



## **STATE PARAMEDICAL SCIENCE** **FACULTY**

### **Diploma in Ortho Technician**

#### **Year I**

<b>Objectives of the Course</b>		
The main objective of the course is to impart holistic knowledge i.e. including theory and practical about carrying out duties related to orthopedic procedures, maintain knowledge about various materials included, maintain machines, equipment related and at the top, learn proper attitude towards patient care.		
<b>Paper I : Anatomy &amp; Physiology</b>		
Sr. No.	Topics	Hrs.
1.	Terminology used in Anatomy, Bones – Names and location. Basic orientation and organization of human body from cell to organ system	06
2.	Human cells and tissues – Muscle, blood, gland, bone, nerve, reproductive cells and tissues – Organization and their functions	15
3.	Directional references of human body	02
4.	Body cavities – Dorsal and ventral	02
5.	Skeletal System – Terminology, position, basic details. Joints – Terminology, types, structure	20
6.	Integumentary System – Terminology, basics	02
7.	Gastrointestinal System – Terminology, position, structure, parts and their functions. Digestive process, absorption and defaecation.	10
8.	Respiratory System – Terminology, position, structure, parts and their functions, breathing mechanism.	10
9.	Urinary System – Terminology, position, structure, parts and their functions, process of urine formation and voiding. Blood, nerve supply of kidney	10

10.	Male Reproductive System – Terminology, position, structure, parts and their functions	05
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11.	Female Reproductive System – Terminology, position, structure, parts and their functions, menstrual cycle.	05
12.	Endocrine System – Terminology, position, structure, function and regulation of all hormones	10
13.	Brain and Spinal Cord – Terminology, structure, functions	05
14.	Blood – Terminology, composition, lymphatic details and clotting system.	05
15.	Sensory organs (eyes, ears, nose and tongue) – Terminology, functions.	10
16.	Cardiovascular System – Terminology, structure. Vessels entering and leaving the heart. Arterial and venous tree.	10
17.	Lymphatic System – Terminology, functions of WBCs, spleen, tonsils and lymph nodes	05

#### Reference Books

1.	An Integrated Approach to Health Sciences	Colbert Bruce, Jeff Ankney, Joe Wilson, John Havrilla	Cengage Learning
2.	Human Physiology, Biochemistry and Basic Medicine	Laurence A. Cole, Peter R. Kramer	Elsevier
3.	Introduction to Human Anatomy and Physiology	Solomon. E.A.	Saunders: St Louis

#### Lab – Anatomy & Physiology

1.	Study of the human skeleton
2.	Study with the help of charts and models of digestive system, respiratory system, ear, cardiovascular system, reproductive system, eye and urinary system
3.	Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues
4.	Examination of blood films for TLC.DLC and malarial parasite
5.	Determination of RBCs, clotting time of blood, erythrocyte sedimentation rate and Hemoglobin Value

6.	Recording of body temperature, pulse, heart-rate, blood pressure and ECG	
Note – The study of physiology and anatomy should be coordinated so that the structure and functions can be explained and understood clearly		
<b>Paper II : Pathology, Pharmacology and Microbiology</b>		
Sr. No.	Topics	Hrs.
1.	Haematology – Composition, formation and function of blood.	05
2.	Anaemia – Meaning and its detailed classification	05
3.	Estimation of Haemoglobin – Structure of haemoglobin, estimation (methods based on development of color, oxygen combining capacity and iron content)	10
4.	Urine Analysis – Collection and preservation, physical, chemical and microscopic examination.	05
5.	Stool Analysis – Macroscopic, microscopic and chemical examination	05
6.	Decalcification – Importance and methods	05
7.	Tissue Processing – Meaning, importance and methods	05
8.	Pharmacokinetics – Basic concepts, drug –administration (enteral routes and parenteral routes), absorption (biological, physicochemical factors effecting), distribution (compartments, protein binding, apparent volume of distribution), metabolism and excretion	10
9.	Pharmacodynamics – Basic concepts, mechanism of action, organ system effects, adverse drug reaction, drug-receptor interactions, combined drug action	10
10.	Pharmacological Classification of Drugs – Drugs Acting on CNS (Central Nervous System) - General anaesthetics, sedatives and hypnotics, analgesic antipyretics and non-steroidal, anti-inflammatory drugs, anti-rheumatic and anti-gout remedies, centrally acting muscle relaxants etc., local anaesthetics. Drugs acting on autonomic nervous system. Cholinergic drugs, anticholinergic drugs, anticholinesterase drugs. Adrenergic drugs and adrenergic receptor blockers. Neuron blockers and ganglion blockers. Neuromuscular blockers.	10
11.	Cardiovascular Drug – Cardiotonics, antiarrhythmic agents, anti-anginal agents, antihypertensive agents, peripheral vasodilators and drugs used in atherosclerosis	10
12.	Drugs Affecting Blood Formation – Coagulants and anticoagulants, antithrombotic & antiplatelet drugs, haematinics, haemostatic, blood substitutes and plasma expanders.	10

13.	Drugs Affecting Renal Function – Diuretics and antidiuretics, urinary antiseptics, cholinergic and anti-cholinergic, acidifiers and alkalinizers	10
14.	Drugs for Hormonal Disorders – Insulin & oral hypoglycemic, thyroid supplements and suppressants, steroids, anabolics, uterine stimulants and relaxants	10
15.	Digestive System Drugs – Anti-emetics & emetics, purgatives, antacids, cholinergic & anti-cholinergics, fluid and electrolyte, anti-diarrhoeals, histamines	10
16.	Drugs for Microbial Infections – Penicillin, streptomycin, tetracyclines and other antibiotics, anti-fungal agents, anti-viral drugs, anti-leprotic drugs	10
17.	Introduction to Bacteria – Structure, shape, anatomy, structure of cell wall, classification and nutrition of bacteria	03
18.	Bacterial Culture Media – Classification, composition, methods, growth curve	05
19.	Sterilization and disinfection – Introduction to sterilization, disinfection, antiseptic, bacteriocidal agents, bacteriostatic agents, methods of sterilization (physical, chemical, dry heat, moist heat), filtration, radiation, autoclave, types of autoclave, commonly employed sterilization method for different clinical article, uses of disinfectant	20
20.	Infection – Classification of infection, source of infection in man, method of transmission of infection	10

#### Reference Books

1.	Robbins and Kumar Basic Pathology: First South Asia Edition	Kumar and Abbas	Elsevier
2.	Textbook of Pathology with Pathology Quick Review and MCQs	Harsh Mohan	Jaypee
3.	Essentials of Medical Pharmacology	K. D. Tripathi	Jaypee Brothers
4.	Essentials of Pharmacology for Nurses	Paul Barber & Deborah Robertson	Tata Mc Graw Hill
5.	Text Book of Microbiology	Chakraborty	New Central Book Agency P Ltd
6.	Microbiology - An Introduction	Tortora Funk	Pearson

#### Lab – Pharmacology and Pathology

1.	To study the effect of potassium and calcium ions, acetylcholine and adrenaline on frog's heart.
2.	To study the effect of spasmogens and relaxants on rabbits intestine.
3.	To study the effect of local anaesthetics on rabbit cornea
4.	To study the effect of hypnotics in mice.
5.	To study the effect of convulsants and anticonvulsant in mice or rats.
6.	Analysis of urine for routine and others tests

### **Paper III : Detailed Osteology, Myology, Neurology, Joints and Radiological Anatomy**

<b>Sr. No.</b>	<b>Topics</b>	<b>Hrs.</b>
1.	Osteology – Introduction, terminologies, anatomical positions, basic classification of bones.	10
2.	Joints – Classification, movements, factors permitting and limiting movements of joints	05
3.	Upper Limb Bones, Joints and Cartilage – Parts, structure, types and functions. Lower Limb Bones – Parts, structure, types and functions.	10
4.	Skull and Spinal Cord - Parts, structural details, thorax, vertebral column, upper and lower extremities, vertebrae, sternum, ribs, hyoid, mandible, teeth, maxillae, parietal bone, frontal bone, temporal bone, occipital bone, zygomatic bones, nasal bones, ethmoid bone, inferior nasal conchae, vomer, sphenoid bone, palatine bones, skull (general features), exterior of the skull, orbital cavity, nasal cavity, interior of the cranial vault, interior of the base of skull.	30
5.	Myology – Meaning, terminology. Muscle – Definition, importance, types, origin, attachments, nerve and blood supply, Muscular Actions: Volkmann's ischaemic contracture, quadrangular and triangular spaces, triangle of auscultation.	20
6.	Neurology – Basic knowledge of central and peripheral nervous system. Nerve – Meaning, origin, types, auxillary, median, ulnar, musculocutaneous, radial, origin, course, distribution, root value. Spinal nerves, nerve plexus of the body with their distributions (cervical plexus, brachial plexus, limbo-sacral plexus) Plexus: Brachial Applied aspects: Nerve injury at various sites - Tendon reflex - Winging of scapula, Erb's palsy, Klumpke's palsy, Crutch palsy, ulnar	30

	paradox	
7.	Radiological Anatomy – Terminology, importance, applications. Radiographic Projections – Types, ways Basics of body planes, sections, and lines, body surfaces and parts, plain X-ray, bones, spine, pelvis, joints etc., USG (Musculoskeletal & Joints etc.), C.T. (plain, contrast, enhanced CT, CT myelo, PET, CT), MRI, colour Doppler through x-ray.	20

#### Reference Books

1.	Clinical anatomy for medical students	Richard Snell	Lippincott Williams and Wilkins
2.	Human Anatomy	B.D. Chaurasia	CBS

#### Lab – Osteology, Myology, Neurology, Joints and Radiological Anatomy

1.	Demonstration of gross anatomy.
2.	Interpretation of x-rays

#### Paper IV : Hand Hygiene and Prevention of Cross Infection

Sr. No.	Topics	Hrs.
1.	Hand Hygiene – Meaning, concerns included, importance, steps and ways, compliance.	05
2.	Techniques – Details of all hand washing and rubbing techniques, care of skin. Promoting hand hygiene. Gloves – Importance, usage and disposal. Pitfalls in hand hygiene.	10
3.	Introduction – Terminology, meaning of cross infection with special reference to orthopedic infections. Portal of entry. Wound categories	10
4.	Causes – Infection agents (bacteria, virus, fungi, protozoa and parasite), reservoir of infection agents, mode of transmission. Susceptible hosts and related causes. Portals of infection exit.	15
5.	Breaking the Link of Cross Infection – Good health and hygiene, environmental sanitation, disinfection, sanitation, hand	20

	hygiene, trash and wash disposal, control of secretions and excretions, wound care, aseptic technique, catheter care, airflow control, proper food handling, isolation precautions, treatment of primary disease, recognize high risk patients, prompt treatment, rapid identification of organism	
6.	Disinfection and Sterilization – Process, physical and chemical ways of sterilization, methods of disinfection, types of disinfectants	20
7.	Environmental Control Measures – Meaning, importance, ways (sterilization of equipment, proper housekeeping, ventilation, waste management, linen and laundry management and care of food service	20
8.	Personal Protective Equipment (PPE) – Meaning, gloves (importance, when to wear, sterile and non-sterile gloves, glove material), cover garb (importance, when to wear, types), masks (importance, when to wear, types, characteristics). Choice of PPE as per requirement, proper use	20

#### Reference Books

3.	Cross Infections: Types, Causes and Prevention	Jin Dong, Xun Liang	Nova Biomedical Books
4.	Fundamental Aspects of Infection Prevention and Control	Vinice Thomas	Andrews UK Limited

#### Lab – Hand Hygiene and Prevention of Cross Infection

3.	Hands-on practice of hand hygiene
4.	Practice of PPE

#### Paper V : Basic Life Support and Cardio-pulmonary Resuscitation

Sr. No.	Topics	Hrs.
1.	Basic Life Support – Introduction, meaning, concerns. Size-up (use of senses, initial impression), primary assessment of the unresponsive adult patient (Level of Consciousness (LOC), airway, head-tilt/chin-lift technique, simultaneous breathing and pulse check, respiratory arrest, cardiac arrest)	10

2.	CPR/AED for Adults – Compressions, ventilations (mouth-to-mouth, pocket mask, bag-valve-mask (BVM) resuscitator).	20
3.	Automated External Defibrillators - Using an AED, AED safety, high-performance CPR. CPR/AED differences between children and adults	20

#### **Reference Books**

1.	Basic Life Support: Provider Manual	American Heart Association	American Heart Association
2.	Heartsaver First Aid CPR AED	American Heart Association	American Heart Association

#### **Lab – Basic Life Support and Cardio-pulmonary Resuscitation**

1.	Demonstration and hands on training of Vital Monitoring
2.	Hands on training of BLS
3.	Hands on training of CPR