evaluation and compensation; Employee welfare; Industrial relations & trade unions; Dispute resolution & grievance management, Employee empowerment.

UNIT VII: Financial Management

Introduction to financial management Objectives of financial management; Time value of money, sources of finance, Investment decisions: Importance, Difficulties determining cash flows, methods of capital budgeting Risk analysis : Cost of capital; Concept and importance, Computations of cost of various sources of finance; Weighted Average Cost of Capital; Capital Structure decisions; Theories of capital structure, Factors determining capital structure. Optimum capital structure; Management of working capital - Cash, Receivables and Inventory Management, Internal Financing and Dividend Policy; Financial Modeling.

UNIT VIII: Business Research Methodology

Nature and Scope of Research Methodology Problem Formulation and Statement of Research Objectives; Value and Cost of Information; Bayesian Decision Theory; Research Process; Research Designs - Exploratory, Descriptive and Experimental; Methods of Data Collection — Observational and Survey Methods; Questionnaire and Interviews. Attitude Measurement

Techniques; Administration of Surveys; Sample Design; Selecting an Appropriate Statistical Technique. Field Work and Tabulation of Data; Analysis of Data; Use of SPSS and other Statistical Software Packages Advanced Techniques for Data Analysis — ANOVA. Discriminate Analysis, Factor Analysis, Conjoin: Analysis and Clustering Methods.

UNIT IX: Production and Operations Management

Nature and Scope of Production and Operations Management; Facility Location; Types of Manufacturing Systems and Layouts; Layout Planning and Analysis; Material Handling : Principles & Equipments; Line Balancing; Production Planning and Control in Mass Production, in Batch and Job Order manufacturing; Capacity Planning; Product Planning and Selection, Process Planning, Aggregate Planning and Master Production Scheduling; Maintenance Management, Work Study : Method Study and Work Measurement, Material Management, Material Management; An Overview of Material Management, Material Requirement Planning and Inventory Control; JIT; Purchase Management; Stores Management; Quality Assurance : Acceptance Sampling, Statistical Quality Control, Total Quality Management; ISO-9000.

UNIT X: Business Policy and Strategic Management

An Introduction to business policy — Nature, Objective and importance of business policy; An overview of strategic management; Strategic decision making; Process of strategic decision making. Types of planning systems - corporate planning, strategic planning and long range planning; Strategy Formulation, Company's mission, purpose and objectives; Corporate strategy - concept, significance and objectives; types of strategies; Environmental and organizational appraisal (Internal & external) techniques of business environment analysis. Strategic alternatives and choice; Business ethics and corporate strategy Concept of value chain and competitive advantage. Strategy implementation - Designing organizational structure and activating strategies; matching structure and activating strategy, Structural, Behavioral and Functional implementation.

UNIT XI: Entrepreneurship Development

Significance of Entrepreneur in Economic Development; Economic, Social and psychological need for entrepreneurship; Characteristics, qualities and pre - requisites of entrepreneur; The function of the entrepreneur in economic development of a Country; Methods and procedures to start and expand one's own business; Life cycle of new business and relationship with large enterprises; Achievement motivation; Environmental Factors affecting success of a new business; Reasons for the failure and visible problems for business. Feasibility Study - Preparation of Feasibility Reports : Selection of factory location, Demand Analysis, Market potential measurement, Capital saving and project costing, Working capital requirements, profit and tax planning; Economic, Technical, Financial and Managerial Feasibility of Project. Govt. support to new enterprise; Incentives; source of Finance; Role of Govt. and Promotional agencies in entrepreneurship development.

UNIT XII: Computer Applications in Management

Computers: An introduction; Computers in business; Elements of computer system set-up; Indian computing environment; components of a computer system Computer languages; Number system PC- Software Packages - An Introduction - Disk Operating System and

Windows; Introduction to Word Processor. Introduction to a spreadsheet software; Creation of spreadsheet applications; Range, Formulas, Functions, Data Base Functions in spreadsheet; Graphics on Spreadsheet; Data Files- Types/Organization; Master & Transaction File; Relevance of Data Base Management; Systems and Integration of Applications; Basics of Data Processing; Data Hierarchy & Data File Structures. Network Fundamentals, Analog and Digital Signals, Band width, Network Topology, Network Applications.

FACULTY OF PUBLIC HEALTH

UNIT I - Environmental Health: Environmental hazards and sources, exposure pathway, air pollution and health effects, water pollution and health, sanitation, food safety, vectors and disease, solid wastes, noise and its effects, climate change and impact on environment and health, heat exposure and effects, indoor air quality, occupational diseases, environmental disasters, emerging environmental problems and diseases, global burden of disease concept, India burden of disease estimates

UNIT II - Epidemiology and Biostatistics: Proportion, ratio, incidence, prevalence, odds ratio, relative risk, attributable risk, attributable fraction, ecological study, cross sectional study, cohort study, case control study, randomised controlled trials, selection bias, information bias, confounding, disease surveillance, public health screening, sensitivity and specificity, methods of organizing and presenting data, elements of data analysis, mean, median, mode, range, standard deviation, coefficient of variation, scales of measurements, continuous scale, ordinal scale, probability, data distribution, sampling techniques, sample size, probability distributions

UNIT III- Public Health Biology: Toxic agents, spectrum of undesired effects, characteristics of exposure, dose response relationship, factors influencing toxicity, toxic responses, body composition and fluids, cell, organelles & organs function, human physiological systems, immunity, genetics and environmental health, infectious diseases and sources, means of transmission and reservoir of infectious diseases, outbreaks, nutrition related disorders, macronutrient, essential nutrients

UNIT IV - Health Policy and Management: Globalization and health, economic evaluation of health, health care systems, health economics, cost benefit and cost effective analysis, health insurance, health care financing, health sector reforms, national health programs in India, policies and program formulation, implementation of health programs, monitoring and analyzing program outcomes, resource allocation

UNIT V - Social & Behavioral sciences: Demographic and social perspective on population health, population behavior and health disparities, determinants of health, lifestyle and disease, health equity, gender and health, major health indicators, behavioral change and intervention, social marketing

UNIT VI - Occupational Safety and Health: Types of industrial process, elements of industrial safety, elements of Industrial hygiene, chemical, physical and biological hazards and risks, psychosocial hazards and risks, ergonomics, control methods of hazards, disaster management, environmental protection acts, permissible limits of exposure, standards and guidelines, factories act, OSHA, ACGIH, element environmental management systems

UNIT VII - Environmental and Research Ethics: Ethical issues in epidemiology, responsible conduct of research, conflict of interest, privacy and confidentiality, data access and management, plagiarism.

FACULTY OF CLINICAL RESEARCH

Unit I

History and evolution of clinical research, Terminologies in clinical research – Ethics in Clinical Research, Unethical trials, Thalidomide Tragedy, Clinical Trials – International Perspective – Implementing Clinical Trials on an international platform, FDA perspective on International Clinical Trials; Clinical Trials – Indian Perspective – Current Scenario – Prospects, opportunities and Challenges

Unit II

Various approaches in drug discovery and development process- New drug discovery process - purpose, main steps involved in new drug discovery process, timelines of each steps, advantages and purposes of each steps

Unit III

Clinical Trial Process – overview, Phases of Clinical trials – Micro dosing / Phase 0, Human pharmacology and safety – Phase I, Therapeutic exploration and dose ranging- Phase II, Therapeutic confirmation/comparison Phase III, Post marketing surveillance- Phase IV trials

Unit IV

Types of clinical Trials – Observational and Interventional trials; Screening trials, Prevention trials, Treatment trials; Multi-arm trials, Multi-stage trials, Cohort studies, Case-control studies, cross sectional studies; Blinding, Open access, Randomized trials; Methods of allocation and Randomization, Inclusion and Exclusion criteria

Unit V

Clinical Trial Market – Clinical Trial Sector Size, Opportunities available; Careers in clinical research – clinical research associate, clinical trial operations manager etc.
Roles and responsibilities of key stakeholders in Clinical Research – Institutional Ethics Committee (IEC), Regulatory Authorities, Sponsor, Investigator/CRO etc.

FACULTY OF AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY

UNIT I – Speech Language Pathology

- a) Language disorders in children: Aetiology and characteristics of language disorders in children, Genetic and chromosomal abnormalities, Language disorders associated with pre-maturity and high-risk infancy, Acquired language disorders in children, Specific Language Impairment, Autism Spectrum Disorder (ASD), Attention Deficit Hyper Activity Disorder (ADHD), Tools available for diagnosis of ASD, ADHD and other language disorders; Differential diagnosis of child language disorders; AAC; Management of child language disorders; Management options for ASD, ADHD including parent implemented intervention for language disorders.
- b) Language disorders in adults: Aetiology and characteristics of language disorders in adults, Classification of aphasia, Neuroanatomical basis of major types of aphasias, Differential diagnosis of different types of aphasia, Plasticity and recovery, Prognostic factors, Management of persons with aphasia, Primary progressive aphasia, Sub-cortical aphasia, Acquired reading & writing disorders, Behavioural and cognitive symptoms of right hemisphere damage, Dementia- causes & types of dementia, language changes in dementia, Traumatic brain injuries- penetrating and non-penetrating injuries, Assessment & rehabilitation of TBI patients, AAC, Counselling and guidance, Intervention models for language disorders in adults.
- c) Speech sciences: Theories of speech production, Acoustic and aerodynamic characteristics of speech sounds, Instrumentation related Physiologic measurements- stroboscope, electroglottography, ultrasound, evoked potentials, Acoustic analysis of speech, Spectrography, Applications of speech sciences- Forensic application, infant cry analysis, Speech synthesis and its applications.
- d) Voice and its disorders: Biology of vocal fold tissue and lamina propria, Voice mechanics, Classification of voice pathologies, Assessment of voice- perceptual, acoustic, stroboscopy, aerodynamic, PROM, Voice disorders in specific populations- laryngectomy, aging voice, professional voice, transgender and trans-sexual voice, counselling and orientations to therapy, Voice exercise principles and procedures, voice habilitation for laryngectomee and professional voice users.
- e) Speech sound disorders: Coarticulation- types & models, Phonetic and phonological assessment procedures, Differential diagnosis, Motor and linguistic based approaches for management of speech sound disorders, Cleft Lip and Palate (CLP) -speech characteristics, phonological & language development, management of persons with CLP, speech problems due to head and neck cancer, assessment, counselling and management.
- f) Fluency and its disorders: Dimensions of fluency, normal non-fluency, developmental stuttering, cluttering, neurogenic, psychogenic and other types of fluency disorders; Assessment of fluency and dysfluency, Diagnosis and differential diagnosis of fluency

disorders, Management of fluency disorders, Relapse and recovery pattern in fluency disorders.

- g) Swallowing disorders: Anatomy & physiology of swallowing; Motor and sensory issues in feeding/ swallowing among developmental conditions; assessment of swallowing- bedside evaluation, visual examination, instrumental evaluation; management of dysphagia- behavioural, pharmacological and surgical; Direct and indirect strategies to facilitate safe swallow in children and adults.
- h) Neurogenic speech disorders: Neuroanatomical substrates of speech motor control, models of speech motor control, age related changes in speech motor control, assessment and management of dysarthria, assessment and management of apraxia of speech, motor learning principles.

UNIT II – Audiology

- a) Diagnostic Audiology: Behavioural tests
Assessment of hearing and balance disorders using behavioural methods: Principle, Rationale and Assessment Protocol, Response elicitation, factors affecting testing, Differential diagnosis, Interpretation and Implications for diagnosis, counselling and treatment
- b) Diagnostic Audiology: Electrophysiological tests
Assessment of hearing and balance disorders using electrophysiological and physiological test methods: Principle, Rationale and Assessment Protocol of Early, middle and late auditory and endogenous potentials, Recording techniques, Response elicitation, Differential diagnosis, Interpretation, Factors affecting and Implications for diagnosis, counselling and treatment.
- c) Paediatric Audiology
Development of human auditory system and auditory behaviour, Universal hearing screening, Early Identification and Intervention, High Risk Registers, UNHS, School Screening, Screening and Diagnostic behavioural and objective tests – stimuli, procedure, recording of response, interpretation and implications for counselling and treatment
- d) Rehabilitation Audiology
Speech reading and Auditory training: Definition, methods, strategies, factors affecting, Management of individuals with hearing impairment and multiple handicap, central auditory processing difficulties, Assistive Listening Devices – Classification, Selection and Candidacy, Utility of technology/devices in the management of tinnitus, hyperacusis, Government policies and schemes, implementation methods and strategies, Prevention of hearing loss.
- e) Hearing Aids and Amplification Devices
Application of recent advances in hearing aids and hearing assistive technology, Electroacoustic characteristics, critical analysis of hearing aid – prescriptive and comparative procedures, Fitting of hearing aids: Selection, Candidacy – pre-post evaluation, Assessment

of benefit, Care & Maintenance, Implantable devices – Candidacy, Pre-post evaluation, Assessment of benefit, Mapping and monitoring strategies, post implant consideration, Care & Maintenance, Trouble shooting.

UNIT III – Allied Courses

- a) Anatomy related to Speech Language and Hearing Cells, tissues and cartilages of head and neck, Muscles of neck and face Muscles of lips, cheek, and muscles of mastication, physiology of swallow, Muscles of tongue – Intrinsic and extrinsic muscles – origin, insertion, functions and nerve innervations, Muscles of palate, origin, insertion and nerve innervations, muscles of pharynx, Velo-pharyngeal mechanism and function larynx, cartilages (paired and unpaired), connections and nerve innervations. Nervous system: central and peripheral nervous system – lobes, functions, cranial nerves. Respiratory system: General outline, detailed study of trachea, larynx and nasopharynx. Anatomy of face and oral cavity -tooth, types of teeth, parts of tooth, structure, arterial supply and lymphatic drainage, Anatomy of oesophagus and swallow mechanism. Para nasal sinuses (frontal, maxillary, ethmoidal and sphenoidal), blood supply, venous drainage of head and neck
Anatomy of ear, parts of external, middle and inner ear, blood supply, venous drainage and nerve supply
- b) Physiology related to Speech Language and Hearing: Circulatory system: Definition of capillaries, arteries, veins, cardiac cycle, blood brain barrier, aneurysm, vascular shock – its reference to aphasia / speech disorders. Nervous system: Neuron, synapse, reflex action, bio electrical phenomena, action potential, depolarization Mechanism of respiration – internal and external influence, nervous control – vital capacity – tidal volume, residual air, artificial respiration Vocal fold physiology, Physiology of hearing and balance.
- c) Electronics & Acoustics: Fundamentals of Digital Signal processing and Communication systems, Biomedical signals and Signal Processing, Technology of Hearing Aids & Speech Processing and Analysis, Advanced Technology for Speech and Language Disorders – EMG, EEG, etc.
- d) Linguistics, & Phonetics: Principles of general linguistics, Socio-linguistics-Discourse analysis, Discourse comprehension, Psycholinguistics- Second language acquisition, Language acquisition in multilingual environments, Neurolinguistics-Neuroanatomical and neurophysiological basis of language learning, coding & decoding, Language and lateralization – left brain and right brain differences. Articulatory phonetics, acoustic phonetics, distinctive features, phonological process, phonetic and phonological analysis
- e) Neurology: Divisions and functions of the nervous system, nerve fibres and synapse, Structure of brain and its divisions, planes, Cerebrum, lobes of the brain, structures and functions, Cerebellum, neurotransmitters, Brainstem and cranial nerves – origin and insertion, CSF – secretion, absorption, pathway and its composition, Blood supply to central nervous system,

blood brain barrier, circle of Willis, Neuromuscular junction, Brodman's area, motor and sensory homunculus, Spinal cord, reflex arc.

- f) ENT: Anatomy & Physiology of ear, nose, throat, Causes, signs and symptoms of disorders of the ear, nose and throat, fundamental assessment, differential diagnosis and management
- g) Paediatrics: Early motor development – Stages in motor development and manipulative behaviour, Development of complex motor skills, handedness, Motor development during later childhood, Evolutionary growth of intelligence, Emotional and social development in children, Role of perception and memory in development, Development of sensory systems (vision and hearing), Early language development and language development in infancy through childhood, Development of feeding and eating behaviours from birth through childhood, Developmental disorders in children.
- h) Psychology: Definition of psychology, historical development, modern history of clinical development, Scope of clinical psychology in health science, Concepts of normality and abnormality, Methodology in clinical psychology (case history, interview and observation), Psychology of learning (classical and operant conditioning), reinforcement and strategies, Piaget's theory of cognitive development and Sigmund Freud's theory of psychosexual developments, DSM and ICD classification of abnormal behaviour, Assessment of mental function – Attention, concentration, memory, intelligence (verbal and non-verbal), Assessment of personality and interpersonal relationship, Introduction to cognitive behaviour therapy and counselling.

FACULTY OF SPORTS & EXERCISE SCIENCES

Unit I: Functional Anatomy

Muscular System-Classification- Functions of the musculoskeletal system- Composition and structure of bone -Function of skeleton with an emphasis on movement -Load-deformation curve of bone-Synovial joints and motions possible at each joint during various types of exercises -Anatomical Directional Terms & Anatomical Body Planes-Body Cavities and Body Quadrants Structure, muscle types applied to human motion -Types of muscular actions during various exercise activities-Skeletal muscle as part of a lever system during exercise-Postural muscles

Unit II: Sports Nutrition

Energy intake in sport and exercise- Carbohydrate intake before, during and after exercise or competition- role of BCAA for physical active individuals-Protein deficiency, excess intake and health risk-Role of Medium chain triglycerides-LCHF diets and exercise performance-Role of vitamins in athletic performance- Recommendations for minerals in athletes-Assessment of mineral status in athletes-Hydration and sport performance

Unit III: Exercise Physiology :

Cardiovascular Response and Regulation during Exercise & Recovery-Respiratory Response and Regulation during Exercise & Recovery-Hormonal and Immune Response during Exercise & Recovery-Skeletal Muscle Response and Regulation during Exercise & Recovery - Neuromuscular Response and Regulation during Exercise & Recovery_Body Fluid Response and Regulation during Exercise and Recovery_The Brain as a Regulator of Exercise

UNIT IV: Sport and Exercise Psychology:

Acute and chronic psychological effects of exercise, Group dynamics in sports environments, Techniques used to influence motivation in sport

UNIT V: Exercise prescription for athletic population:

Pre-exercise screening and fitness assessment, Basic principles of training, Periodization and progression of physical training programs, Training for endurance & strength, Exercise prescription for the development of specific physical capacities

UNIT VI: Physical activity and exercise in diseased population:

Functional tests for diseased populations, Epidemiology, etiopathogenesis, clinical features, exercise prescription of respiratory disorders, cardiopulmonary disorders, cerebrovascular disease, metabolic disease, musculoskeletal disease and neurological disease

UNIT VII: Applied sport and exercise Biomechanics :

Biomechanics of anatomical materials, Biomechanics of gait, Biomechanics of injuries and Ergonomics.

UNIT VIII: Rehabilitation of sports injuries :

Principles of rehabilitation exercise, Assessment and Rehabilitation of Common Injuries, Motor control and rehabilitation, Orthotics & Taping

UNIT IX: Sports Management :

Scope of sports management, Role of the sports manager, Sports development, Market segmentation, targeting and positioning, Sports strategies and role-players in Indian sport

FACULTY OF OCCUPATIONAL THERAPY

Unit I: Gross anatomy and functional anatomy: Cardiovascular system, respiratory system, central and peripheral nervous system, musculoskeletal system.

Unit II: Physiology and applied physiology of: Cardiorespiratory system, central and peripheral nervous system, special sense, muscles and blood.

Unit III: Basic principles of Occupational therapy and Therapeutic activities: History of Occupational Therapy, Ethics of Occupational therapy, Activity analysis.

Unit IV: Biomechanics and Kinesiology of: Spine, TM joint, upper extremity, lower extremity, posture, gait, respiration.

Unit V: Occupational Therapy in neurological conditions: Principles of assessment and treatment for motor system, sensory system, higher mental functions, perception in central nervous system pathologies, peripheral nervous system pathologies and myopathies. Motor control Theories, motor relearning program, Bobath approach, Brunnstrom approach, Proprioceptive neuromuscular facilitation, Roods approach and neuro developmental therapy.

Unit VI: Occupational Therapy in Hand and Musculoskeletal conditions: Principles of assessment and treatment in Hand and Musculoskeletal conditions, fractures, soft tissue injuries, post-operative conditions including joint replacements, joint and spinal pathologies. Principles & types of Hand Splinting, Assistive and adaptive technologies.

Unit VII: Occupational Therapy in Paediatric conditions: Developmental milestones, Principles of assessment and treatment in Paediatric conditions, developmental disorders, congenital disorders. Frames of References, Sensory integration therapy, Play therapy, Group therapy, Learning theories, Behavior theories, Occupational theories and Sensori-motor approaches.

Unit VIII: Occupational Therapy in Mental health: Principles of assessment and treatment in Child Psychiatry, Adult Psychiatry, Geriatric Psychiatry. Therapeutic use of self, Learning theories, Behavior theories, Cognitive theories, Models & Frames of Reference in Occupation.

Unit IX: Occupational Therapy in Gynecological & Obstetrical conditions: Principles of assessment and treatment in antenatal and post-natal period. Quality of Life of women.

Unit X: Occupational Therapy in Oncology and Palliative Care: Principles of assessment and management in Oncologic conditions, Pre- post-surgical management, Palliative care, Quality of Life.

Unit XI: Occupational Therapy in Cardio -pulmonary Rehabilitation: Principles of assessment and management in Cardio – Pulmonary rehabilitation.

Unit XII: Rehabilitation medicine and community based Occupational Therapy:
Concept of rehabilitation and team approach, disability evaluation, legal aspects of Disability and rehabilitation, an architectural barrier, orthotics and prosthetic services.

Faculty of Engineering and Technology

Unit 1: Engineering Mathematics

Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Monoids, Groups. Graphs: connectivity, matching, coloring. Combinatorics: counting, recurrence relations, generating functions.

Linear Algebra: Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition.

Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

Probability and Statistics: Random variables. Uniform, normal, exponential, poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Unit 2: Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Unit 3: Computer Organization and Architecture

Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Unit 4: Programming and Data Structures

Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Unit 5: Algorithms

Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths

Unit 6: Theory of Computation

Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and context-free languages, pumping lemma. Turing machines and undecidability.

Unit 7: Compiler Design

Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. Local optimisation, Data flow analyses: constant propagation, liveness

analysis, common subexpression elimination.

Unit 8: Operating System

System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

Unit 9: Databases

ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Unit 10: Computer Networks

Concept of layering: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit- switching; Data link layer: framing, error detection, Medium Access Control, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets; Application layer protocols: DNS, SMTP, HTTP, FTP, Email.

FACULTY OF BEHAVIOURAL AND SOCIAL SCIENCES

Unit 1:

General Psychology: Definition of psychology, historical development, modern history of clinical development, Scope of clinical psychology in health science, Concepts of normality and abnormality, Methodology in clinical psychology (case history, interview and observation), Psychology of learning (classical and operant conditioning), reinforcement and strategies, Piaget's theory of cognitive development and Sigmund Freud's theory of psychosexual developments, DSM and ICD classification of abnormal behaviour, Assessment of Primary mental function – Attention, concentration, memory, intelligence (verbal and non verbal), Assessment of personality and interpersonal relationship, **Executive Functions:** Neural underpinnings of executive functions: Prefrontal cortex and beyond, Problem-solving and decision-making: Cognitive biases and heuristics, Cognitive flexibility, inhibition, and goal-directed behavior.

Unit 2:

Sociology of Health and Illness: Social Determinants of Health: Impact of socioeconomic disparities on health outcomes, Gender and health: Intersectionality in healthcare access, Role of education and employment in health disparities. Medical Sociology: Social construction of illness and disability, Role of healthcare institutions in perpetuating inequities, Analysis of healthcare delivery models: Public vs. private systems. Social Networks and Mental Health: Role of family and peer networks in recovery, Loneliness and its psychological consequences, Social support systems and stress-buffering effects. Illness Narratives: Patient storytelling as a tool for understanding chronic illness, Biographical disruptions: Identity changes in long-term illness, Role of qualitative research in healthcare sociology. Nature of human problems in modern society; Social Work Concepts: Social Welfare, Social Service, Social Reform, Social Development, and Social Security. Rights: Human Rights, Fundamental Rights, Civil Rights, Gender Rights, and Social Justice. Society: Concepts, Characteristics, Structure and Functions of Society.

Unit 3:

Contemporary Theories: Biopsychosocial model: Integration of biological, psychological, and social factors, Critiques of the DSM-5: Dimensional vs. categorical approaches, Emerging paradigms: Network theory of mental disorders. Severe and Persistent Mental Illness: Schizophrenia spectrum disorders: Symptoms, etiology, and treatment, Bipolar I and II: Differential diagnosis and management strategies, Challenges in managing comorbidities in severe mental illnesses. Behavioral Addictions: Diagnostic criteria for internet gaming disorder and compulsive shopping, Neurobiological similarities with substance use disorders, Treatment approaches: CBT and harm reduction strategies. Forensic Psychology: Criminal behavior and mental health disorders, Psychological assessments in legal settings, Rehabilitation and reintegration of offenders with mental health issues.

Unit 4:

Mind-Body and Psychoneuroimmunology: Interactions between the nervous, endocrine, and immune systems, Chronic stress and its impact on immunity and disease progression, Role of cytokines in depression and anxiety. Psychosomatic Medicine: Psychological factors in cardiovascular diseases and IBS, Chronic pain syndromes: Biopsychosocial management, Mind-body interventions for psychosomatic disorders. Mindfulness and Neuroplasticity: Mechanisms of neuroplasticity in mindfulness-based interventions, Applications of mindfulness in neurodegenerative diseases, Role of meditation in improving executive function and emotional regulation. Yoga and Mental Health: Evidence-based applications of yoga in anxiety, depression, and PTSD. Mechanisms of yoga in reducing allostatic load. Yoga as a complementary therapy in chronic illness management.

Unit 5:

Advanced Psychopathology: Neurobiological Foundations: Role of neurotransmitters (dopamine, serotonin, GABA) in mental health disorders, Neuroanatomical changes in schizophrenia and depression, Genetics and epigenetics in mood and anxiety disorders. Developmental Psychopathology: Early-life adversity and its impact on brain development, Attachment theory and psychopathology, Risk and resilience factors in childhood trauma. Cultural Psychopathology: Cultural definitions of normalcy and abnormality, Culturally bound syndromes and their implications, Stigma and its impact on mental health care-seeking behaviors. Trauma and Stressor-Related Disorders: PTSD and Complex PTSD: Symptoms, diagnosis, and comorbidities, Neurobiological responses to trauma: HPA axis dysregulation, Trauma-informed care approaches in clinical settings.

Unit 6:

Early motor development – Stages in motor development and manipulative behaviour, Development of complex motor skills, handedness, Motor development during later childhood, Evolutionary growth of intelligence, Emotional and social development in children, Role of perception and memory in development, Development of sensory systems (vision and hearing), Early language development and language development in infancy through childhood, Development of feeding and eating behaviours from birth through childhood, Developmental disorders in children.

Unit 7:

Introduction to counselling, definition, scope of counselling practise, origin and history of counselling, Phases of counselling – assessment, initiation and termination, Different facets of counselling: Individual and group counselling, skills in counselling – observation, questioning,, communication, making notes and reflections. Hospital counselling: Counselling to terminally ill, pain management, rehabilitation counselling in hospitals, Cultural issues in counselling, Counselling intellectual exceptionality – superior and mental retardation, Counselling sensory handicaps – visual, hearing, speech, motor, Family, personal and educational counselling, Ethical codes & guidelines – right of clients, dimensions of confidentiality, Ethical and legal responsibilities.

Unit 8:

Psychology of Social and Organizational Behavior : Social Psychology: Social cognition: Attribution theory, heuristics, and biases, Group dynamics: Conformity, compliance, and leadership, Social identity and intergroup relations: Prejudice, discrimination, and conflict resolution. Organizational Behavior: Motivation theories in workplace settings (Maslow, Herzberg, and Vroom), Leadership styles and their psychological impact on organizational culture, Work stress and burnout: Causes, consequences, and interventions. Applications in Modern Contexts: Role of psychology in change management and innovation in organizations, Workplace mental health and employee well-being initiatives, Cross-cultural organizational psychology: Adapting practices for global teams.

Unit 9:

Basic Human Anatomy and Physiology Overview: Basic Structure; Homeostasis, Cells and Tissue; Skeletal System; Muscular System; Circulatory System; Nervo Endocrine control of homeostasis, Gut - Brain Axis; and Immune System Lifestyle Medicine Overview and Principles of Lifestyle Medicine; Basics of Lifestyle Pillars - Impact, Benefits, Techniques and Management; Stress and Burnout; Causes, assessment, Impact and Management; Non - Communicable Diseases and Lifestyle Management; Behaviour Change; Goal Setting, communication and constructive feedback

Unit 10:

Psychology of Human Development Across the Lifespan Developmental Milestones and Theories: Prenatal, infancy, and early childhood: Milestones and influencing factors, Adolescent development: Identity, autonomy, and peer relationships, Aging: Cognitive decline, emotional regulation, and successful aging. Psychological Issues at Different Life Stages: Developmental disorders: Autism, ADHD, and intellectual disabilities, Midlife challenges: Work-life balance, parenting, and existential crises, Mental health in older adults: Depression, dementia, and caregiving challenges. Applications in Lifespan Development: Life transitions and their psychological impact (e.g., retirement, bereavement), Interventions for enhancing lifespan development: Cognitive training and therapy, Policy implications: Supporting diverse age groups through targeted programs.

Unit 11:

Cognitive Applications and Development: Language and Cognition: Language acquisition: Key stages in children's cognitive development of language, Relationship between language and thought: Sapir-Whorf Hypothesis, Role of working memory in language comprehension and production. Cognition in Everyday Life: Decision-making processes: Rational decision-making vs. heuristics and biases, Role of attention and memory in multitasking and performance, Metacognition: Thinking about thinking, self-regulation, and monitoring. Cognitive Development and Aging : Key theories of cognitive development: Piaget and Vygotsky, Cognitive changes in adulthood: Memory, processing speed, and executive functions, Strategies for maintaining cognitive health in aging: Cognitive training and lifestyle factors.