



**SYLLABUS & CURRICULA(Revised 2019)  
w.e.f. 2019-20&onwards**

**FOR**

**DOCTOR OF PHYSICAL THERAPY (DPT)**

**(Five Year Degree Program)**

**Department of Allied Health Sciences**

**Sargodha Medical College Campus**

**University of Sargodha**

## DPT CURRICULA / SYLLABI

### 1<sup>st</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G.Viva Marks	Total Marks
1	ANATOMY I	150	50	200
2	PHYSIOLOGY I	150	50	200
3	BIOCHEMISTRY I	150	50	200
4	KINESIOLOGY	150	50	200
5	ENGLISH	100	Not Applicable	100
6	INTRODUCTION TO COMPUTER	100	Not Applicable	100
	<b>TOTAL</b>	<b>800</b>	<b>200</b>	<b>1000</b>

### 2<sup>nd</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G.Viva Marks	Total Marks
1	ANATOMY II	150	50	200
2	PHYSIOLOGY II	150	50	200
3	BIOCHEMISTRY II	150	50	200
4	BIOMECHANICS & ERGONOMICS	150	50	200
5	ISLAMIC STUDIES	100	Not applicable	100
6	PAKISTAN STUDIES	100	Not applicable	100
	<b>TOTAL</b>	<b>800</b>	<b>200</b>	<b>1000</b>

### 3<sup>rd</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G.Viva Marks	Total Marks
1	PHARMACOLOGY	150	50	200
2	GENERAL PATHOLOGY & MICROBIOLOGY	150	50	200
3	PHYSICAL AGENTS & ELECTROTHERAPY INCLUDING MEDICAL PHYSICS	150	50	200
4	THERAPEUTIC EXERCISES AND TECHNIQUES & MANUAL THERAPY	150	50	200
	<b>TOTAL</b>	<b>600</b>	<b>200</b>	<b>800</b>

### 4<sup>th</sup> YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G.Viva Marks	Total Marks
1	COMMUNITY HEALTH, RESEARCH METHODOLOGY, SOCIAL AND BEHAVIORAL SCIENCES	100	Not applicable	100
2	SPECIAL PATHOLOGY	150	50	200
3	PHYSICAL THERAPY IN MEDICINE	150	50	200
4	PHYSICAL THERAPY IN SURGERY INCLUDING RADIOLOGY & DIAGNOSTIC IMAGING	150	50	200
5	CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS	100	Not applicable	100
6	PHYSICAL THERAPY TREATMENT & TECHNIQUES-I ( <i>Musculoskeletal, Sports, Gerontology including Geriatric, Paediatric Physical Therapy and Supervised Clinical Practices I</i> )	150	50	200
	<b>TOTAL</b>	<b>800</b>	<b>200</b>	<b>1000</b>

### FINAL YEAR

Sr. No.	Subject Title	Theory Marks	Practical / Clinical & G.Viva Marks	Total Marks
1	EVIDENCE BASED PHYSICAL THERAPY & PROFESSIONAL PRACTICE	100	Not applicable	100
2	EMERGENCY PROCEDURES & PRIMARY CARE IN PHYSICAL THERAPY	150	50	200
3	( <i>Cardiopulmonary, Neurological, Gynecological &amp; Obstetrics, Integumentary Physical Therapy, and Supervised Clinical Practices II</i> )	150	50	200
4	PROSTHETICS, ORTHOTICS, HUMAN DEVELOPMENT & COMMUNITY BASED REHABILITATION	100	Not applicable	100
5	EXERCISE PHYSIOLOGY & HEALTH AND WELLNESS	150	50	200

<b>TOTAL</b>	<b>650</b>	<b>150</b>	<b>800</b>
<b>REPORT WRITING (In Final Year)</b>	<b>Qualifying Mandatory</b>		

**Note:**

1. There shall be 01 Question Paper in each subject having equal contribution from all sections.
2. Supervised Clinical Practices I shall commence from 3rd year & evaluated at the end of 4th year along with relevant subject while Supervised Clinical Practices II shall commence from 4th year & evaluated at the end of final year along with relevant subject.
3. 10% marks are reserved for internal assessment based upon 3-5 Class Tests average, Class attendance, and Overall performance.

**CREDIT ACCUMULATION AND TRANSFER SYSTEM(CAT)**

A Credit accumulation and transfer system is a systematic way of describing an educational program based upon its components. Credit hour or credit unit is basically the academic currency of the academic activities.

In DPT under the CAT system is defined as

Title	Recommended	Actual		
		Teaching	Clinical	Total
1. Contact hours 1500-1800 hrs/year 2. 25-30 Contact hours = 01 credit point 3. Number of credit points in a year = 55-60	1500-1800 hours/year	1400+1400+1100+1500+1100+300(R.W.) =6800	550+520+840=1910	8710/5=1742 hours/year

**1. DIVISION OF STUDY HOURS**

**1<sup>st</sup> YEAR**

Sr. No.	Subject Title	Total Contact Hours	Theory	Practical
1	ANATOMY I	300	200	100
2	PHYSIOLOGY I	300	200	100
3	BIOCHEMISTRY I	300	200	100
4	KINESIOLOGY	300	200	100
5	ENGLISH	100	100	N/A
6	INTRODUCTION TO COMPUTER	100	100	N/A
	<b>TOTAL</b>	<b>1400</b>		

**2<sup>nd</sup> YEAR**

Sr. No.	Subject Title	Total Contact Hours	Theory	Practical
1	ANATOMY II	300	200	100
2	PHYSIOLOGY II	300	200	100
3	BIOCHEMISTRY II	300	200	100
4	BIOMECHANICS & ERGONOMICS	300	200	100
5	ISLAMIC STUDIES	100	100	N/A
6	PAKISTAN STUDIES	100	100	N/A
	<b>TOTAL</b>	<b>1400</b>		

**3<sup>rd</sup> YEAR**

Sr. No.	Subject Title	Total Contact Hours	Theory	Practical
1	GENERAL PATHOLOGY & MICROBIOLOGY	300	200	100
2	PHARMACOLOGY	200	100	100
3	PHYSICAL AGENTS & ELECTROTHERAPY INCLUDING MEDICAL PHYSICS	300	200	100
4	THERAPEUTICS EXERCISES AND TECHNIQUES & MANUAL THERAPY	300	200	100
	<b>TOTAL</b>	<b>1100</b>		

### 4<sup>th</sup> YEAR

Sr. No.	Subject Title	Total Contact Hours	Theory	Practical
1	COMMUNITY HEALTH, RESEARCH METHODOLOGY, SOCIAL AND BEHAVIORAL SCIENCES	100	100	N/A
2	SPECIAL PATHOLOGY	300	200	100
3	PHYSICAL THERAPY IN MEDICINE	300	200	100
4	PHYSICAL THERAPY IN SURGERY INCLUDING RADIOLOGY & DIAGNOSTIC IMAGING	200	100	100
5	CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS	100	100	N/A
6	PHYSICAL THERAPY TREATMENT & TECHNIQUES-I <i>(Musculoskeletal, Sports, Gerontology including Geriatric, Paediatric Physical Therapy and Supervised Clinical Practices I)</i>	500	300	200
<b>TOTAL</b>		<b>1500</b>		

### FINAL (5<sup>th</sup>) YEAR

Sr. No.	Subject Title	Total Contact Hours	Theory	Practical
1	EVIDENCE BASED PHYSICAL THERAPY & PROFESSIONAL PRACTICE	100	100	N/A
2	EMERGENCY PROCEDURES & PRIMARY CARE IN PHYSICAL THERAPY	200	100	100
3	PHYSICAL THERAPY TREATMENT & TECHNIQUES-II <i>(Cardiopulmonary, Neurological, Gynecological &amp; Obstetrics, Integumentary Physical Therapy, and Supervised Clinical Practices -II)</i>	500	300	200
4	PROSTHETICS, ORTHOTICS, HUMAN DEVELOPMENT & COMMUNITY BASED REHABILITATION	100	100	N/A
5	EXERCISE PHYSIOLOGY & HEALTH AND WELLNESS	200	100	100
6	<b>TOTAL</b>	<b>1100</b>		
	Report Writing (in final year)	300		
	<b>G. TOTAL</b>	<b>6800</b>		

### BREAK DOWN OF HOURS OF CLINICAL PRACTICE

YEAR	WARD/CLINIC	HOURS	PERIOD
<b>THIRD YEAR</b>	PHYSIOTHERAPY CLINIC	550	ONE YEAR
	<b>TOTAL</b>	<b>550</b>	
<b>FOURTH YEAR</b>	PHYSIOTHERAPY CLINIC	200	THREE MONTHS
	GENERAL MEDICINE	80	TWO MONTHS
	PULMONOLOGY & CARDIOLOGY	40	ONE MONTH
	GENERAL SURGERY	80	TWO MONTHS
	GYNECOLOGY & OBSTETRICS	40	ONE MONTHS
	PEDIATRICS	80	TWO MONTHS
	<b>TOTAL</b>	<b>520</b>	
<b>FINAL YEAR</b>	PHYSIOTHERAPY CLINIC	200	THREE MONTHS

	CHEST MEDICINE	80	ONE MONTH
	BURN & PLASTIC SURGERY	80	ONE MONTH
	GENERAL SURGERY	80	TWO MONTHS
	ORTHOPEDICS SURGERY	120	TWO MONTHS
	NEUROLOGY	120	ONE MONTH
	CARDIOVASCULAR & THORACIC SURGERY	80	ONE MONTH
	ICU & CCU	80	ONE MONTH
	<b>TOTAL</b>	<b>840</b>	
	<b>S. TOTAL</b>	<b>1910</b>	
	<b>G. TOTAL</b> (including Theory & Clinical) =6800+1910	8710	

**Note:**

\* 2/3<sup>rd</sup> of the clinical training shall be provided in the morning whereas 1/3<sup>rd</sup> of the clinical training shall be provided in the evening. There shall be 1-2 months of summer vacations in an academic session.

**DETAILED COURSE OUTLINE DPT**

**1st YEAR**

1. Anatomy I	200 Marks
2. Physiology I	200 Marks
3. Biochemistry I	200 Marks
4. Kinesiology	200 Marks
5. English	100 Marks
6. Introduction to Computer	100 Marks
<b>Total</b>	<b>1000 Marks</b>

**1. ANATOMY I**

**CELL BIOLOGY**

**GENERAL ANATOMY**

Terms related to position and movements, the skin and subcutaneous tissues, Layers of skin, Integuments of skin, Glands associated with hair follicle, Microscopic picture of skin

**BONES AND CARTILAGES**

Osteology, Functions of Bones, Classification of bones, Parts of developing long bones, Blood supply of bones, Lymphatic vessels & nerve supply, Rule of direction of nutrient foramen, Gross structure of long bone, Surface markings, Cartilage, Development of bone and cartilage and Microscopic picture of cartilage and bone

**THE MUSCLE**

Introduction, Histological Classification, Functions of muscles in general, Type of skeletal muscles, Parts of skeletal muscle and their action and Nomenclature and Microscopic picture of muscle

**STRUCTURES RELATED TO MUSCLES & BONES**

Tendons, Aponeurosis, Fasciae, Synovial bursae, Tendon Synovial sheaths, Raphae, Ligaments, Condyle, Epicondyle, Ridge, Tuberosity, Tubercle, Foramen, Canal, Groove, Process and Spur

**THE JOINTS**

Introduction, Functional classifications, Structural classification, Structures comprising a Synovial joint, Movements of joints, Blood supply of Synovial joints, their nerve supply and lymphatic drainage and Factors responsible for joint stability and Development of joints

**CARDIOVASCULAR SYSTEM**

Definition, Division of circulatory system into pulmonary & systemic, Classification of blood vessels and their microscopic picture and Heart and its histology and Function of the Heart and Anastomosis

## **NERVOUS SYSTEM**

Definition, Outline of cellular architecture, Classification of nervous system, Parts of the central nervous system, Microscopic picture of cerebrum, cerebellum, spinal cord, Functional components of a nerve, Typical spinal nerve and Microscopic picture of nerve and Introduction of autonomic nervous system and Anatomy of neuromuscular junction

## **UPPER LIMB**

### **OSTEOLOGY:**

Detailed description of all bones of upper limb and shoulder girdle along their musculature and ligamentous attachments

### **MYOLOGY**

Muscles connecting upper limb to the axial skeletal, Muscles around shoulder joint, Walls and contents of axilla, Muscles in brachial region, Muscles of forearm, Muscles of hand, Retinacula and Palmar apouenrosis and Flexor tendon dorsal digital expansion

### **NEUROLOGY**

Course, distribution and functions of all nerves of upper limb and Brachial plexus

### **ANGIOLOGY (CIRCULATION).**

Course and distribution of all arteries and veins of upper limb, Lymphatic drainage of the upper limb and Axillary lymph node and Cubital fossa

### **ARTHROLOGY**

Acromioclavicular and sternoclavicular joints, Shoulder joint, Elbow joint, Wrist joint, Radioulnar joints, Inter carpal joints, Joints MCP and IP and Surface Anatomy of upper limb, and Surface marking of upper limb

### **DEMONSTRATIONS:**

Demonstration on Shoulder joint, attached muscles and articulating surfaces, Demonstration on Elbow joint, Demonstration on Wrist joint, Demonstration on Radioulnar joint, Demonstration on MCP and IP joints, Demonstration on acromioclavicular joint, Demonstration on sternoclavicular joint and Demonstration on Brachial plexus and Demonstration on Structure of bones

## **THORAX**

### **STRUCTURES OF THE THORACIC WALL:**

Dorsal spine (Vertebrae), Sternum, Costal Cartilages & Ribs, Intercostal Muscles, Intercostal Nerves, Diaphragm, Blood supply of thoracic wall and Lymphatic drainage of thoracic wall and Joints of thorax

### **THORACIC CAVITY:**

Mediastinum, Pleura, Trachea, Lungs, Bronchopulmonary segments, Pericardium, Heart – Its blood supply, venous drainage & nerve supply, Large veins of thorax, superior and inferior vena cava., pulmonary veins brachiocephalic veins and Large Arteries – Aorta & its branches

## **LOWER LIMB**

### **OSTEOLOGY**

Detailed description of all bones of lower limb and pelvis along their musculature and ligamentous attachments.

### **MYOLOGY**

Muscles of gluteal region, Muscles around hip joint, Muscles of thigh (anteriorly, posteriorly, laterally and medially) and Muscles of lower leg and foot

### **NEUROLOGY**

Course, distribution, supply of all nerves of lower limb and gluteal region and Lumbosacral plexus.

### **ANGIOLOGY**

Course and distribution of all arteries, veins and lymphatic drainage of lower limb

### **ARTHROLOGY**

Pelvis, Hip joint, Knee joint, Ankle joint, Joints of the foot, Surface Anatomy of lower limb and Surface marking of lower limb

### **GENERAL HISTOLOGY**

Cell, Epithelium, Connective tissue, Bone, Muscles tissue, Nervous tissues, Blood vessels, Skin and appendages and Lymphatic organs

#### **GENERAL EMBRYOLOGY:**

Cell division and Gametogenesis, Fertilization, cleavage, blastocyst formation and implantation of the embryo. Stages of early embryonic development in second and third week of intrauterine life, Foetal membrane (amniotic cavity, yolk sac, allantois, umbilical cord and Placenta) and Developmental defects, musculo skeletal system.

#### **General Histology**

Microscope, Epithelium, Connective Tissue, Cartilage, Bone, Muscles, Nerves System, Skin, Respiratory System.

#### **Practicals:**

During study of Anatomy, emphasis should be given on applied aspect, radiological anatomy, histological anatomy, surface anatomy and cross-sectional anatomy of the region covered in the respective year.

#### **RECOMMENDED TEXT BOOKS:**

1. Gray's Anatomy by Prof. Susan Standring 39<sup>th</sup>Ed.,
2. Elsevier, Clinical Anatomy for, Medical Students by Richard S.Snell,
3. Clinically Oriented Anatomy by Keith Moore,
4. Clinical Anatomy by R.J. Last, Latest Ed,
5. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 15th Ed., Vol-I, II and III,
6. The Developing Human. Clinically Oriented Embryology by Keith L. Moore, 6th Ed, Wheater's Functional Histology by Young and Heath,
7. Latest Ed, Medical Histology by Prof. Laiq Hussain, Neuroanatomy by Richard S.Snell.

## **2. PHYSIOLOGY I**

### **BASIC AND CELL PHYSIOLOGY**

Functional organization of human body, Homeostasis, Control systems in the body, Cell membrane and its functions, Cell organelles and their functions and Genes: control and function

### **NERVE AND MUSCLE**

Structure and function of neuron, Physiological properties of nerve fibers, Physiology of action potential, Conduction of nerve impulse, Nerve degeneration and regeneration. Synapses, Physiological structure of muscle, Skeletal muscle contraction, Skeletal, smooth and cardiac muscle contraction, Neuromuscular junction and transmission, Excitation contraction coupling, Structure and function of motor unit

#### **Clinical Module**

Perform nerve conduction studies and explain their clinical importance. Myopathies and neuropathies. Peripheral nerve injuries

### **CARDIOVASCULAR SYSTEM**

Heart and circulation, Function of cardiac muscle, Cardiac pacemaker and cardiac muscle contraction, Cardiac cycle, ECG: recording and interpretation. Common arrhythmias and its mechanism of development, Types of blood vessels and their function, Haemodynamics of blood flow (local control systemic circulation its regulation and control). Peripheral resistance its regulation and effect on circulation, Arterial pulse, Blood pressure and its regulation, Cardiac output and its control, Heart sounds and murmurs Importance in circulation and control of venous return., Coronary circulation, Splanchnic, pulmonary and cerebral circulation , Clinical Module

Clinical significance of cardiac cycle, correlation of ECG and heart sounds to cardiac cycle. Clinical significance of cardiac cycle, interpretation of ischemia and arrhythmias. Effects of hypertension. Clinical significance of heart sounds. Effects of ischemia. Shock

### **RESPIRATORY SYSTEM**

Function of respiratory tract, Respiratory and non-respiratory function of the lungs, Mechanics of breathing, Production & function of surfactant and compliance of lungs, Protective reflexes, Lung volumes and capacities including dead space, Diffusion of gases across the alveolar membrane, Relationship between ventilation and perfusion. Mechanism of transport of oxygen and carbon dioxide in blood, Nervous and chemical regulation of respiration, Abnormal breathing, Hypoxia, its causes and effects, Cyanosis, its causes and effects

## Clinical Module

Clinical importance of lung function tests. Causes of abnormal ventilation and perfusion. Effects on pneumothorax, pleural effusion, and pneumonia. Respiratory failure. Artificial respiration and uses & effects of O<sub>2</sub> therapy. Clinical significance of hypoxia, cyanosis, and dyspnoea

## BLOOD

Composition and general functions of blood, Plasma proteins their production and function, Erythropoiesis and red blood cell function, Structure, function, production and different types of haemoglobin, Iron absorption storage and metabolism, Blood indices, Function, production and type of white blood cells, Function and production of platelets, Clotting mechanism of blood, Blood groups and their role in blood transfusion, Complications of blood transfusion with reference to ABO & RH incompatibility, Components of reticuloendothelial systems, gross and microscopic structure including tonsil, lymph node and spleen, Development and function of reticuloendothelial system

## Clinical Module

Anemia and its different types. Blood indices in various disorders. Clotting disorders. Blood grouping and cross matching. Immunity

## SKIN AND BODY TEMPERATURE REGULATION+ SPORT PHYSIOLOGY

### **Practicals:**

#### HEMATOLOGY

Use of the microscope. Determination of haemoglobin. Determination of erythrocyte sedimentation rate. Determining packed cell volume. Measuring bleeding and clotting time. RBC count. Red cell indices. WBC count. Leukocyte count. Prothrombin and thrombin time

#### RESPIRATORY SYSTEM

Clinical examination of chest. Pulmonary volume, their capacities and clinical interpretation. Stethography

#### CARDIOVASCULAR SYSTEM

Cardiopulmonary resuscitation (to be coordinated with the department of medicine), Examination of arterial pulse, ECG recording and interpretation, Arterial blood pressure, Effects of exercise and posture on blood pressure, Apex beat and normal heart sounds

#### **RECOMMENDED TEXT BOOKS**

1. Textbook of Physiology by Guyton and Hall, Latest Ed.
2. Review of Medical Physiology by William F. Ganong, Latest Ed.
3. Physiology by Berne and Levy, Latest Ed.
4. Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards
5. Physiological Basis of Medical Practice by John B. West and Taylor, 12<sup>th</sup> Ed.

### **3. BIOCHEMISTRY I**

#### CELL

Introduction to Biochemistry, Cell: (Biochemical Aspects), Cell Membrane Structure, Membrane Proteins, Receptors & Signal Molecules

#### BODY FLUIDS

Structure and properties of Water, Weak Acids & Bases, Concept of pH & pK, Buffers, their mechanism of action, Body buffers

#### BIOMOLECULES

Amino Acids, Peptides & Proteins

Amino acids: Classification, Acid-Base Properties, Functions & Significance, Protein Structure, Primary, Secondary & Super secondary. &, Structural Motifs, Tertiary & Quaternary Structures of Proteins, Protein Domains, Classification of Proteins, Fibrous proteins (collagens and elastins) & Globular proteins

#### ENZYMES

Introduction, Classification & Properties of Enzymes, Coenzymes, Isozymes & Proenzymes, Regulation & Inhibition of Enzyme activity & enzymes inhibitors, Clinical Diagnostic Enzymology

#### CARBOHYDRATES

Definition, Classification, Biochemical Functions & Significance of Carbohydrates, Structure & Properties of Monosaccharides & Oligosaccharides, Structure & Properties of Polysaccharides, Bacterial cell Wall, Heteropolysaccharides, GAGS



## LIPIDS

Classification of Lipids, Fatty Acids: Chemistry, Classification occurrence & Functions, Structure & Properties of Triacylglycerols and Complex Lipids, Classification & Functions of Eicosanoids, Cholesterol: Chemistry, Functions & Clinical Significance, Bile acids/salts

## NUCLEIC ACIDS

Structure, Functions & Biochemical Role of Nucleotides. Structure & Functions of DNA, Structure & Functions of RNA

## MINERALS & TRACE ELEMENTS

Sources, RDA, Biochemical Functions & Clinical Significance of Calcium & Phosphorus, Sources, RDA, Biochemical Functions & Clinical Significance of Ca, Na, K, Cl, Mg, S, &P, Biochemical Functions & Clinical Significance of Fe, Cu, Zn, Mn, Mb, Se, Co, I, F

## VITAMINS

Sources, RDA & Biochemical Functions & Clinical Significance of Fat Soluble Vitamins, Sources, RDA & Biochemical Functions & Clinical Significance of Water Soluble, Vitamins

## NUTRITION

Dietary Importance of Carbohydrates, Lipids & Proteins and other dietary Ingredients. Balanced Diet. Diet in specialized conditions

## MOLECULAR BIOLOGY

Nitrogenous basis, Nucleosides and Nucleotides, Structure & Role of Nucleotide.

## TISSUE BIOCHEMISTRY

Extracellular Matrix, Collagen, Elastin and Extracellular Matrix Components, Biochemistry of Proteoglycans, Bone & Teeth, Muscle & Cytoskeleton

### **Practicals:**

Section 1: Introduction to Biochemistry

Working SOPs for a Biochemistry Practical Laboratory. Introduction to Laboratory Equipments and Techniques. Preparation of solution (Normal, Molar Equivalent solution etc).

Section 2: Physical Biochemistry

Surface Tension. Process of adsorption. Buffer Action. Practical application of Henderson-Hasselbalch's equation

Section 3: Carbohydrate

Molisch's Test & Iodine Test. Benedict's Test & Barfoed's Test. Selivanoff's Test & Phenylhydrazine Test. Sucrose Hydrolysis. Starch Hydrolysis. Schematic Identification of an unknown carbohydrate

Section 4: Proteins

Biuret Test, Heat Coagulation Test & Salt Saturation Test. Ninhydrin Test, Xanthoproteic Test & Millon-Nasse's Test. Aldehyde Test, Sakaguchi's Test & Lead Sulphide Test. Determination of Isoelectric pH of casein Protein. Schematic Identification of unknown protein

Section 5: Lipids

Emulsification of natural fat & Solubility of soap. Acrolein Test & Test for Cholesterol Iodine & Peroxide value calculation. Saponification value calculation

Section 6: Biochemical analysis of different body fluid

Sample Collection & Physical Evaluation of Urine. Analysis of Normal Urine. Analysis of Abnormal Urine

### **RECOMMENDED BOOKS**

1. Harper's Biochemistry by Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwel (Latest Edition).
2. Lippincott's Illustrated Review of Biochemistry by Pamela C. Champe and Richard A. Harvey (Latest Edition).
3. Practical Clinical Biochemistry by Varley (Latest Edition).
4. Textbook of Biochemistry by Devlin (Latest Edition).
5. Textbook of Medical Biochemistry by M.A. Hashmi (Latest Edition).
6. Biochemistry by Stryer (Latest Edition).

## **4. KINESIOLOGY**

### **INTRODUCTION TO KINESIOLOGY**

Definition of kinesiology, Definition of rehabilitation

## **MECHANICS:**

Mechanical Principles and Mechanics of Position

Force - force system – Description of units, Gravity: Center of gravity and line of gravity, Level of gravity, Equilibrium, Fixation and Stabilization

Mechanics of movement

Axes /Plane, Speed, Velocity, Acceleration, Momentum, Inertia, Friction, Lever - types – application, Pulley - types – application, Anatomical application of lever system and other pulley system application, Angle of pull

## **INTRODUCTION TO MOVEMENT**

The body levers, Forces applied to the body levers, Types of movement and posture, Patterns of movement, Timing in movement, Rhythm of movement, the nervous control of movement

## **STARTING POSITIONS**

Definition, Fundamental positions, Standing, Kneeling, Sitting, Lying, Hanging, The pelvic tilt

## **POSTURE**

Inactive postures, Active postures, The postural mechanism, The pattern of posture, Principles of Re- Education, Techniques of Re-Education, Prevention of muscles wasting, The initiation of muscular contraction, Strengthening methods, Abnormal postures

## **MUSCLE STRENGTH AND MUSCLE ACTION**

Types of Muscles contraction, Muscles tone, Physiological application to postural tone, Group action of muscles, Overview of muscle structure, Types of muscle work, Range of muscle work, Group action of muscles, Two joint muscle work, Active and passive insufficiency, Group movement of joints, Muscular weakness and paralysis

## **RANGE OF MOTION**

Active Movements

Voluntary movements

Definition, Classification

Free Exercises

Classification of free exercises, Techniques of free exercises, Effects and uses

Assisted Exercises

The principles of assistance, Technique, Effects and uses

Assisted Resisted Exercises

Resisted Exercises

The principles of resistance, Variation of the power of the muscles in different parts of their range, Techniques of resisted exercises, Resistances, Progressive resistance exercise, Progression, Effects and uses of resisted exercises

Involuntary Movement

Reflex movement, reflex arc, stretch reflex, righting reflexes, postural reflexes, Effects and uses of reflex movement

## **PASSIVE MOVEMENT**

Classification, Specific definitions, Relaxed passive movements, Principles of giving relaxed passive movements & its Effects and uses, Accessory movements, Principles of giving accessory movements and its Effects and uses, Passive manual mobilization and manipulations, Principles and Effects and uses, Controlled sustained stretching, Principles and Effects and uses.

## **RELAXATION**

Definition, Muscle tone, Postural tone, Voluntary movement, mental attitudes, Degrees of relaxation, Pathological tension in the muscles, Technique, General relaxation, Local relaxation

## **DERIVED POSITIONS**

Purpose of derived positions, Positions derived from standing By: alteration of arms, alteration of the legs, alteration of trunk & alteration of legs and trunk, positions derived from kneeling, sections derived from sitting By: alteration of the legs & by alteration of trunk, Positions derived from lying, By alteration of arms and by alteration of the legs, Positions derived from hanging, Other positions in which some of the weight is taken on the arms

## **SUSPENSION THERAPY**

Suspension application, Suspension concept of inclined planes, The fixed point suspension, Supporting rope and its types, Sling and its types, Type of suspension: axial & vertical, Methods, techniques of suspension: upper limb & lower limb, Suspension effect on muscle work and joint mobility

#### NEUROMUSCULAR CO-ORDINATION

Coordinated movement, Group action of muscles, Nervous control, Inco-ordination, Re-Education, Frenkel's exercises.

#### WALKING AIDS

Crutches, Sticks, Tripod or Quadra pod, Frames.

#### **Practicals:**

Fundamentals of muscle testing, Methods of muscle recording, Basic muscle grading system, Evaluation of posture, Regional manual muscle testing of all the regions of the body, Practical demonstrations of muscles work and its ranges, Practical demonstrations of various fundamental positions and posture analysis, Practical demonstrations of the techniques of active, passive movements, Practical demonstrations of relaxation procedures, Practical demonstrations of various derived positions

#### RECOMMENDED TEXT BOOKS:

1. Practical exercise therapy by Margaret Hollis (Latest Edition).
2. Brunnstrom's Clinical Kinesiology (Latest Edition).
3. Clinical Kinesiology and anatomy by Lynn S Lippert(Latest Edition).
4. Joint structure and function: a comprehensive analysis by: Pamela. K. Levangie and Cynthia. C. Norkin (Latest Edition).
5. Muscle function testing by: Cunningham and Daniel (Latest Edition).
6. Human movement explained by kimjonas and karenbaker(Latest Edition).
7. The principles of exercise therapy by: M Dena Gardiner (Latest Edition).

### **5. ENGLISH**

#### DETAILED COURSE OUT LINE

Comprehension; Answers to questions on a given text

Translation skills; Urdu to English

Paragraph writing; Topics to be chosen at the discretion of the teacher

Paragraph writing; Practice in writing a good, unified and coherent paragraph

Essay writing; Introduction

CV and job application; Translation skills, Urdu to English

Study skills; Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

Academic skills; Letter/memo writing, minutes of meetings, use of library and internet

How to write a proposal for research paper/term paper

How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency)

Technical report writing, Progress Report writing

#### RECOMMENDED TEXT BOOKS:

1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492
2. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506
3. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41 45-53.
4. Reading. Upper Intermediate. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
5. Writing. Upper-Intermediate by Rob Nolasco. Oxford Supplementary Skills. Fourth Impression 1992. ISBN 0 19 435406 5 (particularly good for writing memos, introduction to presentations, descriptive and argumentative writing).
6. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.
7. Reading and Study Skills by John Langan

### **6. INTRODUCTION TO COMPUTER**

Basic Definitions & Concepts

Hardware: Computer Systems & Components  
 Storage Devices, Number Systems  
 Software: Operating Systems, Programming and Application Software  
 Introduction to Programming, Databases and Information Systems  
 Networks  
 Data Communication  
 The Internet, Browsers and Search Engines  
 The Internet: Email, Collaborative Computing and Social Networking  
 The Internet: E-Commerce  
 IT Security and other issues

**RECOMMENDED TEXT BOOKS**

1. Introduction to Computers by Peter Norton, 6th International Edition (McGraw HILL)
2. Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6th Edition (McGraw HILL)
3. Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer
4. Fundamentals of Information Technology by Alexis Leon, Mathewsleon Leon press

**2<sup>nd</sup> Year**

1. Anatomy II	200 Marks
2. Physiology II	200 Marks
3. Biochemistry II	200 Marks
4. Biomechanics & Ergonomics	200 Marks
5. Islamic Studies	100 Marks
6. Pak Studies	100 Marks
<b>Total Marks</b>	<b>1000 Marks</b>

**1. ANATOMY II**

**THEORY**

**THE HEAD AND NECK**

**THE NECK:**

Muscles around the neck, Triangles of the neck, Main arteries of the neck, Main veins of the neck, Cervical part of sympathetic trunk, cervical plexus, cervical spine (Vertebrae), Joint of neck

**THE FACE:**

Sensory nerves of the face, Bones of the face, Muscles of the face, Facial nerve, Muscles of mastication, Mandible, Hyoid bone, Temporomandibular joint, Brief description of orbit and nasal cavity

**THE SKULL:**

Bones of skull, Anterior cranial fossa, Middle cranial fossa, Posterior cranial fossa, Base of skull and Structures passing through foramina

**NEURO ANATOMY**

Central Nervous System: Disposition, Parts and Functions, Brain stem (Pons, Medulla, and Mid Brain), Cerebrum, Cerebellum, Thalamus, Hypothalamus, Internal Capsule, Blood Supply of Brain, Stroke and its types, Ventricles of Brain, CSF circulation and Hydrocephalus, Meninges of Brain, Neural pathways (Neural Tracts), Pyramidal and Extra pyramidal System (Ascending and Descending tracts), Functional significance of Spinal cord level, Cranial Nerves with special emphasis upon IV, V, VII, XI, XII (their course, distribution, and palsies), Autonomic nervous system, its components and Nerve receptors

**SPINAL CORD**

Gross appearance, Structure of spinal cord, Grey and white matter (brief description), Meninges of spinal cord, Blood supply of spinal cord and Autonomic Nervous system

**ABDOMEN**

**ABDOMINAL WALL:**

Structures of anterior abdominal wall: superficial and deep muscles, Structure of rectus sheath, Structures of Posterior abdominal wall, description of Gut Tube, Lumbar spine (vertebrae), Brief description of viscera.

**PELVIS**

Brief description of anterior, posterior and lateral walls of the pelvis, Inferior pelvic wall or pelvic floor muscles, Sacrum, Brief description of perineum and Nerves of perineum.

#### **SPECIAL EMBRYOLOGY:**

Gastrointestinal system, cardiovascular system, CNS, Respiratory system

#### **SPECIAL HISTOLOGY**

Tongue, Oesophagus, Stomach, Small Intestine, Large Intestine, Major Salivary Glands, Liver, Kidneys, Pituitary / Adrenal, Thyroid / Parathyroid

#### **Practicals:**

During study, emphasis should be given on applied aspect, radiological anatomy, histological anatomy, surface anatomy and cross-sectional anatomy of the region covered in the respective year

#### **RECOMMENDED TEXT BOOKS:**

1. Gray's Anatomy by Prof. Susan Standring 39th Ed., Elsevier.
2. Clinical Anatomy for Medical Students by Richard S. Snell.
3. Clinically Oriented Anatomy by Keith Moore.
4. Clinical Anatomy by R.J. Last, Latest Ed.
5. Cunningham's Manual of Practical Anatomy by G.J. Romanes, 15th Ed., Vol-I, II and III.
6. The Developing Human. Clinically Oriented Embryology by Keith L. Moore, 6th Ed.
7. Wheater's Functional Histology by Young and Heath, Latest Ed.
8. Medical Histology by Prof. Laiq Hussain.
9. Neuroanatomy by Richard S. Snell

## **2. PHYSIOLOGY II**

### **NERVOUS SYSTEM**

General organization of the nervous system, Classification of nerve fibers, Properties of synaptic transmission, Function of neurotransmitters and neuropeptides, Type and function of sensory receptors, Function of the spinal cord and ascending tracts, Reflex action and reflexes, Muscle spindle and muscle tone, Mechanism of touch, temperature and pain., Functions of the cerebral cortex, Difference between the sensory and motor cortex and their functions, Motor pathways including pyramidal and extrapyramidal, Basal Ganglia and its functions, Cerebellum and its function, Control of posture and equilibrium, Physiology of sleep, Physiology of memory, Mechanism and control of speech, Function of the thalamus, Function of the hypothalamus and limbic system, Production of CSF.

#### **Clinical Module**

Significance of dermatomes. Injuries of the spinal cord. Hemiplegia and paraplegia.

Parkinsonism. Effects of cerebellar dysfunction.

### **REPRODUCTION**

Production and function of testosterone and Physiological changes during male puberty, Function of the female reproductive system, Production and function of oestrogen, and progesterone, Menstrual cycle, Physiological changes during female puberty and menopause.

#### **Clinical Module**

Male infertility. Female infertility. Basis for pregnancy tests.

### **GASTROINTESTINAL TRACT**

General function of gastrointestinal tract, Enteric nervous system, control of gastrointestinal motility and secretion, Mastication, Swallowing: mechanism and control, Function, motility and secretions of stomach, Function, motility and secretions of small intestine, Function, motility and secretions of large intestine, Function of GIT hormones, Mechanism of vomiting and its control pathway, Defecation and its control pathway, Functions of liver, Functions of, gallbladder and bile in digestion and Endocrine & exocrine pancreas and functions of pancreas in digestion

#### **Clinical Module**

Dysphagia. Physiological basis of acid peptic disease. Causes of vomiting. Diarrhea and constipation in clinical settings. Jaundice and liver function tests in clinical settings

### **ENDOCRINOLOGY**

Classification of endocrine glands, Mechanism of action, feedback and control of hormonal secretion, Functions of the hypothalamus, Hormones secreted by the anterior and posterior pituitary and their mechanism of action and function.. Function of the thyroid gland, Function of the parathyroid gland, Calcium metabolism and its regulation, Secretion and function of calcitonin, Hormones secreted by the adrenal cortex and medulla, and their function and mechanism of action, Endocrine functions of the pancreas, Control of blood sugar. Hormones secreted by the gastrointestinal system and their function, Function of the thymus and The endocrine functions of the kidney and Physiology of growth.

Clinical Module

Acromegaly, gigantism and dwarfism. Effects of panhypopituitarism. Diabetes insipidus. Thyrotoxicosis and myxoedema. Pheochromocytoma. Cushing's disease. Adrenogenital syndrome. Diabetes mellitus and hypoglycemia.

**BODY FLUIDS AND KIDNEY**

Components and quantitative measurements of body fluids, Fluid compartments, tissue and lymph fluid, Structure of the kidney and nephron, General function of the kidney, GFR and its regulation, Formation of urine including filtration, re-absorption and secretion, Plasma clearance., Mechanism of concentration and dilution of urine, Water and electrolyte balance with reference to the kidney, Role of the kidney in blood pressure regulation, Hormonal functions of the kidney, Acidification of urine and its importance, Acid base balance with reference to the kidney and Micturition and its control.

Clinical Module

Renal function tests and their clinical importance. Fluid excess and depletion. Renal failure and dialysis. Metabolic acidosis and alkalosis. Abnormalities of micturition.

**Practicals:**

Nervous System

Examination of superficial and deep reflexes. Brief examination of the motor and sensory system. Examination of the cranial nerves.

**RECOMMENDED TEXT BOOKS**

1. Textbook of Physiology by Guyton and Hall, Latest Ed.
2. Review of Medical Physiology by William F. Ganong, Latest Ed.
3. Physiology by Berne and Levy, Latest Ed.
4. Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards
5. Physiological Basis of Medical Practice by John B. West and Taylor, 12th Ed

### **3. BIOCHEMISTRY II**

**BIOENERGETICS**

Introduction to Bioenergetics, Biological Oxidations and Electron Transport Chain and Oxidative Phosphorylation

**METABOLISM OF CARBOHYDRATES**

Digestion & Absorption of Carbohydrates, Glycolysis & its Regulation, Citric Acid Cycle, Metabolism of Glycogen, Gluconeogenesis and regulation of blood glucose and Pentose Phosphate Pathway & its Significance.

**METABOLISM OF LIPIDS**

Digestion & Absorption of Lipids, Metabolism & Clinical Significance of Lipoproteins, Fatty acid oxidation biosynthesis and metabolism of Triacylglycerols, Metabolism & clinical Significance of Cholesterol and Metabolism of Eicosanoids

**METABOLISM OF PROTEINS & AMINO ACIDS**

Digestion of Proteins & Absorption of Amino Acids, Transamination & Deamination of Amino Acids and urea cycle and Specialized products formed from Amino Acids

Metabolism of Nucleic Acids

**MOLECULAR BIOLOGY**

Structural Organization of Chromosome and Genes. Replication, Transcription in Prokaryotes & Eukaryotes, Translation: (Genetic Code) in Prokaryotes & Eukaryotes, Translation Inhibition by Antibiotics, Regulation of Gene Expression and Recombinant DNA Technology & Polymerase Chain Reaction, Blotting Techniques.

**HORMONES**

Classification & Mechanism of Action of Hormones, Signal Transduction, Second Messengers and Receptors, Hypothalamic & Pituitary Hormones, Steroid Hormones: Glucocorticoids and Mineralocorticoids, Insulin & Glucagon and Disease related to hormones abnormalities

**Practicals:**

Techniques of Instruments in Clinical Biochemistry with examples.

Visible Spectrophotometry. Flame photometry. UV & IR spectrophotometry. Atomic Absorption spectrophotometry. pH Metry. Chromatography and determination of Amino Acids in Urine by paper chromatography

Clinical quantitative analysis in Biochemistry

Sample Collection Blood, Faces and body fluids. Serum Glucose Estimation. Glucose tolerance Test (GTT). Serum Cholesterol estimation (Total, HDL and HDL cholesterol). Serum Bilirubin Estimation (Total, Direct and Indirect bilirubins). Serum Amylase Estimation. Serum AST Estimation. Serum ALT Estimation. Serum ALP Estimation. Serum Creatine Kinase(CK) Estimation. Serum Ascorbic acid Estimation. Serum LDH Estimation. Serum Proteins Estimation (Total, Albumin & Globulin). Serum Total lipids Estimation. Serum calcium Estimation (total, ionized & unionized). Serum Uric acid Estimation. Serum Magnesium Estimation. Serum Urea Estimation. Serum Creatinine Estimation

**RECOMMENDED TEXT BOOKS:**

1. Harper's Biochemistry by Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell (Latest Edition).
2. Lippincott's Illustrated Review of Biochemistry by Pamela C. Champe and Richard A. Harvey (Latest Edition).
3. Practical Clinical Biochemistry by Varley (Latest Edition).
4. Textbook of Biochemistry by Devlin (Latest Edition).
5. Biochemistry by Stryer (Latest Edition).by Stryer, Lubert, Latest Ed

**4. BIOMECHANICS & ERGONOMICS**

Biomechanics

Basic terminology

Biomechanics, Mechanics, Dynamics, Statics, Kinematics, Kinetics and anthropometries, Scope of scientific inquiry addressed by biomechanics, Difference between quantitative and qualitative approach for analyzing human movements and Biomechanics of human bone growth and development.

Kinetic Concepts for Analyzing Human Motion

Common units of measurement for mass, force, weight, pressure, volume, density, specific weight, torque and impulse, Different types of mechanical loads that act on human body and Uses of available instrumentation for measuring kinetic quantities.

Biomechanics of Tissues And Structures of the Musculoskeletal System

Biomechanics of Bone, Biomechanics of Articular Cartilage, Biomechanics of Tendons and Ligaments, Biomechanics of Peripheral Nerves and Spinal Nerve Roots and Biomechanics of Skeletal Muscles.

Biomechanics of the Human Upper Extremity

Biomechanics of the Shoulder, Biomechanics of the Elbow, Biomechanics of the Wrist and Hand, Factors that influence relative mobility and stability of upper extremity articulation, Muscles that are active during specific upper extremity movements and Biomechanical contributions to common injuries of the upper extremity.

Biomechanics of Human Lower Extremity

Biomechanics of the Hip, Biomechanics of the Knee, Biomechanics of the ankle and foot, Factors influencing relative mobility and stability of lower extremity articulations, Adaptation of lower extremity to its weight bearing functions, Muscles that are active in specific lower extremity movements and Biomechanical contribution to common injuries of the lower extremity.

Biomechanics of Human Spine

Biomechanics of the Lumbar Spine, Biomechanics of the Cervical Spine, Factors influencing relative mobility and stability of different regions of Spine, Biomechanical adaptations of spine during different functions, Relationship between muscle location and nature and effectiveness of muscle action in the trunk, Biomechanical contribution to common injuries of the spine

applied biomechanics

Introduction to the Biomechanics of Fracture Fixation, Biomechanics of Arthroplasty, Engineering Approaches to Standing, Sitting, and Lying and Biomechanics of Gait.

Human Movement in Fluid Medium

The nature of fluids, Buoyancy and floatation of human body, Drag and components of drag, Lift Force and Propulsion in a fluid medium

Ergonomics

Overview And Conceptual Framework.

Ergonomics and Therapy: An Introduction, A Client-Centered Framework for Therapists in Ergonomics, Macroergonomics.

Knowledge, Tools, and Techniques.

Anthropometry, Psychosocial Factors in Work-Related Musculoskeletal Disorders, Physical Environment and Human Factors in Medical Rehabilitation Equipment: Product Development and Usability Testing.

Special Considerations

Lifting Analysis, Seating and Computers and Assistive Technology.

Application Process

Ergonomics of Children and Youth

### **Practicals:**

- Biomechanical assessment of Upper extremity
- Biomechanical assessment of Lower Extremity
- Biomechanical assessment of Gait
- Reflective case assignment related to biomechanics of various regions of the body
- Measurement of angles of joints
- Biomechanical study of deformities
- Fundamentals of Goniometry: Introduction to Goniometry, Basic concepts in Goniometry, Joint motion, Range of motion, Factors affecting ROM, End-feel, Capsular and non capsular pattern of ROM limitation, Procedures, Positioning, Stabilization, Measurements Instruments, Alignment, Recording, Procedures
- Procedural Goniometry: Measurement of upper extremity, lower extremity, temporomandibular joint, cervical spine, thoracic spine and lumbar joint ROM.

### **RECOMMENDED TEXT BOOKS**

1. Basic biomechanics of musculoskeletal system By: Nordin & Frankel, 3<sup>rd</sup> edition.
2. Basic Biomechanics, By: Susan J. Hall 4<sup>th</sup> edition.
3. Additional study material as assigned by the tutor.
4. Ergonomics for the therapist by Karen Jacobs 3<sup>rd</sup> edition mosby and Elsevier publishers

### **5. ISLAMIC STUDIES**

Fundamental Beliefs and Practices of Islam.

Tauheed (Unity of Allah), Risalat (Finality of the Prophet-hood). Akhirat (Day of Judgement)., Salat, Soum, Zakat, Hajj and Jihad

Need of Religion and its Role in Human Life.

Morality in Islam.

Concept of morality, Concept of morality and Faith., Islamic principles and methods of character building., Moral values in Islam.

Rights of the individual in Islam.



Quran as a guide for the modern society and scientific development.

Holy prophet (peace be upon him) and his life.

Islamic concept of state.

Islam and society.

Role of man and women in society, Rights of women children in Islam. Concept of woman's freedom in Islam., Hukook-ul-Ibad.

Importance of rizk-e-hilal.

Contribution of Islamic scholars in science and medicine.

#### RECOMMENDED BOOKS

1. Introduction to Islam by Dr.Hamidullah.
2. Islam: Its meaning and message by Khurshid Ahmad

3. اسلام کی نظر میں مولانا صدرالدین اصلاحی

4. قرآن اور تعمیر سیرت ڈاکٹر میر ولی الدین

#### **6. PAKISTAN STUDIES**

Ideology of Pakistan.

Definition and elucidation. Historical aspect. Ideology of Pakistan in the light of speeches and sayings of Allama Iqbal and Quaide-Azam.

Pakistan Movement

Basis for the creation of Pakistan. Historical developments: 1857-1947

Political Developments in Pakistan since 1947

Land and people of Pakistan

Geography, Society., Culture., Natural resources., Health and education with reference to characteristics trends and problems.

#### RECOMMENDED BOOKS

1. Ideological Orientations of Pakistan by Sharif Al Mujahid.
2. Struggle for Pakistan by I.H. Qureshi.
3. The Making of Pakistan by Richard Symond

#### **3<sup>rd</sup> Year:**

- |   |           |
|---|-----------|
| 1. Pharmacology   | 200 Marks |
| 2. General Pathology & Microbiology                           | 200 Marks |
| 3. Physical Agents & Electrotherapy including Medical Physics | 200 Marks |
| 4. Therapeutic Exercises and Techniques & Manual Therapy      | 200 Marks |

**Total Marks 800 Marks**

#### **1. PHARMACOLOGY**

General Pharmacology: Introduction, Sources of drugs, Active principles of crude drugs, Physical nature/ classification/ nomenclature of drugs, Nature of drugs, Routes of drugs of administration, Pharmacokinetics, Principle types of drug actions, Pharmacodynamic receptors, Dose response curve, Pharmacokinetics absorption & distribution, Quantal DRC + therapeutic index, Drug dosage, Factors modifying actions & dosage of drugs, Complex drug reactions, Cumulative drug reactions, Pharmacogenetics, Adverse drug effects, Teratogenicity + carcinogenicity, Adverse drug effects, Drug toxicity (blood & skin), Biotransformation, Drug toxicity, Interactions of drugs, Bioavailability + plasma conc. of drug, Development of new drug, Development of new drug II & evaluation, Drug dependence, Kinetics of Metabolisms. Systemic Pharmacology: Autonomic nervous system, Autacoids, Blood, Gastrointestinal tract, Kidney, Musculo Skeletal, Endocrine, Respiratory System, Cardiovascular system, Central Nervous System, Chemotherapy.

#### **PRACTICALS**

A -Experimental Pharmacology

Mixtures, KMNO<sub>4</sub> lotion, Replacement Fluids & dehydration (Normal saline, half normal saline, ringer solution, dextrose solution), ORS powder. Experiments designed to observe the action of drugs on animals and isolated tissue. Experiments on the actions

of selected drugs to be demonstrated to the students. Effects of drugs on rabbit's eye, Effects of Acetylcholine and Atropine on isolated rabbit's ileum, Effects of histamine and antihistamines on isolated rabbit's ileum, Schemes to find out unknown drug having stimulatory or inhibitory effect on isolated rabbit's ileum, Methodology of clinical trials, Introduction to Biostatistics.

## B. Prescription Writing

General principles

Guideline for rational use of drugs

Prescription writing for common ailments

Acute watery diarrhea, Bacillary dysentery, Amoebic dysentery, Ascariasis, Tape-worm, infestation, Acute streptococcal pharyngitis, Iron deficiency anemia, Allergic rhinitis, Scabies, Acute malarial fever, Cerebral malaria, Typhoid fever, Bronchial asthma, Hypertension, Migraine, Cardiac failure, Shock

Recommended Book:

- I. Illustrated Reviews of Pharmacology by Lippincott. Basic & Clinical Pharmacology by Katzung

## 2. GENERAL PATHOLOGY & MICROBIOLOGY

### i. GEN. PATHOLOGY

Cell Injury and Death: Causes of cell injury, Necrosis, Apoptosis and Sub cellular responses. Cell Adaptations: Hyperplasia, Hypertrophy, Atrophy, Metaplasia and Intracellular accumulation. Inflammation: Acute inflammation. Vascular events, Cellular events and Chemical mediators. Chronic Inflammation. General, Granulomatous and Morphologic patterns of acute and chronic inflammation. Healing and Repair:

Normal controls, Repair by connective tissue and Wound healing. Haemodynamic Disorders. Edema, Hyperemia / congestion, Hemorrhage, Thrombosis, Embolism, Infarction and Shock. Diseases of Immunity. General features, Hypersensitivity reactions, Immune deficiencies, Autoimmunity and Amyloidosis. Neoplasia: Nomenclature, Molecular basis, Carcinogenic agents and Clinical aspects

### ii. MICROBIOLOGY

#### Basic Bacteriology

Bacteria Compared with Other Microorganisms, Structure of Bacterial Cells, Growth, Genetics, Classification of Medically Important Bacteria, Normal Flora, Pathogenesis,, Host Defenses, Laboratory Diagnosis, Antimicrobial Drugs: Mechanism of Action, Antimicrobial Drugs: Resistance, Bacterial Vaccines, Sterilization & Disinfection, Biosafety and bio risk management,

#### Clinical Bacteriology

Overview of the Major Pathogens & Introduction to Anaerobic Bacteria. Gram-Positive Cocci; Staphylococcus aureus, Streptococcus pyogenes, Staphylococcus epidermidis, Staphylococcus saprophyticus, S. pyogenes, Streptococcus agalactiae, Enterococcus faecalis, Viridans streptococci, Streptococcus bovi and S. pneumoniae

Gram-Negative Cocci; Neisseria meningitidis and Neisseria gonorrhoeae.

Gram-Positive Rods; Bacillus anthracis, Bacillus cereus, Clostridium tetani, Clostridium botulinum, Clostridium perfringens, Clostridium difficile, Corynebacterium diphtheriae and Listeria monocytogenes.

Gram-Negative Rods Related to the Enteric Tract; E. coli, Salmonella species, Shigella species, Vibrio cholerae, Vibrio parahaemolyticus, Vibrio vulnificus, Campylobacter jejuni, Helicobacter pylori, Klebsiella, Enterobacter, Serratia, Proteus, Providencia, Morganella, Pseudomonas spp., Bacteroides & Prevotella.

Gram-Negative Rods Related to the Respiratory Tract; Haemophilus influenzae, Bordetella pertussis, and Legionella pneumophila

Gram-Negative Rods Related to Animal Sources (Zoonotic Organisms); Brucella species, Francisella tularensis, Yersinia pestis, and Pasteurella multocida

Mycobacteria, Actinomycetes, Mycoplasmas, Spirochetes, Chlamydiae, Rickettsiae, Minor Bacterial Pathogens

#### Basic Virology

Structure, Replication, Genetics, Classification of Medically Important Viruses, Pathogenesis, Host Defenses, Laboratory Diagnosis, Viral Vaccines.

### Clinical Virology

Herpes Viruses, Rabies Virus, Polio Virus, Hepatitis Viruses, Human Immunodeficiency Virus, Dengue Virus.

### Mycology

Basic Mycology, Cutaneous & Subcutaneous Mycoses, Systemic Mycoses, Opportunistic Mycoses,

### Parasitology

Intestinal & Urogenital Protozoa, Blood & Tissue Protozoa, Minor Protozoan Pathogens, Cestodes, Trematodes, Nematodes.

Sterilization

Laboratory Exercises:

Each lecture will be followed by two hour practical class where the student will apply their theoretical knowledge in the understanding of related microbiological investigations, which have been proved useful for the diagnosis of human diseases.

During the other laboratory sessions, the students will be engaged in the preparation of media, the sterilization of glass ware, Antigens, Antibodies, Vaccines – haemolysin, permanent slides, laboratory reagents and also to assisting postgraduate students in the isolation of micro – organisms from clinical materials.

### **Practicals:**

- Acute Inflammation
- Chronic Inflammation
- Necrosis
- Gangrene
- Pigmentation
- Calcification
- Urine Examination
- Sterilization
- Culture Media
- Antibiotic Sensitivity testing
- Culturing bacterial pathogens
- Examination of different clinical specimens
- Blood Culture
- Anaerobic Culture
- Gram Staining
- ZN Staining
- Biochemical tests to identify bacteria (Conventional, API 20E, API 20NE, Automated systems)
- PCR
- KOH preparation for scraping
- Stool Examination
- ELISA

### RECOMMENDED BOOKS

- i. Basic Pathology by Robbins Latest Edition
- ii. Clinical Pathology Interpretations by A.H. Nagi
- iii. Pocket Companion to Robbins, Pathologic basis of disease Cotran, Kumar
- iv. Theory and Practice of Histological Techniques by John D Bancroft

### **3. PHYSICAL AGENTS & ELECTROTHERAPY INCLUDING MEDICAL PHYSICS**

#### **i. PHYSICAL AGENTS & ELECTROTHERAPY**

Introduction & General Consideration of Electrophysics

Types of current used

Low Frequency Current

Medium Frequency Current:

High Frequency Current:

Faradic Current

Sinusoidal Current

Detailed description of sinusoidal current, Treatment and Methods of application

## Galvanic Current

- Constant galvanic current
  - Detailed description of galvanic current treatment, Methods of application, Dangers, precautions, contraindications & Ionization

## Medical Ionization

### Modified Galvanic Current

Definition, Physical effects, Therapeutic effects, Uses, Treatment techniques & methods of application, Electrical stimulation of nerve & muscle

- A nerve impulse & Property of accommodation

Electrical Reactions, Normal & abnormal reactions of nerve & muscle to faradism & interrupted direct current

- Changes in electrical reaction in
  - Upper motor neurons, Lower motor neurons & Muscular disease
- Methods of electrical test
  - Faradic & I.D.C test,
  - Strength duration curve
  - Accomodity test
  - Electromyography
  - Definition, method, value, uses of E.M.G, Electromyography & temperature , feedback technique

## Transcutaneous Electrical Stimulation (Tens)

Definition, Theoretical basis of pain, Equipment selection, Electrode placement and Clinical indications

## MEDIUM FREQUENCY CURRENT:

Interferential Current, Introduction, physical principles, electro-physiological effects, Clinical applications, methods of application and Treatment consideration & contraindications

## Physics of Heat and Radiation

Definition of heat and temperature, Physical effects, Transmission of heat, Radiant energy electromagnetic spectrum its production & properties and Laws governing radiation

## Infra-Red Rays

Definition, Production, luminous & non-luminous generators, Physiological effects, Therapeutic effects, Uses, Techniques of application and Dangers and contraindications

## Ultra Violet Rays

Production, U.V. rays, Mercury Vapor Lamp: Air cooled mercury vapor lamp & Kromayer lamp, Fluorescent Tubes and Penetration of rays into the skin, Physiological effects (local & general), Therapeutic effects and Sensitizers, Assessment of doses, Test dose, Techniques of local and general radiation with special techniques of treatment of wounds, Techniques with compression, Dangers & precautions and Contraindications

## Heliotherapy

Introduction, Effects, Uses and dangers and contraindications

## Ultrasonic Therapy

Introduction, Production, Physiological & therapeutic effects, Uses, dangers, precautions & contraindications and Techniques and application of treatment

## Cryotherapy

Definition, Methods, Physiological & therapeutic effects and Dangers, indications and precautions

## Hydrotherapy

Physiological principles of hydrotherapy, Application of heat & cold, Outline of methods of applying moist heat, Medium used, contrast bath, paraffin baths, whirlpool baths,

techniques, effects, uses, dangers, contraindications of each, The use of water as medium of each, the use of water as a medium of movement pool therapy, Immersion baths, full, plain and medicated, partial baths, packs, general local methods of application, Hot air, vapors, the care of patients in hydrological department and Detailed description of indication of hydrotherapy

Traction

Effects of spinal traction, Clinical indications for the use of spinal traction, Contraindications and precautions for spinal traction, adverse effects of spinal traction and Application technique

Compression

Effects of External Compressions, Clinical indications for the Use of External Compression, Contraindications and Precautions of External Compression, Contraindications for the Use of Intermittent or Sequential Compression Pumps, Precautions for the Use of Intermittent or Sequential Compression Pumps, Adverse Effects of External Compression and Application Techniques

Laser therapy:

Definition, Properties of laser, Production of Lasers, Types of Lasers, Techniques of application, Dosage parameters, Interaction of laser with body tissues, Physiological and therapeutic effects of lasers, Dangers and contraindications and Methods of Treatment

## **ii. MEDICAL PHYSICS**

Electricity and Magnetism:

Structure of an atom, Electron Theory, Conductors & Insulations, Conduction & Convection, Displacement Current.

Static Electricity

Charging by conduction and Induction, Electrostatic Fields, Gold leaf Electroscope, Capacitors, types of capacitors, Construction, Units, Arrangement of Capacitors in series and parallel, Charging and discharging of capacitors, Oscillating Discharge of Capacitors.

Current Electricity

Ohm's Law. Electrical Components and their unit, Resistance, Types of Resistance, Units, Chemical effects of a Current, Types of Current, Cell and Batteries, Combination of Cells in series and parallel, Thermal effects of current, Electrolysis and Electrolytic burns, Ionization of gases and Thermionic emission, Electronic tubes, Diodes and Triodes

Electromagnetism:

Molecular theory of magnetism, Magnetic effect of an electric current, Moving coil volt meter and Ammeter, Moving iron type, Electromagnetic induction, Faradays law and Lenses law, Mutual and self Induction, Eddy currents, Transformer, Construction and types, Static and auto Transformer, Dynamo, construction and A.C & D.C Dynamo.

Electro mechanics:

Current for treatment, Rectification, Rectification of A.C, Half wave and full wave Rectification, Valve Rectification Circuits and Metal Rectifier,.

Classification of currents (overview)

Low frequency current

Sinusoidal current. Faradic current, Galvanic current (constant and interrupted), Diadynamic current TENS, Smart Bristow faradic coil.

Medium Frequency Current

Interferential current and Russian current

High Frequency Current Waves

Waves, Transistors and Long waves, medium waves short waves micro waves

Sound Waves  
Heat Waves  
Electromagnetic Radiation  
Safety in Biomedical Instruments  
Radiation Protection

**Practicals:**

The practical training will be practiced in Physical Therapy treatment ward under the supervision of qualified physiotherapists

Location of motor points, Faradic & I.D.C test, Strength duration curve, determination of Rheobase and Chronaxie, Accomodity test, Electromyography, Definition, method, value, uses of E.M.G, Electromyography & temperature, feedback technique, Practical application of TENS in physical therapy treatment ward, Reflective clinical case studies, Iontophoresis, Practical application of Infra red rays, Practical application of ultrasound including Phonophoresis, Supervised application of Ultraviolet rays including determination of test dosage, Practical application of cold packs, Practical application of traction, Paraffin Wax bath application Demonstration of techniques during practical classes, later on techniques practiced by students on patients attending the department under supervision of trained

Note: The students are expected to make a record of his/her achievements in the log book. The log book is a collection of evidence that learning has taken place. It is a reflective record of achievements.

The log book shall also contain a record of the procedures which student would have performed/observed.

**Recommended Text Books:**

1. Clayton's Electrotherapy and Actinotherapy, 10<sup>th</sup> edition by PM Scott
2. Electrotherapy: Evidence based Practice, 11<sup>th</sup> edition by Shelia Kitchen
3. Michelle H Cameron's Physical Agent in Rehabilitation: From research to Practice
4. Electrotherapy and Electrodiagnosis by S. Lient
5. Applications of Shortwave Diathermy by P.M. Scott
6. Practical Electrotherapy by Savage
7. Clayton's Electrotherapy and actinotherapy by: PM Scott
8. Medical physics for physical therapists by: AD Moore
9. Preliminary Electricity for Physiotherapists by B. Savage.
10. Basic Electronics by Grob.
11. Principles of Bio-instrumentation by Richard A. Normann.
12. Hand book of Biomedical Instrumentation by R.S. Khanpur.
13. Basic Radiation Protection Technology by Gollnick

**4. THERAPEUTIC EXERCISES AND TECHNIQUES & MANUAL THERAPY**

**i. THERAPEUTIC EXERCISES AND TECHNIQUES**

Therapeutic Exercise: Foundational Concepts

Therapeutic exercise: impact on physical function, Process and models of disablement, Patient management and clinical decision making: an, Interactive relationship:, Strategies for effective exercise and task-specific and Instruction:

Prevention, Health, and Wellness

Role of physical therapy in healthy people

Applied Science of Exercise and Techniques

Range of Motion

Types of ROM exercises, Indications and goals for ROM, Limitations of ROM exercises, Precautions and contraindications to ROM exercises, Principles and procedures for

applying ROM Techniques, ROM techniques, Self-assisted ROM, Continuous passive motion and ROM through functional patterns

#### Stretching for Impaired Mobility

Definitions of terms related to mobility and stretching, Properties of soft tissue—response to immobilization and stretch, Determinants, types, and effects of stretching interventions, Procedural guidelines for application of stretching interventions, Precautions for stretching, Adjuncts to stretching interventions, Manual stretching techniques in anatomical planes of motion.

#### Peripheral Joint Mobilization

Definitions of terms; mobilization/manipulation, self-mobilization (auto-mobilization), mobilization with movement, physiological movements, accessory movements, thrust, manipulation under anesthesia, muscle energy, Basic concepts of joint motion: arthrokinematics, Indications for joint mobilization, Limitations of joint mobilization techniques contraindications and precautions, Procedures for applying passive joint mobilization techniques, Mobilization with movement: principles of application and Peripheral joint mobilization techniques including Shoulder Girdle Complex, Elbow and Forearm Complex, Wrist Complex, Hand and Finger Joints, Hip Joint, Knee and Leg, Ankle and Foot Joint

#### Resistance Exercise for Impaired muscle Performance

Muscle performance and resistance exercise—definitions and guiding principles, Skeletal muscle function and adaptation to resistance exercise, Determinants of an exercise program , Exercise program, Physiological changes that occur with training, Determinants of resistance exercise, Types of resistance exercise, General Principles Of Resistance Training, Precautions For Resistance Exercise, Contraindications to resistance exercise, Manual resistance exercise; definition and use, guidelines and special considerations, techniques—general background, upper extremity, lower extremity, Proprioceptive neuromuscular facilitation—principles and Techniques, Diagonal patterns, basic procedures with PNF patterns, upper extremity diagonal patterns, lower extremity diagonal patterns, specific techniques with PNF, Mechanical resistance exercise; use in rehabilitation, use in conditioning programs, special considerations for children and older adults, Selected resistance training regimens and Equipment for resistance training.

#### Principles of Aerobic Exercise

- Application of principles of an aerobic conditioning program for the patient with coronary disease; inpatient phase
  - (phase i) outpatient phase
  - (phase ii) outpatient program
  - (phase iii) special considerations, adaptive changes
- Applications of aerobic training for the de-conditioned individual and the patient with chronic illness
- Age differences; children, young adults, older adults

#### Aquatic Exercise

Background and principles for aquatic exercise, Definition of aquatic exercise, Goals and indications for aquatic exercise, Precautions and contraindications to aquatic exercise, Properties of water, Aquatic temperature and therapeutic exercise, Special equipment for aquatic exercise, Exercise interventions using an aquatic environment stretching exercises, Strengthening Exercises and Aerobic Conditioning.

#### **Practicals:**

Practical demonstration of ROM techniques, Practical demonstration of stretching techniques, Practical demonstration of resisted exercise techniques, Practical demonstration of peripheral joint mobilization techniques, Aerobic exercises, Balance

training, Hydrotherapy. Reflective clinical case studies and Supervised and independent Practical application of therapeutic techniques on patients in outdoor and indoor Physical Therapy treatment settings.

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The log book shall also contain a record of the procedures which student would have performed/observed.

#### Recommended Text Books

1. Therapeutics Exercises and Technique, By: Carolyn Kisner& Lynn Allen Colby 4<sup>th</sup> 5<sup>th</sup> edition.
2. Therapeutics Exercises: Techniques for Intervention By: WillimD.Banddy
3. Clinical decision making in therapeutic exercise By: Patricia e. Sullivan & prudence d. Markos, Appleton & Lange Norwalk, Connecticut

#### **ii. MANUAL THERAPY**

Course description:

Through the utilization of instruction, demonstration, practical exercises, research article critical review and case study discussions and presentations this course will provide the best evidence in state of the art advanced manual therapy A detailed overall review of all Manual Therapy techniques, along with manual therapy techniques covering spine and Temporo-Mandibular joint, will take place. Techniques covered are: advanced myofascial trigger point therapy, Proprioceptive training, muscle energy combination techniques, strain counter strain, neuromobilization combination techniques and mobilization, manipulation techniques with emphasis on thrust manipulation. Thorough evaluation, assessment and technique selection training will take place utilizing evidence based models such as APTAs “Open Door” and “Hooked in Evidence” programs All skills will be introduced through on-site demonstration and hands-on practice Students will also get significant exposure in critical review of research articles pertaining to application of manual therapy techniques Case review, discussion and case presentations are an important component of this course

Introduction to Manual Therapy

OMT (Orthopedic Manual Therapy) Kaltenborn-Evjenth Concept

History, Special features and Overview.

Principles

Spinal Movement

The mobile segment, Spinal range of movement, Joint positioning for evaluation and treatment, Three-dimensional joint positioning

- Resting position, Actual resting position & Nonresting positions
- Joint locking
- Bone and joint movement
- Rotations of a vertebral bone
  - Standard bone movements, Combined bone movements, Coupled movements & Noncoupled movements
- Joint roll-gliding associated with bone rotations
  - Joint roll-gliding & Abnormal roll-gliding
- Translation of vertebral bone
- Joint play associated with bone translation

Translatory Joint Play

The Kaltenborn Treatment Plane, Translatory Joint Play Movements, Determining the direction of restricted gliding, Glide test, Kaltenborn Convex-Concave Rule, Grades of translatory movement, Normal grades of translatory movement (Grades I - III)

- Palpating resistance to normal movement

Pathological grades of translatory movement and Using translatory grades of movement

Tests of Function

- Principles of function testing



- Assessing quantity of movement
  - Measuring rotatoric movement with a device &
  - Manual grading of rotatoric movement
- Assessing quality of movement
  - Quality of movement to the first stop
  - End-feel: Quality of movement after the first stop
- Elements of function testing
- Active and passive rotatoric movements
  - Testing rotatoric movement
  - Localization tests
  - Differentiating articular from extra-articular dysfunction
  - Differentiating muscle shortening from muscle spasm
- Translatory joint play tests
- Resisted movements
- Passive soft tissue movements
- Additional tests

#### OMT Evaluation

- Goals of the OMT evaluation, Physical diagnosis, Indications and contraindications, Measuring progress, Elements of the OMT evaluation, Screening exam
- Detailed exam
  - History, inspection, Tests of function, Palpation & Neurologic and vascular tests
- Medical diagnostic studies & Diagnosis and trial treatment

#### Spinal Joint Mobilization

- Goals of joint mobilization
- Mobilization techniques
- Pain relief mobilization
  - Pain-relief traction mobilization (Grade I -IISZ), Vibrations and oscillations
- Relaxation mobilization
  - Relaxation-traction mobilization (Grade I -II)
- Stretch mobilization
  - Stretch-traction mobilization (Grade III), Stretch-glide mobilization (Grade /)
- Manipulation
- If traction exacerbates symptoms
- A voiding high-risk manual treatment
  - Rotation mobilization, Joint compression

#### OMT Treatment

- Elements of OMT
- Treatment to relieve symptoms
  - Immobilization, Thermo-Hydro-Electric (T-H-E) therapy, Pain-relief mobilization & Special procedures for pain relief
- Treatment to increase mobility
  - Soft tissue mobilization, Passive soft tissue mobilization, Active-facilitated soft tissue mobilization, Muscle stretching principles, Joint mobilization to increase mobility & Neural tissue mobilization
- Specialized exercise to increase mobility
- Treatment to limit movement
- To inform, instruct and train
- Research

#### Spinal Syndromes

Introduction of kellenborn spinal syndromes with neurological evaluation through key muscles, upper & lower cross syndromes and Mackenze's three syndromes.

#### Manual Therapy Assessment

The Maitland's and Mulligan concept, Subjective examination, Physical examination, Examination of the temporomandibular joint, Examination of the upper cervical spine,

Examination of the cervicothoracic spine, Examination of the thoracic spine and Examination of the lumbar spine

The Subjective Examination Step by Step

Introduction, Body chart, Behavior of symptoms, Special questions, History of the present condition (HPC), Past medical history (PM H), Social and family history (SH, FH), Plan of the physical examination, Case scenarios, Counterfeit clinical presentations

Physical Examination Step by Step

Introduction, Observation, Joint tests, Muscle tests, Neurological tests, Special tests, Functional ability, Palpation, Accessory movements, Completion of the physical examination.

Techniques used in Manual Therapy

Principles

Learning manual techniques, Applying manual techniques, Objective

- Starting position
  - Patient's position & Therapist's position
- Hand placement and fixation/stabilization
  - Grip, Therapist 's stable hand & Therapist's moving hand
- Procedure
  - Joint pre-positioning, Mobilization technique & Symbols
- Recording
- Identifying an intervertebral segment
- The Star Diagram

Physiotherapy related with following Joints

1. Sacroiliac Joint
2. Lumbar Spine;
3. Thoracic Spine;
4. Cervical Spine;
5. Upper Cervical Spine;

Jaw Tests and Mobilization;

Spinal Mobilizations Mulligan

The Cervical and Upper Thoracic Spines

Nags, Reverse Nags, Snags, Self Snags, Spinal Mobilization with arm movement the Upper Cervical Spine Special Techniques

The acute Wry Neck, Headaches, Vertigo, Nausea and Other Vertebral Artery Signs

The Lumbar Spine

Snags and Self Snags

Integrative Manual Therapy

Postural Compensations of the spine, Muscle Energy and 'Beyond' Technique for the spine, Treatment of spine Hypertonicity for Synergic Pattern, Release with Strain and Counter strain Technique, Myofascial Release, Tendon Release Therapy for Treatment of Tendon Tissue Tension with Advanced Strain and Counter strain Technique, Ligaments: a Tensile Force Guidance System: Treatment with Ligament Fiber Therapy and Procedures and Protocols to correct spinal Dysfunction with Integrative Manual Therapy

**Practicals:**

In the laboratory sessions, Supervised evaluation and manual therapy treatment techniques will be demonstrated and practiced, including joint and soft-tissue mobilization, manipulations, and posture and movement retraining in the physiotherapy clinic/Ward and Orthopaedic clinic/Ward, Indoor as well as outdoor. Various reflective case studies related to manual therapy of the spine and TM joint will be assigned to the students.

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It is a reflective record of achievements. The log book shall also contain a record of the procedures which student would have performed/observed.

Recommended Text Books

1. Manual Mobilization of the Joints The Kaltenborn Method of Joint Examination and Treatment Volume I The Extremities By: Freddy M. Kaltenborn in collaboration with Olaf Evjenth, Traudl Baldauf Kaltenborn, Dennis Morgan, and Eileen Vollowitz, OPTP Minneapolis, Minnesota, USA.
2. Manual Therapy By: Ola Grimsby, the Ola Grimsby institute San Diego.
3. Integrative Manual therapy for the upper and lower extremities By: Sharon weiselfish, North Atlantic books Berkeley, California.
4. Orthopedic manual therapy an evidence-based approach by: Chad Cook
5. Orthopaedic Manual Therapy Diagnosis Spine and Temporomandibular Joints By: Aad van der
6. Translatory Spinal Manipulation By: John R. Krauss, Olaf Evjenth, and Doug Creighton John R. Krauss A Lakeview Media L. L.C. Publication
7. Neuromusculoskeletal Examination and Assessment A Handbook for Therapists
8. By: Nicola J Petty, Ann P Moore & G D Maitland, Second Edition Churchill Livingstone
9. Myofascial Manipulation Theory and Clinical Application, Second Edition By: Robert I. Cantu, Alan J. Grodin an Aspen Publication Aspen Publishers, Inc. Gaithersburg, Maryland 2001
10. Maitland's Vertebral Manipulation Seventh Edition By: Geoffrey D. Maitland
11. Musculoskeletal manual medicine, diagnosis and treatment by Jiri Dovark, Vaclav Dovark, Werner Schneider etc

#### 4<sup>th</sup> Year

1. Community Health, Research Methodology, Social & Behavioral Sciences	100 Marks
2. Special Pathology	200 Marks
3. Physical Therapy in Medicine	200 Marks
4. Physical Therapy In Surgery Including Radiology & Diagnostic Imaging	200 Marks
5. Clinical Decision Making & Differential Diagnosis	100 Marks
6. Physical Therapy Treatment & Techniques-I <i>(Musculoskeletal, Sports, Gerontology including Geriatric, Paediatric Physical Therapy and Supervised Clinical Practices I)</i>	200 Marks
<b>Total Marks</b>	<b>1000 Marks</b>

### 1. **COMMUNITY HEALTH, RESEARCH METHODOLOGY, SOCIAL & BEHAVIORAL SCIENCES**

#### i. **Community Health**

Introduction; History of Community Medicine, Definition, concept of Health & illness of diseases and Natural History of diseases, levels & prevention  
 Environmental Sanitation & Medical Entomology; Water, waste disposal and Environmental problems & pollution  
 Genetics; Prevention of genetic diseases and Genetic counseling  
 General and Descriptive Epidemiology; Time, Place and Person  
 Analytical Epidemiology; Case control and Cohort studies  
 Experimental Epidemiology Randomized Control Trial.  
 Systemic Epidemiology; Vector borne diseases, Water borne diseases, Air born diseases, Contact diseases and Diseases of major public health and its importance along with national health programs wherever Applicable.  
 Non-Communicable Diseases; Diabetes, Hypertension, Heart diseases, Blindness, Accidents, Geriatric problems  
 Occupational Health Problems; M.C.H. and family welfare Programs, Health care delivery in the community, National Health Policy, National Health programs including, Rehabilitation, Evaluation of Health, Programs, Health Planning Organization, Community Nutrition; Foundation and status in Pakistan masses. Community nutrition programs: key features, benefits, planning, implementation, evaluation. Nutritional status assessment: Anthropometric, Dietary, Biochemical, Clinical measurements. Community Nutrition and Dietetics profession. Steps of nutritional epidemiological study, Testing and Piloting of nutritional epidemiological study, Questionnaire design. Evaluation, sources of variation in the dietary intake, Methodological studies on dietary questionnaires.

Structure of Health Care System In The Country; P.H.C. district level, State level and central level. P.H.C. Organization and Function and Role of Non Governmental Organization

Health Education; Principles of Health Promotion, Methods, approaches and media for, I.E.C (Information, Education & Communication), Medical and Health/Information system, Mental Health and Nutrition.

Teaching Methodology; Types of health services, public, private, scientific, traditional health system, Organization of public services in health, central, provincial and local levels, Levels of health care, primary, secondary and tertiary, Planning and Organization of health services, Implementation, Evaluation of health services, Management of resources in health services, Financial management, Health education and social cultural concept Ethics in Health Services, Theories of learning facilitations.

## **ii. Research Methodology**

Research Fundamentals; Research, Theory in Research, Research Ethics

Research Design; Research Problems, Questions, and Hypotheses, Research Paradigms, Design Overview and Research Validity

Experimental Designs; Group Designs and Single-System Design

Non Experimental Research; Overview of Non experimental Research, Clinical Case Reports, Qualitative Research, Epidemiology, Outcomes Research and Survey Research.

Measurement; Measurement Theory and Methodological Research.

Data Analysis; Statistical Reasoning, Statistical Analysis of Differences; The basics, Statistical Analysis of Differences; Advanced and special Techniques, Statistical Analysis of Relationships; The basics and Statistical Analysis of Relationships; Advanced and special Techniques

Implementing Research; Implementing a Research Project and Publishing and Presenting Research

## **iii. Social & Behavioural Sciences**

Introduction of Sociology

Social Action And Interaction; Social processes, Co-operation, Competition, Conflict and Accommodation.

Social Groups; Primary-Secondary, In and Out Group and Reference group

Culture; Values, Beliefs, Sanctions, Cultural relativism and Ethnocentrism, Norms, Folk ways, Conflict, Deviancy and Social control.

Socialization and Personality formation

Social Institution; Meanings, Social stratification and Meanings and Forms (Classes and Castes)

Social and Cultural Change; Factors promoting and resisting social change

The Field Of Medical Sociology; Contribution of Sociology in Health. Environmental pollution and Health, Patient, Healthcare provider relationship. Role of Healthcare provider and attendants in the managements of patient.

Introduction of Behavioural Sciences; Understanding Behaviour. Sensation, sense organs / special organs, Perception and factors affecting it, Attention, concentration, Memory, types and methods to improve it, Types and theories of thinking, Cognition and levels of cognition, Problem solving and decision making strategies, Communication Its types.

Personality and Intelligence; Psychological growth and development, Personality, theories and Factors affecting personality development, Assessment of personality Influence of personality in health, disease, hospitalization, stress, etc, Intelligence and its types Relevance of IQ and EQ Methods of enhancing EQ and IQ Factors affecting intelligence and their assessment

Stress Management

Doctor – Patient Relationship; Concept of boundaries and psychological reactions in doctor – patient relationship.

Pain, Sleep and Consciousness; Concept of pain, sleep and consciousness, Attend states of consciousness, Psychological influence on sleep and consciousness, Non-pharmacological methods of inducing sleep, Changes in consciousness.

Communication Skills; Principles of effective communication. A practical method of communication between the doctor and patient about disease, drugs, prognosis etc

Interviewing; Types of interview and Skills of interviewing

Health Psychology

Psychology in clinical management of patients, Psychological therapies, child's social and cognitive development, Psychological changes during adolescence, old age and their clinical management, Impact of illness on a patient's psychological well being. Association between psychological stress and physical well being, Role of doctor in patient reassurance.

Social And Community Perspective; Inequalities Ethnicity, culture and racism, Gender and Healthcare and Influence of health. Illness on behaviour

Application of Behavioural Principles In Health and Disease; Mentally / emotionally and physically handicapped, Homebound and medically compromised.

Recommended Text Books:

1. Text book of Community Medicine by: Park J E. Latest Edition
2. Horton, Paul B. and Chester L. Hunt, 1984 Sociology, Singapore: Megraw Hill Book Co.
3. Moon, Graham, 1995. Society and Health; An introduction to Social Science for Professionals, London: Routledge.
4. Rehabilitation Research (Principles and Applications) 3<sup>rd</sup> Edition By Elizabeth Domholdt
5. Textbooks of Community Medicine, by Prof. H. A. Siddique (2<sup>nd</sup> Edition).
6. A Handbook of Behavioural Sciences for Medical and Dental Students By: M H Rana, S Ali and M Mustafa, , University of Health Sciences Lahore
7. Developmental Psychology for Healthcare Professions By: Katherine A Billingham

## **2. SPECIAL PATHOLOGY**

Theory:

The course outline is as follows:-

1. Blood Vessels & Heart,
2. Hematopoietic and Lymphoid Systems
3. Respiratory System
4. The Urinary System
5. Musculoskeletal System
6. Endocrine System
7. Nervous System

Practicals:

Basic principles of lab works, Hematopoietic System (ALL, CLL,AML, CML), Musculoskeletal System (Osteogenic sarcoma & Giant cell tumor), The Skin (Squamous cell carcinoma & Basal cell carcinoma), Endocrine System (Thyroid tumors, Colloid goiter, Follicular adenoma & Papillary carcinoma thyroid, Pituitary, Causes of hyperpituitarism& lab. Diagnosis, Causes of biliary, bitarism& lab. Diagnosis, Thyroid, Thyroid function test, Causes of hyperthyroidism & lab. Diagnosis, Causes of hypothyroidism & lab. Diagnosis, Parathyroid, Hyperparathyroidism, Hypoparathyroidism, Hypercalcemia, Hypocalcemia, Diabetes mellitus, Lab. Diagnosis & GTT, Diabetic ketoacidosis), Liver, gall bladder and biliary tract, Chronic cholecystitis, Hepatocellular carcinoma & Liver cirrhosis), Nervous System (Meningioma etc), Basics of Histopathology / tissue Processing, Bone Marrow Biopsy

Recommended Books:

1. Pathological Basis of Disease by Kumar, Cotran, Robbins. 7th. Ed.
2. Medical Microbiology and Immunology by Levinson and Jawetz, 9th Ed. Mc Graw-Hill
3. Clinical Pathology Interpretations by A.H. Nagi

## **3. PHYSICAL THERAPY IN MEDICINE**

Cardiac Diseases:

Chest pain, Dyspnoea, Palpitation, Peripheral edema, Syncope, Cardiac failure, Acute pulmonary edema, Cardiogenic shock, Systemic hypertension, Ischemic heart disease, Angina pectoris, Unstable angina, Myocardial infarction, Rheumatic fever, Valvular heart diseases, Congenital heart diseases, Ventricular septic defect , Atrial septal defect, pulmonary heart disease, Pericardial disease, Pulmonary hypertension and Cardiac arrhythmias and heart in pregnancy.

## Vascular Diseases:

Arteriosclerosis, Acute & Chronic ischemia of leg, Aortic aneurysm, Buerger's disease, Raynaud's disease, Varicose veins and Venous thrombosis.

## Rheumatology and Bone Diseases

### Arthritis

Osteoarthritis, Rheumatoid arthritis, Connective tissue diseases, Arthritis in elderly, Arthritis in children, Seronegative spondyloarthropathies, Crystals deposition disease, Arthritis associated with other diseases

### Back Pain

Back Pain due to serious disease, Inflammatory Back Pain, Disc disease, Mechanical problems, Soft tissues problems, Psychogenic Back Pain, Nonspecific Back Pain and Neck pain.

### Soft Tissue Rheumatism

### Bone Diseases

Paget's disease, Infections of bones, Neoplastic disease, Skeletal dysplasia and Other hereditary diseases

### Respiratory Diseases

#### Diseases of Upper Respiratory Tract

Common cold, Sinusitis, Rhinitis, Pharyngitis, Acute laryngo-tracheobronchitis, Influenza, Inhalation of the foreign bodies

#### Disease of Lower Respiratory Tract

Acute & chronic Bronchitis, Bronchiectasis, Cystic fibrosis, Asthma, Emphysema, Pneumonias, Tuberculosis, Pulmonary fibrosis, Radiation damage, Common tumors of the lungs, Respiratory failure, Adult distress respiratory syndrome, Disorders of chest wall and pleura, Chest trauma, Deformities of rib cage, Dry pleurisy, Pleural effusion, Empyema and Pneumothorax

### Dermatology

Introduction to disorders and diseases, Acne vulgaris, Psoriasis, Boils, Carbuncles, Alopecia, Mycosis fungoides, Polymorphic light eruptions, Vitiligo, Pityriasis and Hyperhidrosis

### Diseases of Brain and Spinal Cord:

Common neurological symptoms, Neurological examination, The brain death, Stroke, types of stroke, Parkinson's disease, Epilepsy, Multiple Sclerosis, Infective and Inflammatory diseases, Intracranial tumors, Hydrocephalus, Headache, Migraine, Facial pain, Head injury, Motor neuron disease, Diseases of spinal cord, Diseases of Cranial nerves, Peripheral nerve lesions, Diseases of voluntary muscles and of neuromuscular junction, Sleep and Unconsciousness and Coma

### Renal Diseases

Glomerulonephritis, Acute nephritic syndrome, Nephrotic syndrome, Urinary tract infection, Renal hypertension, Renal failure, Benign enlargement of prostate gland and Prostatic carcinoma

### Diseases of the Blood:

Anaemia, Brief description of types of Anaemia and Brief description of Bleeding and Coagulation, only Haemophilia and Thrombosis is described in detail

### Miscellaneous Diseases:

Brief description of Diabetes Mellitus and its complications, Detailed description of Diabetic Neuropathy and Diabetic foot, Steroid induced Myopathy

## Practicals

The students are expected to make a record of his/her achievements in the log book. The logbook is a collection of evidence that learning has taken place. It is a reflective record of achievements. The log book shall also contain a record of the procedures which student would have performed/observed.

**Evaluation pattern of Practical Training for Final Examination shall comprise of the following pattern:**

1. OSCE: 04 static and 02 Interactive
2. Short Cases : 02
3. Long Case :01

Recommended Text Books:

1. Practice of medicine by: Davidson
2. Clinical medicine by: Parveen j Kumar & Michael Clark
3. Short text book by medicine by: M. Inam Danish
4. Hutchison's clinical methods by: Michael swash. 21st edition
5. Bed side techniques
6. Looking Within (How X-ray, CT, MRI, Ultrasound and Other Medical Images Created and How They Help Physicians Save Lives) By Anthony Brinton Wolbarst
7. A–Z of Musculoskeletal and Trauma Radiology By: James R. D. Murray
8. Essentials of Radiology by Fred. A. Mettler, 2<sup>nd</sup> edition.
9. Imaging in rehabilitation, By: Terry. R. Malone, Charles Hazle & Michael L. Grey. McGraw Hill Publishers.

#### **4. PHYSICAL THERAPY IN SURGERY INCLUDING RADIOLOGY & DIAGNOSTIC IMAGING**

##### **i. Surgery**

Orthopedic surgery

Fractures

Dislocations & Subluxations

Definition, Traumatic dislocation, General description

Principles of general description and management of traumatic dislocation and subluxation of

- Shoulder joint, Acromioclavicular joint, Elbow joint, Hip joint and Knee joint

Soft Tissue Injuries

General Orthopedic Disorders

Carpel tunnel syndrome, Compartment syndromes, Muscular dystrophies, Neuropathies, Avascular necrosis of bone in adult and children, Ischemic contracture, Gangrene, Rickets, Osteoporosis and osteomalacia, Shoulder pain, Neck pain, Knee pain, Backache, Painful conditions around elbow

- Detailed description of : Orthotics, Prosthetics, Splintage, Traction & POP

Tumors:

Deformities and Anomalies

Deformities of the Spine:

Torticollis, Scoliosis, Kyphosis, Lordosis and flat back

Deformities of the Lower Limb:

CDH, coxa vera, coxa valga, anteversion, Retroversion, Genuvalgum, Genuvarum, Genurecurvatum, CDK, Talipes calcaneusequines, varus&valgus, Talipes calcaneovarus, Talipes calcaneovalgus, Talipes equinovarus, Pes cavus, Pes planus. Hallux valgus &varuma and Hallux rigidus and hammer toe

Deformities of Shoulder and Upper Limb:

Sprengels shoulder, Cubitus varum, Cubitus valgum and Deputryn's contracture

General Surgery

Introduction, Indications for surgery and Types of incisions, Wounds, types of wounds, factors affecting wounds healing, care of wounds, Bandages and dressing, Trauma and metabolic response to trauma, Detailed description of chest and abdominal trauma, Hemorrhage, hemostasis and blood transfusion, Classification and brief description of shock, Fluid and electrolyte balance, Classification of body fluid changes, Pre, intra and post operative fluid therapy, Surgery and diabetes, Burns and grafts, Neoplasia, Preoperative assessment & preparation, Post operative treatment, complications and their management

Types of Anaesthesia

Local anaesthetic agents and Regional anaesthesia (spinal and epidural)

Intravenous anaesthetic agents, Muscle relaxants, Inhalational anaesthetic agents, Anaesthesia and associated diseases, Complications of anaesthesia, Perioperative management, Cardiopulmonary Resuscitation. CPR, Recovery from anaesthesia, Pain management and postoperative care, Ulcers, sinuses and fistulas, Transplantation and Brief description of operation performed on: oesophagus, stomach, intestine gall bladder, bile duct, spleen, pancreas, liver, abdominal wall, hernias, breast, kidneys, ureters, prostate, peritoneum, mesentery and retroperitoneal space

Thoracic Surgery

i. Pulmonary Surgery

Introduction, types of incision, types of operation, complications of pulmonary surgery, drains, tubes, pneumonectomy, lobectomy, thoracoplasty, Operations on pleura. Chest injuries, Brief description of indication for pulmonary surgery, Diseases of chest wall and pleura, Diseases of bronchi, Tumors of lung, Lung abscess, Hydatid disease of lung, Pulmonary embolism, Mediastinal masses and Problems related to diaphragm

ii. Cardiac Surgery

Introduction, Cardiorespiratory resuscitation, Special investigation procedures in cardiac surgery, Basic techniques in cardiac surgery, Types of incision, Types of operation, Complications of cardiac surgery, Lines, drains and tubes, Brief description of indications for cardiac surgery, Congenital heart disease, Acquired heart diseases, Diseases of the pericardium, Cardiac transplantation

iii. Vascular Surgery

Introduction, Investigation in vascular disease types of operation, Indication for vascular surgery, Complication of vascular surgery, Brief description of arterial occlusion, Gangrene, Detailed description of amputation, Aneurysm, Burgers disease, Raynaud's disease and syndrome, Varicose veins, Superficial and deep venous thrombosis, Venous hemorrhage, Lymph edema, Lymph adenitis and lymphomas

NEUROSURGERY

i. Cranial Surgery

Introduction, Special investigation in brain diseases and traumas, Types of operations, indications and complications of cranial surgery, Head injuries to the brain, Acute intracranial hematomas, Fractures of the skull, Intra cranial abscess, Intracranial tumors and Intra cranial aneurysm and hydrocephalus

ii. Surgery of Vertebral Column Spinal Cord and Peripheral Nerves

Dislocation and management of dislocation of vertebral column, Tumors of vertebral column, Prolapse intervertebral disc, Disc protrusion, Spondylosis and spondylolisthesis, Spinal cord injuries and their management, Tumors of spinal cord types of operations performed on nerves, Nerve injuries and their surgical management and Brief description of lesions of cranial and spinal nerves and their management.

## ii. RADIOLOGY & DIAGNOSTIC IMAGING



This course component covers the study of common diagnostic and therapeutic imaging tests. At the end of the course students will be aware of the indications and implications of commonly used diagnostic imaging tests as they pertain to patient's management. The course will cover that how X-Ray, CT, MRI, Ultrasound and Other Medical Images are created and how they help the health professionals to save lives.

History, A New Kind of Ray, How a Medical Image Helps, What Imaging Studies Reveal, Radiography( x-rays ), Fluoroscopy, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound, Endoscopy

Radiography and Mammography:

Fluoroscopy:

Computed Tomography (CT):

Magnetic Resonance Imaging (MRI)

Ultrasound:

Endoscopy:

Nuclear Medicine:

Interventional Radiology

**Practicals:**

In the laboratory/ Clinical sessions, clinical evaluation of Physical Therapy related surgical cases including orthopedic and General Surgery skills shall be taught/ demonstrated/ practiced. Various reflective case studies related to diagnosis and management of orthopedic and general Surgery cases will be assigned to the students.

Practical training will mainly focus on the following:

- Communication skills including history taking and counseling
- Vitals determination ( Measurement)
- Systemic Examination including Chest Examination and Practical Joints Examination
- Basic Life Support training
- Evaluation of Orthopedic deformities
- Observation of Various orthopedic procedures performed for correction of deformities

Note:The students are expected to make a record of his/her achievements in the log book. The log book is a collection of evidence that learning has taken place. It is a reflective record of achievements. The log book shall also contain a record of the procedures which student would have performed/observed.

In the laboratory sessions, clinical evaluation of Physical Therapy related medical cases including Radiology and Diagnostic Imaging skills shall be taught, demonstrated and practiced. Various reflective case studies related to diagnosis and management will be assigned to the students. Practical will focus on the following:

- Communication skills including history taking and counseling
- Vitals determination ( Measurement)
- Systemic Examination including Chest Examination
- Basic Life Support training
- Radiography( x-rays )
- Fluoroscopy
- Computed Tomography (CT)
- Magnetic Resonance Imaging (MRI)
- Ultrasound
- Endoscopy
- Interventional Radiology
- Nuclear Medicine

**Evaluation pattern of Practical Training for Final Examination shall comprise of the following pattern:**

1. OSCE : 04 static and 02 Interactive
2. Short Cases : 02
3. Long Case :01

Recommended Text Books

1. Short practice of surgery by Baily and Love's
2. Text Book of Surgery by Ijaz Ahsan
3. Outline of Fractures
4. Wound Care Essentials, practice principles, By Sharon Baranoski& Elizabeth A. Ayello
5. APTA. Guide to Physical Therapy Practice: Revised second edition. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-

**5. CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS**

Screening and Interviewing, the Pt Scope of Practice: to refer or Treat?

Introduction to Screening for Referral in Physical Therapy,

Reasons to Screen, Screenings and Surveillance, Diagnosis by the Physical Therapist, Differential Diagnosis Versus Screening, Direct Access, Decision-Making Process, Case Examples and Case Studies

Introduction to the Interviewing Process

Concepts in Communication, Cultural Competence, The Screening Interview, Subjective Examination, Core Interview, Hospital Inpatient Information and Physician Referral

Overview of the Physiology of Pain and Systemic Causes of Pain

Mechanisms of Referred Visceral Pain, Multisegmental Innervations, Assessment of Pain and Symptoms, Sources of Pain, Types of Pain, Comparison of Systemic Versus Musculoskeletal Pain, Patterns, Characteristics of Viscerogenic Pain, Screening for Emotional and Psychologic Overlay, Screening for Systemic Versus Psychogenic, Symptoms and Physician Referral.

Physical Assessment as a Screening Tool

General Survey, Techniques of Physical Examination, Integumentary Screening Examination, Nail Bed Assessment, Lymph Node Palpation, Musculoskeletal Screening Examination, Neurologic Screening Examination, Regional Screening Examination, Systems Review and Physician Referral.

Screening for Hematologic Disease

Signs and Symptoms of Hematologic Disorders, Classification of Blood Disorders and Physician Referral

Screening for Cardiovascular Disease

Signs and Symptoms of Cardiovascular Disease, Cardiac Pathophysiology, Cardiovascular Disorders and Laboratory Values

Screening for the Effects of Cardiovascular Medications

Physician Referral

Screening for Pulmonary Disease

Signs and Symptoms of Pulmonary Disorders, Inflammatory/Infectious Disease, Genetic Disease of the Lung, Occupational Lung Diseases, Pleuropulmonary Disorders, Physician Referral

Screening for Hepatic and Biliary Disease

Hepatic and Biliary Signs and Symptoms, Hepatic and Biliary Pathophysiology, Gallbladder and Duct Diseases, Physician Referral

Screening the Head, Neck, and Back

Using the Screening Model to Evaluate the Head, Neck, or Back, Location of Pain and Symptoms, Sources of Pain and Symptoms, Screening for Oncologic Causes of Back Pain, Screening for Cardiac Causes of Neck and Back Pain, Screening for Peripheral Vascular Causes of Back Pain, Screening for Pulmonary Causes of Neck and Back Pain, Screening for Renal and Urologic Causes of Back Pain, Screening for Gastrointestinal Causes of Back Pain, Screening for Liver and Biliary Causes of Back

Pain, Screening for Gynecologic Causes of Back Pain, Screening for Male Reproductive Causes of Back Pain, Screening for Infectious Causes of Back Pain and Physician Referral.

Screening the Sacrum, Sacroiliac, and Pelvis

The Sacrum and Sacroiliac Joint, The Coccyx, The Pelvis and Physician Referral

Screening the Lower Quadrant: Buttock, Hip, Groin, Thigh, and Leg

Using the Screening Model to Evaluate the Lower Quadrant, Trauma as a Cause of Hip, Groin, or Lower Quadrant Pain, Screening for Systemic Causes of Sciatica, Screening for Oncologic Causes of Lower Quadrant Pain, Screening for Urologic Causes of Buttock, Hip, Groin, or Thigh Pain. Screening for Male Reproductive Causes of Groin Pain, Screening for Infectious and Inflammatory Causes of Lower Quadrant Pain, Screening for Gastrointestinal Causes of Lower Quadrant Pain, Screening for Vascular Causes of Lower Quadrant Pain, Screening for Other Causes of Lower Quadrant Pain and Physician Referral

Screening the Chest, Breasts, and Ribs

Using the Screening Model to Evaluate the Chest, Breasts, or Ribs, Screening for Oncologic Causes of Chest or Rib Pain, Screening for Cardiovascular Causes of Chest, Breast, or Rib Pain, Screening for Pleuropulmonary Causes of Chest, Breast, or Rib Pain, Screening for Gastrointestinal Causes of Chest, Breast, or Rib Pain, Screening for Breast Conditions that Cause Chest or Breast Pain, Screening for Other Conditions as a Cause of Chest, Breast, or Rib Pain, Screening for Musculoskeletal Causes of Chest, Breast, or Rib Pain, Screening for Neuromuscular or Neurologic Causes of Chest, Breast, or Rib Pain and Physician Referral

Screening the Shoulder and Upper Extremity

Using the Screening Model to Evaluate Shoulder and Upper Extremity, Screening for Pulmonary Causes of Shoulder Pain, Screening for Cardiac Causes of Shoulder Pain, Screening for Gastrointestinal Causes of Shoulder Pain, Screening for Liver and Biliary Causes of Shoulder Pain, Screening for Rheumatic Causes of Shoulder Pain, Screening for Infectious Causes of Shoulder Pain, Screening for Oncologic Causes of Shoulder Pain, Screening for Gynecologic Causes of Shoulder Pain and Physician Referral

#### Recommended Text Books

1. Goodman CC, Snyder TEK. Differential Diagnostics for Physical Therapists: Screening for Referral. Saint Louis, MO: Saunders: Elsevier; 2006. ISBN: 978-0-7216-0619-4
2. APTA. Guide to Physical Therapy Practice: Revised second edition. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-
3. Additional readings as assigned by the instructors

## **6. PHYSICAL THERAPY TREATMENT & TECHNIQUES-I (*Musculoskeletal, Sports, Gerontology including Geriatric, Pediatric Physical Therapy and Supervised Clinical Practices I*)**

### **i. MUSCULOSKELETAL PHYSICAL THERAPY**

Medical Terminology

Principles and Concepts of Musculoskeletal Evaluation & Assessment

Principles of Intervention

Soft tissue Injury, Repair, and Management

Joint, Connective Tissue, and Bone Disorders and Management

Arthritis–arthrosis, Fibromyalgia and myofascial pain syndrome, Osteoporosis, Fractures–post-traumatic immobilization

Surgical Interventions and Postoperative Management

Peripheral Nerve Disorders and Management

Exercise Interventions by Body Region

The spine and posture: structure, function, postural impairments & management guidelines

Posture and biomechanical influences

Impaired posture

Etiology of pain and Common faulty postures: characteristics and Impairments

Management of Impaired Posture

General management guidelines and Tension headache/cervical headache

The Spine: Impairments, Diagnoses, & Management Guidelines

Review of the structure and function of the spine

Spinal Pathologies and Impaired Spinal Function

Management Guidelines Based on Impairments

The Spine: Exercise Interventions

The Shoulder and Shoulder Girdle

The Elbow & Forearm Complex

The Wrist & Hand

The Hip

The knee

The Ankle & Foot

### **Practicals:**

- The practical training will be sought in Physical Therapy treatment-based settings. Keeping in view therapeutic principles, management of various pre and post-operative conditions will be practiced under supervision and later independently by the students, the practical work might include:
- Therapeutic Management of conditions of spine, Therapeutic Management of conditions of extremities, Therapeutic Management of vascular disorders, Therapeutic Management of pulmonary conditions, Therapeutic Management of gynecological conditions, Reflective clinical case studies & Supervised and independent Practical application of therapeutic techniques on patients in outdoor and indoor Physical Therapy treatment settings.

*Note:* The students are expected to make a record of his/her achievements in the log book. The log book is a collection of evidence that learning has taken place. It is a reflective record of achievements. The log book shall also contain a record of the procedures which student would have performed/observed

## **ii. SPORTS PHYSICAL THERAPY**

Medical Terminology Related to Sports Physical Therapy

Introduction to Sports Rehabilitation

Introduction to Sport injury management

Injury Screening and Assessment of Performance

Injury prevention and screening and Assessment and needs analysis

Pathophysiology of Musculoskeletal Injuries

Pathophysiology of skeletal muscle injuries, Pathophysiology of tendon injuries,

Pathophysiology of ligament injuries, Pathophysiology of skeletal injuries and Peripheral nerve injuries

Effective Clinical Decision Making

Joint Specific Sport Injuries and Pathologies

Traveling with a team

Drugs and the Athlete

Ethics and Sports Medicine

Case Histories

## **iii. GERONTOLOGY & GERIATRIC PHYSICAL THERAPY**

Gerontology

Geriatric Physical Therapy

Medical Terminology Regarding Geriatrics

Attitudes and Ageism

Ageism, Myths and Facts about Older Adults, Age Bias in Healthcare, Geriatric Training and Role of Physical Therapist

Normal Physical Changes in Older Adults

Psychological Changes:

The 3 Ds and Suicide in Older Adults, Delirium, Dementia and Depression

Older Adult Abuse and Neglect:

Scope of Older Adult Abuse and Neglect and Clues to Abuse and Interventions

Triage and Assessment:

ABCs of Geriatric Assessment and Assessment Techniques and Atypical Presentations  
Pain

Pain in Older Adults, Pain Assessment and Challenges, Impact of Physiological Changes, Medication and Pain Management, Medication Interactions, Medication and Food

Effects of age:

Task Complexity, Exercise, Ambulation.

Physical Therapy for Geriatrics in Various Neuromuscular Disorders:

Alzheimer's disease, Parkinsonism, Cerebro vascular accident (C.V.A) and Poly neuropathies

Pre-operative and post-Operative Physical Therapy for Geriatrics in Various Musculoskeletal Disorders:

Hip & Knee Joint replacements, Soft tissue injuries.

Balance and Fall in Elderly: Issues in Evaluation and Treatment

Medications

Nutritional Deficiencies:

- Primary nutritional problems, limited fixed incomes, severely limited food choices and availability.

Case Histories:

Principles of assessment and outcome measures, Documentation in SOAP notes format and Evidence based geriatric Physical Therapy Treatment protocols

#### **iv. PAEDIATRIC PHYSICAL THERAPY**

This course addresses both the medical and rehabilitation management of the pediatric patient. Foundation lectures on normal development provide the students with a model to use when learning about pediatric pathologies, assessments and interventions. This course also involves the examination and treatment of the pediatric population using an interdisciplinary approach.

The etiology and clinical features of common diseases/ disorders observed in the pediatric population will be emphasized. Lab: methods for examination, goal setting, and intervention are emphasized. Students will participate in interdisciplinary case studies and an interdisciplinary evaluation project. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

Detailed Course Outline:

History and examination / pediatric examination, assessment and outcome measurement, theories of development, approaches to working with children, normal developmental milestones, sports and recreation, orthotic and assistive devices, motor learning & principles of motor learning, the child parents and physiotherapist, aging with pediatric onset disability and diseases, the assessment of human gait, motion, and motor function, Duchenne muscular, hemophilia, lower limb deformities, orthopedics and musculoskeletal conditions, talipes equino varus, torticollis, pediatric limb deficiencies, neuromuscular diseases, myopathies, traumatic brain injury, cerebral palsy, spinal cord injuries, spina bifida and oncology and palliative care.

case histories

principles of assessment and outcome measures, documentation in soap notes format and evidence based pediatric physical therapy treatment protocols

## v. SUPERVISED CLINICAL PRACTICE I

### a. HISTORY TAKING

PROFESSIONAL YEAR	SUPERVISION	FOCUS	WARDS	COMPETENCIES
4 <sup>th</sup>	Supervised by trained PT	History Taking	All wards	As listed below

#### Clinical Competencies:

Review pertinent medical records and conduct an interview which collects the following data: Past and current patient/client history, Demographics, General health status, Chief complaint, Medications, Medical/surgical history, Social history, Present and pre-morbid functional status/activity, Social/health habits, Living environment, Employment, Growth and development, Lab values, Imaging, Consultations and Documentation of the history

### b. SYSTEM REVIEW

PROFESSIONAL YEAR	SUPERVISION	FOCUS	WARDS	COMPETENCIES
4 <sup>th</sup>	SUPERVISED BY TRAINED PT	SYSTEMS REVIEW	All wards	AS LISTED BELOW

#### CLINICAL COMPETENCIES:

Perform review of systems to determine the need for referral or for physical therapy services and Systems review screening includes the following:

General Health Condition (GHC) ,Cardiovascular System (CVS) Gastrointestinal System (GIS) Urinary System (US) Genital Reproductive System (GRS) Integumentary System, Musculoskeletal System, Neurological System

### c. MUSCULOSKELETAL

PROFESSIONAL YEAR	SUPERVISION	FOCUS	WARDS	COMPETENCIES
4 <sup>th</sup>	Supervised by trained PT	Evaluation, Examination, and Intervention	MSK (IPD/OPD; surgical & non-surgical)	Listed below

#### Clinical Competencies:

- Based on best available evidence select examination tests and measures that are appropriate for the patient/client.
- Perform posture tests and measures of postural alignment and positioning.
- Perform gait, locomotion and balance tests including quantitative and qualitative measures

Perform Musculoskeletal System Tests and Measures, Perform Orthotic Tests and Measures, Evaluation, Diagnosis, Prognosis: Plan of Care, Interventions, Body Mechanics and Positioning

#### Practicals:

In the laboratory sessions, supervised clinical training shall be given to the students related to the physical therapy. Various reflective case studies related to physical therapy will be assigned to the students.

NOTE:The students are expected to make a record of his/her achievements in the log book. The log book is a collection of evidence that learning has taken place.

It is a reflective record of achievements. The log book shall also contain a record of the procedures which student would have performed/observed.

#### Recommended Text Books:

1. *physical therapy for children* by, suzann k. campbell, robert j. palisano & darl w. vander linden.
2. *paediatric rehabilitation principles and practice* (fourth edition) by, michael a alexander &dennis j. matthews.
3. *additional reading material as assigned by the teacher concerned.*

### 5th (Final) Year

1. Evidence based physical therapy & Professional Practice	100 Marks
2. Emergency Procedures & Primary Care in Physical Therapy	200 Marks
3. Physical Therapy Treatment & Techniques-II (Cardiopulmonary, Neurological, Gynecological & Obstetrics, Integumentary Physical Therapy, and Supervised Clinical Practices II)	200 Marks
4. Prosthetics, Orthotics, Human Development & Community Based Rehabilitation	100 Marks
5. Exercise Physiology & Health and Wellness	200 Marks
	<b>Total Marks</b>
	<b>800 Marks</b>
Report Writing	Qualifying

## 1. EVIDENCE BASED PHYSICAL THERAPY & PROFESSIONAL PRACTICE

### i. Evidence-Based Physical Therapy

An introduction about evidence-based Physical Therapy:

- What do we mean by 'high quality clinical research'? , What do we mean by 'patient preferences'? , What do we mean by 'practice knowledge'? , Additional factors and The process of clinical decision-making

Importance of evidence-based Physical Therapy:

- For patients, For physiotherapists and the profession, For funders of Physical Therapy services, History of Evidence-Based Health Care and Steps for practicing evidence-based Physical Therapy.

What do we need to know?

Relevant clinical questions, Refining your question, Effects of intervention, Experiences, Prognosis and Diagnosis.

What Constitutes Evidence?

Evidence about effects of interventions, Different forms of evidence, Different sources of evidence, Hierarchy of evidence and Research study design.

Finding the Evidence

- Search Strategies
  - The World Wide Web & Selecting search terms AND and OR
- Finding Evidence of Effects of Interventions
  - PEDro
  - The Cochrane Library
- Finding Evidence of Prognosis and Diagnostic Tests
- Finding Evidence of Experiences
  - CINAHL & Pub Med
- Getting full text
- Finding evidence of advances in clinical
- Practice (Browsing)

Trust upon Evidence

- A process for critical appraisal of evidence
- Critical appraisal of evidence about the Effects of intervention
  - Randomized trials & Systematic reviews of randomized trials
- Critical appraisal of evidence about experiences
- Critical appraisal of evidence about prognosis
  - Individual studies of prognosis & Systematic reviews of prognosis

- Critical Appraisal of Evidence about Diagnostic Tests
    - Individual studies of diagnostic tests & Systematic reviews of diagnostic tests
- Clinical Guidelines as a Resource for Evidence-Based Physical Therapy
- What are clinical guidelines?
  - History of clinical guidelines and why they are important
  - Where can I find clinical guidelines?
  - How do I know if I can trust the recommendations in a clinical Guideline?
    - Scope and purpose, Stakeholder involvement, Rigor of development, Clarity and presentation, Applicability, Editorial independence & what do the results of the critical appraisal mean for my practice?
  - Legal Implications of Clinical Guidelines
    - Clinical guidelines or 'reasonable care': which do the courts consider more important?
    - Documenting the use of a clinical guideline in practice: legal implications
  - Reflections on the Future of Guideline Development
    - Who should develop clinical guidelines?
    - Collaboration in guideline development
    - Uniprofessional or multiprofessional guideline development?

### Critical Thinking

The Benefit of Asking the Right Questions, What Are the Issue and the Conclusion?, What Are the Reasons?, What Words or Phrases Are Ambiguous?, What Are the Value Conflicts and Assumptions?, What Are the Descriptive Assumptions?, Are There Any Fallacies in the Reasoning?, How Good Is the Evidence: Intuition, Personal Experience?, Testimonials, and Appeals to Authority?, How Good Is the Evidence: Personal Observation, Research?, Studies, Case Examples, and Analogies, Are There Rival Causes?, Are the Statistics Deceptive?, What Significant Information Is Omitted?, What Reasonable Conclusions Are Possible?, Practice and Review, The Tone of Your Critical Thinking and Strategies for Effective Critical Thinking.

### ii. **Professional Practice** (Law, Ethics & Administration)

#### The Physical Therapist as Professional

What does professional mean?, Preliminary definitions of profession and professional, Sociological perspective, Structural approach, Processual approach, Characteristics of professions cited in the literature, Power approach, Dimensions of occupation & profession, Autonomy, self-regulation of ethical standards, and accountability, Privileges of autonomous practice in 2020, Self-regulation of ethical standards, Accountability of professionals, Individual professionalism—professionalism without professions?, The history of a profession and Professional recognition.

#### Contemporary Practice Issues

A vision for the future, The doctorate in physical therapy, Perspective of the profession, Perspective of the practitioner, Direct access issue, Selected curriculum requirements from evaluative criteria for physical therapist, Plan of care, Social responsibility, Career development, Physical therapy practice patterns, Components of a practice pattern, Important factors that affect health

#### The Five Roles of the Physical Therapist

##### The Physical Therapist as Patient/Client Manager

Evaluation and diagnosis, Diagnosis as clinical decision making, Prognosis, Discharge planning and discontinuance of care, Discontinuance of care, Outcomes, Clinical decision making, Referral relationships, Interpersonal relationships, Ethical and legal issues, Informed consent and Managed care and fidelity.

##### The Physical Therapist as Consultant



Physical therapy consultation, Building a consulting business, The consulting process, The skills of a good consultant, Trust in the consultant/client relationship, Ethical and legal issues in consultation and Components of a consulting agreement

The Physical Therapist as Critical Inquirer

History of critical inquiry, Evidence-based medicine, Outcomes research, Whose responsibility is research? Roles of the staff physical therapist in critical inquiry, Collaboration in clinical research, Ethical and legal issues in critical inquiry

The Physical Therapist as Educator

History of physical therapy education, Contemporary educational roles of the physical therapist, Teaching opportunities in continuing education, Academic teaching opportunities, Theories of teaching and learning in professional education, Ethical and legal issues in physical therapy education

The Physical Therapist as Administrator

History of physical therapy administration, Contemporary physical therapy administration, Patient/client management, First-line management, Midlevel managers and chief executive officers, Leadership and Ethical and legal issues.

Professional Development, Competence and expertise

Lifelong process of skill enhancement, the professional development continuum: from competence to expertise, Activities that promote professional development, Evaluation of competence and professional development, Professional development planning, Possible evaluators of professional achievement, Career advancement and Organizational impact on professional development.

Future Challenges in Physical Therapy

Physical therapy's moral mission, The future in three realms, individual, institutional & societal, Professionalism and the physical therapist

Recommended text books:

1. Professionalism in Physical Therapy: History, Practice, & Development, Lisa L. Dutton, PT, PhD
2. APTA. Guide to Physical Therapy Practice: Revised second edition. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-
3. Practical Evidence based Physical Therapy By, Rob Herbert, Gro Jamtdvedt, Judy Mead & Kare Birger Hagen.

Asking the right question-A guide to critical thinking, 8<sup>th</sup> Edition By, M.Neil.Browne & Stuart M Keeley

## **2. EMERGENCY PROCEDURES & PRIMARY CARE IN PHYSICAL THERAPY**

Organization and Administration of Emergency Care

Develop and implement emergency action plan, Emergency team, Initial patient assessment and care, Emergency communication, Emergency equipment and supplies, Venue location, Emergency transportation, Emergency care facilities and Legal need and documentation

Physical Examination of the Critically Injured Patient/Athlete

Scene assessment and safety, Body substance isolation precautions, Primary survey, Secondary survey and Vital signs

Airway Management

Air way anatomy, Air way compromise, Oxygen therapy and Advanced airway devices

Sudden Cardiac Death

Incidence and etiology of sudden death in general population, Sudden cardiac arrest in athletes, Screening and recognition of cardiac warning signs, Preparation for cardiac emergencies and Management of sudden cardiac arrest

Head Injuries

Pathomechanics of brain injuries, Types of pathology, Classification of cerebral concussion, Cerebral contusion, Cerebral hematoma, Second impact syndrome, Initial on site assessment, Sideline assessment, Special tests for assessment of coordination, Special tests for assessment of cognition, Other tests, Medications and Wake ups and rest.

Emergency Care of Cervical Spine Injuries

Anatomy, Mechanism of injuries, Injuries to the spinal cord, Assessment and Management

Emergent General Medical Conditions

Sudden death, Exercise induced anaphylaxis, Acute asthma, Diabetes mellitus, Mononucleosis, Sickle cell traits and Hypertension.

Environment-Related Conditions

Heat related emergencies and their prevention, Cold related injuries, Lightning and Altitude related emergencies

Orthopedic Injuries

Basic emergency medical care, Fundamentals of skeletal fractures, Splinting techniques, Fractures and dislocations of upper extremity, Fractures and dislocations of lower extremity and Fractures and dislocations of spine

Abdominal Injuries

Initial evaluation, Specific injuries: abdominal wall contusions, splenic injuries, liver injuries, renal injuries, intestinal injuries, pancreatic injuries and Non-traumatic abdominal injuries: Appendicitis, ectopic pregnancy.

Thoracic Injuries

Assessment and Management of different Types of injuries: fractures, Pneumothorax, hemothorax, pulmonary embolism.

Spine Boarding in Challenging Environments

The soft foam pit in gymnastics, The pole vault pit, The swimming pole and diving well and The ice hockey rink

The Psychological and Emotional Impact of Emergency Situations

Defining psychological trauma, Psychological interventions in crisis situations, Psychological trauma in athletic environment, the psychological emergency response team, Internal team members, External team members and the psychological interventions recommendations.

Primary Care

Primary care: physical therapy models, Evidence - Based examination of diagnostic information, Cultural competence: An essential of primary health care, Pharmacologic considerations for the physical therapist and the patient interview: the science behind the art

Examination and Evaluation

Prologue, Symptoms investigation, Part I: Chief complaint by body region, Symptoms investigation, Part II: Chief complaint by symptom, Patient health history including identifying health risk factor, Review of systems, Patient interview: the physical examination begins, Review of cardiovascular and pulmonary systems and vital signs, Upper quadrant screening examination, Lower quadrant screening examination, Diagnostic imaging and Laboratory tests and values

Disorders and Management

Acute Care Physical Therapy Examination and Discharge Planning, Clinical Laboratory Values and Diagnostic Testing, Physiologic Monitors and Patient Support Equipment, Bed Rest, Deconditioning, and Hospital-Acquired Neuromuscular Disorders The Immune System and Infectious Diseases and Disorders, Cardiovascular Diseases and Disorders, Pulmonary Diseases and Disorders, Musculoskeletal/Orthopedic Diseases

and Disorders, Neurologic and Neurosurgical Diseases and Disorders, Endocrine Diseases and Disorders, Gastrointestinal Diseases and Disorders, Genitourinary Diseases and Disorders, Oncological Diseases and Disorders, Transplantation, Integumentary Diseases and Disorders and Wound Management.

#### Special Populations

The Pediatric and adolescent population, the obstetric client, the geriatric population and Health and wellness perspective in primary care.

#### **Practicals:**

The practical training regarding the emergency evaluation/management of the following will be practiced in the Physical Therapy treatment ward/ available facility under the supervision of qualified physiotherapists

- Airway management
- Head injuries
- Emergent general medical conditions
- Emergency care of cervical spine injuries
- Orthopedic injuries
- Abdominal injuries
- Thoracic injuries
- Spine boarding in challenging environments

Note: The students are expected to make a record of his/her achievements in the log book. The log book shall also contain a record of the procedures which student would have performed/observed.

#### **RECOMMENDED TEXT BOOKS**

1. Emergency Care in Athletic Training by: Keith M.Gorse, Robert O. Blanc, Francis Feld, Matthew Radelet, 1<sup>st</sup> edition, 2010, FA Davis Company
2. Acute care hand book for Physical Therapists by: Jaime C paz, Michelle P West, 2<sup>nd</sup> edition, 2002, Butterworth Heinemann

### **3. PHYSICAL THERAPY TREATMENT & TECHNIQUES-II (Cardiopulmonary, Neurological, Gynecological & Obstetrics, Integumentary Physical Therapy, and Supervised Clinical Practices II)**

#### **ii. Cardiopulmonary Physical Therapy**

Medical Terminology Regarding Cardiopulmonary System

Introduction

Anatomy and Physiology

Anatomy of the Cardiovascular and Respiratory Systems and Physiology of the Cardiovascular and Respiratory Systems

Patho-physiology Restrictive Lung Dysfunction, Chronic Obstructive Pulmonary Diseases and Cardiopulmonary Implications of Specific Diseases

Diagnostic Tests and Procedures

Cardiovascular Diagnostic Tests and procedures, Pulmonary Diagnostic Tests and Procedures

Surgical Interventions, Monitoring and Support

Cardiovascular and Thoracic interventions,

**PHARMACOLOGY**

Cardiovascular Medications and Pulmonary Medications

Cardiopulmonary Assessment and Intervention

Assessment Procedures, Treatment of Acute Cardiopulmonary Conditions, Therapeutic Interventions in Cardiac Rehabilitation and Prevention, Pulmonary Rehabilitation, Outcome Measures

The needs of Specific Patients

Intensive Care for the Critically Ill Adult

Pulmonary Rehabilitation

Cardiac Rehabilitation

- Introduction
- Goals of cardiac rehabilitation
- Cardiac rehabilitation team
- Role of the physiotherapist
- Rationale for cardiac rehabilitation
  - Early ambulation, Exercise training, Secondary prevention & Education
- Manifestations of ischaemic heart disease
  - Cardiac arrest, Angina pectoris & Myocardial infarction
- Cardiac surgery
- Drugs to control the cardiovascular system
- Physical Therapy
  - Assessment, Recording, Treatment, Outcome evaluation & Complications of exercise
- Other considerations

Cardiopulmonary Transplantation

Introduction, Assessment, The transplantation process, Donors, Operative procedures, Postoperative care, Rejection of the transplanted organs, Immunosuppression, Infections, Special considerations for the physiotherapist, Denervation of the heart/lungs, Immunosuppression, Infection/rejection, Physical Therapy management

Hyperventilation

Introduction, Signs and symptoms, Causes of hyperventilation, Personality, Diagnostic tests, Breathing patterns, Treatment, The assessment, Treatment plan, Breathing education, Breathing pattern re-education, Compensatory procedures in the short term, Planned rebreathing, Speech, Home programme, Exercise and fitness programmes and Group therapy.

## Bronchiectasis, Primary Ciliary Dyskinesia and Cystic Fibrosis

- Bronchiectasis
  - Medical management, Physical Therapy & Evaluation of Physical Therapy
- Primary ciliary dyskinesia
  - Medical management, Physical Therapy & Evaluation of Physical Therapy
- Cystic fibrosis
  - Medical management, Physical Therapy, Evaluation of Physical Therapy & Continuity of care

## Case Histories

- Principles of assessment and outcome measures
- Documentation in SOAP notes format
- Evidence based cardiopulmonary Physical Therapy Treatment protocols

## ii. **Neurological Physical Therapy**

Medical Terminology Regarding Neurological System

Anatomy and Physiology of the Nervous System

Brain, Spinal cord, CNS Support Structures, Neurons, PNS and Spinal Level Reflexes

Neurological Examination:

History, System review and Test and measures

Interventions:

Introduction to Theories of Neurological Rehabilitation

- Remediation & facilitation approaches
  - Bobath-NDT
  - Motor relearning program(MRP)
  - Kabat, Knott, Voss (PNF)
  - Constraint induced movement therapy (CIMT)

Motor Control / Motor Learning Approach, Neural plasticity/ adoptability, Balance, Role of sensory system, Skill acquisition, Postural Control, Mobility Function, Task-Related Training Approach, Compensatory Training Approach and Normal Reach, Grasp and Manipulation

Neurological Dysfunctions

CVA (Stroke), Traumatic Brain Injury (TBI), Spinal Cord Injury (SCI), Degenerative Diseases (Progressive CNS disorders), Multiple Sclerosis (MS), Parkinson's Disease (PD), Post Polio Syndrome (PPS), Cerebellar Disorders, Vestibular Disorders, Cranial Nerves Disorders and Poly Neuropathies

Neuromuscular Disorders

Case Histories

Principles of assessment and outcome measures, Documentation in SOAP notes format, Evidence based neurological Physical Therapy Treatment protocols

## iii. **Gynaecological& Obstetric Physical Therapy**

medical Terminology regarding Gynecology, Obstetrics and Women's Health

Anatomy, Physiology of pregnancy, Physical and physiological changes of labour and the puerperium, The antenatal period, Relieving the discomforts of pregnancy, Preparation of labour, Postnatal period, The climacteric, Common gynecological conditions, Gynecological surgery, Urinary function and dysfunction, Bowel and anorectal function and dysfunction

Oncological Issue with Women's Health

Management of breast cancer, Management of lymphedema

Special Topic in Women's Health

Female athletes, Exercise issues and aging, aquatic therapy services in women health, Physical therapy management for women with long term physical disabilities

Case Histories

Principles of assessment and outcome measures, Documentation in SOAP notes format, Evidence based obstetrics and gynecological Physical Therapy Treatment protocols

**iv. Integumentary Physical Therapy**

Wound Care Concepts

Quality of Life and Ethical Issues, Regulation and wound Care, Skin, an Essential Organ, Acute and Chronic Wound Healing, Wound assessment, Wound Bioburden, Wound Debridement. Wound Treatment Options, Nutrition and wound care, Seating, Positioning and support surfaces, Pain Management and wounds

Wound Classifications and Management Strategies

Pressure Ulcers, Vascular Ulcers, Diabetic Foot Ulcers, Sickle Cell Ulcers, Wounds in special Populations, Complex wounds, Atypical Wounds and Wound Care; where we were, where we are, and where we are going

Case Histories

Principles of assessment and outcome measures, Documentation in SOAP notes format and Evidence based integumentary Physical Therapy Treatment protocols

**v. SUPERVISED CLINICAL PRACTICE II**

**a. NEUROLOGICAL**

PROFESSIONAL YEAR	SUPERVISION	FOCUS	WARDS	COMPETENCIES
5 <sup>th</sup>	Supervised by trained PT	Evaluation, Examination, and Intervention	Neurological (IPD/OPD; surgical & non-surgical)	Listed below

**CLINICAL COMPETENCIES:**

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to neurological disorders. Student is required to keep a performance record of all listed competencies and successfully perform on real patients during the final evaluation of the course.

Evaluation, Diagnosis, Prognosis, Plan of Care, Interventions

**b. CARDIOVASCULAR AND PULMONARY**

PROFESSIONAL YEAR	SUPERVISION	FOCUS	WARDS	COMPETENCIES
5 <sup>th</sup>	Supervised by trained PT	Evaluation, Examination, and Intervention	Cardiovascular and pulmonary (IPD/OPD; surgical & non-surgical)	Listed below

**CLINICAL COMPETENCIES:**

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to cardiovascular and pulmonary disorders. Students learn to objectively perform these skills under the supervision of trained physical therapists. Student is required to keep a performance record of all listed competencies and successfully perform on real patients during the final evaluation of the course. It will include Evaluation, Diagnosis, Plan of Care and Interventions relevant to wards mentioned above.

**c. INTEGUMENTARY**

Professional	Supervision	Focus	Wards	Competencies
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Year				
5 <sup>th</sup>	Supervised by trained PT	Evaluation, Examination, and Intervention	Integumentary, gynecology & obstetrics, sports and metabolic disorders (IPD/OPD; surgical & non-surgical)	Listed below

**CLINICAL COMPETENCIES:**

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to Integumentary, gynecology and obstetrics, sports and metabolic disorders. Students learn to objectively perform these skills under the supervision of trained physical therapists. Student is required to keep a performance record of all listed competencies and successfully perform on real patients during the final evaluation of the course. It will include Evaluation, Diagnosis, Plan of Care and Interventions relevant to wards mentioned above.

**Practicals:**

1. In the laboratory sessions, Cardiopulmonary and neurological Physical Therapy skills will be demonstrated and practiced. Various reflective case studies related to the neurological rehabilitation will be assigned to the students.
2. In the laboratory sessions, Supervised Clinical Training shall be given to the students related to the Physical Therapy in Gynae & Obstetrics. Various reflective case studies related to Physical Therapy in Gynae & Obstetrics will be assigned to the students.

Note: The students are expected to make a record of his/her achievements in the log book. The log book is a collection of evidence that learning has taken place.

It is a reflective record of achievements. The log book shall also contain a record of the procedures which student would have performed/observed.

**Recommended Text Books:**

1. Essentials of Cardiopulmonary Physical Therapy (2<sup>nd</sup> Edition) By Hillegass and Sadowsky
2. Physical Therapy for respiratory and cardiac problems, By: Jennifer A. Pryor & Barbara A. Webber, 2<sup>nd</sup> edition, Churchill Livingstone.
3. Tidy's Physical Therapy by Thomas A Skinner & Piercy
4. Therapeutics Exercises and Technique by Carolyn Kisner & Laynn Allen Colby 4<sup>th</sup> 5<sup>th</sup> edition
5. Cash's Text book of General Medical & Surgical Condition for Physiotherapists by Patrica A. Downie
6. Cash's Textbook of chest , heart and vascular condition for physiotherapist by Patrica A. Downie
7. Neurological Physical Therapy Bases of evidence for practice Treatment and management of patients described by specialist clinicians by Cecily Partridge
8. Neurological Physical Therapy A problem-solving approach By Susan Edwards, second edition.
9. Neurologic examination By Robert j. Schwartzman , first edition
10. Physical Therapy in Obstetrics and Gynecology By: Jill Mantle, Jeanette Haslam, Sue Barton, 2nd edition.
11. Textbook of Physical Therapy for Obstetric and Gynecological Conditions (Paperback) By (author) G.B. Madhur.
12. Short practice of surgery by Baily and Love's

13. Text Book of Surgery by Ijaz Ahsan
14. Outline of Fractures
15. Wound Care Essentials, practice principles, By Sharon Baranoski & Elizabeth A. Ayello
16. APTA. Guide to Physical Therapy Practice: Revised second edition. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-

#### **4. PROSTHETICS & ORTHOTICS, HUMAN DEVELOPMENT & COMMUNITY BASED REHABILITATION**

##### **i. PROSTHETICS & ORTHOTICS**

###### Orthotics

###### Introduction to Orthotics

Basic Terminology, Historical Background, Factors In Prescription Orthotics, Nomenclature of Orthotics, Biomechanical Principles, Materials Used in Orthotics Manufacturing and Methods of Construction

###### Foot Orthoses

Shoe Style, Parts of Shoes, Special Purpose Shoes, Foot Examination, Orthotics Interventions, Fabrication Options, Pediatric Foot Orthoses and Guideline for Prescription Foot Orthoses

###### Ankle Foot Orthoses

Plastic Ankle Foot Orthoses, Lather Metal Ankle Foot Orthoses, Composite Materials, Weight Relieving Ankle Foot Orthoses, Support (Fabric, Leather, Gel And Air), Contracture Reducing Ankle Foot Orthoses and Guidelines for Prescription Ankle Foot Orthoses.

###### Knee Ankle Foot Orthoses and Knee Orthoses

Plastic Metal Knee Ankle Foot Orthoses, Knee Immobilizer, Supra-Condylar Knee Ankle Foot Orthoses, Weight Relieving Orthoses, Fracture Orthoses, Lather Metal Knee Ankle Foot Orthoses, Knee Orthoses and Guidelines For Prescription Knee Ankle Foot Orthoses.

###### Orthoses for Paraplegia and Hip Disorders

Paraplegia, Standing Frames, Orthoses Designed For Ambulation, Functional Electrical Stimulation, Specific Devices for Paraplegia, Hip Orthoses, Guidelines for Prescription Evaluation Procedures for Lower Limb Orthoses

Need of Evaluation, Static Evaluation, Dynamic Evaluation, Gait Disorders with Orthoses Usage

###### Trunk and Cervical Orthoses

Trunk Orthoses, Trunk Orthoses Evaluation, Scoliosis and Kyphosis Orthoses, Scoliosis and Kyphosis Orthoses Evaluation, Cervical Orthoses, Cervical Orthoses Evaluation and Guideline for Prescription.

###### Upper Limb Orthoses

Hand And Wrist Hand Orthoses, Forearm and Elbow Orthoses, Shoulder Orthoses, Fabrication Option, Upper limb Orthoses Evaluation (Hand, Wrist, Fingers, Shoulder and Elbow) and Guideline for Prescription

###### Orthoses for Burns and Other Soft Tissue Disorders

Importance of Orthoses for Burns and Other Soft Tissue Disorders, Orthoses for Burn Management and Orthoses for Patients with Soft Tissues Problem Associated With Neuromuscular Disorders.

###### Goal Setting and Treatment Plan

Long Term Goals, Short Term Goals, Treatment Planning, Criteria for Discharge and Care of Orthoses

###### Prosthetics

###### Early Management



Clinic Team Approach to Rehabilitation, Amputation Surgery: Osteomyoplastic Reconstructive Technique, Postoperative Management, Pain Management, Skin Disorders and Their Management and Psychological Consequences of Amputation  
Rehabilitation of Adults with Lower-Limb Amputations  
Partial Foot and Syme's Amputations and Prosthetic Designs, Transtibial Prosthetic Designs, Transfemoral Prosthetic Designs, Hip Disarticulations and Transpelvic Prosthetic Designs, Basic Lower-Limb Prosthetic Training  
Rehabilitation of Adults with Upper-Limb Amputations  
Body-Powered Upper-Limb Prosthetic Designs, Upper-Limb Externally Powered Prosthetic Designs, Training Patients with Upper-Limb Amputations  
Beyond the Basics  
Special Considerations with Children, Rehabilitation Outcomes, Adaptive Prostheses for Recreation, Future Prosthetic Advances and Challenges and Future Surgical and Educational Advances and Challenges.

## **ii. HUMAN DEVELOPMENT & COMMUNITY BASED REHABILITATION**

This course component intends to give the Physical Therapy students basic knowledge about the human development from new life to adulthood. It deals with scientific study of processes of change in stability throughout the human life span; it focuses on the physical, psychosocial and cognitive development from conception to late adulthood

Introduction

Forming a New Life, The Study of Human Development, Theory and Research, Physical Development during the First Three Years, Cognitive Development during the First Three Years and Psychosocial Development during the First Three Years.

Early Childhood

Physical and Cognitive Development in Early Childhood, Psychosocial Development in Early Childhood, Physical and Cognitive Development in Middle Childhood, Psychosocial Development in Middle Childhood

Adolescence

Physical and Cognitive Development in Adolescence, Psychosocial Development in Adolescence, Physical and Cognitive Development in Young Adulthood and Psychosocial Development in Young Adulthood

Middle Adulthood

Physical and Cognitive Development in Middle Adulthood, Psychosocial Development in Middle Adulthood, Physical and Cognitive Development in Late Adulthood, Psychosocial Development in Late Adulthood and Dealing with Death and Bereavement

Health in the Community

Handicap and the community, Nutrition and mal nutrition, Breast feeding, Immunization and Oral rehydration

Normal Body Function

Normal development and Growth and weight of children

Conditions and Treatments

Cerebral palsy in children, Down syndrome, Mental handicap, Hydro-cephalus, Spin bifida, Poliomyelitis, Blindness, Deafness, Strokes, Spinal cord injuries, Amputation  
Management of Patients

Assessment and recoding, Fits, Contractures, Pressure sores, Urine and bowel management, Chest infection, Feeding children with cerebral palsy, Toy making workshop and Welfare assistance.

Recommended Text Books:

1. Prosthetics and Patient Management: A Comprehensive Clinical Approach By: Kevin Carroll ; Joan Edelstein

2. Orthotics a comprehensive clinical approach By: Joan E Eldestein& Jan Bruckner
3. Introduction to Special Education By: Allen and Beacon,(1992), A Simon &SuperterComp.Needham Heights
4. Exceptional Children, Howard, W.I. (1988); Columbus, Merill.
5. Exceptional Children and Adults, Patton, J.R. (1991); Boston Scott Foresmen and Co.
6. Exceptional Children in Focus by: Patton J.R. (1991); New York, Macmillan pub. Co
7. Community based rehabilitation worker manual, marion loveday, global health publication

## **5. EXERCISE PHYSIOLOGY & HEALTH AND WELLNESS**

### **i. EXERCISE PHYSIOLOGY**

#### Control of Internal Environment

Homeostasis, Control systems of the body, Nature of the control system, Examples of homeostatic control and Exercise: A test of homeostatic control.

Hormonal Responses to Exercise (Brief Revision)

Hormonal Regulation of Metabolism During Exercise

Measurement of Work, Power & Energy Expenditure

Units of measure, Work and power defined, Measurement of work and power, Measurement of energy expenditure, Estimation of energy expenditure and Calculation of exercise efficiency.

Circulatory Responses to Exercise:

Organization of the circulatory system, Heart: myocardium and cardiac cycle, Cardiac output, Hemodynamics, Changes in oxygen delivery to muscle during exercise, Circulatory responses to exercise, Regulation of cardiovascular adjustments to exercise.

Respiration During Exercise (Brief Revision)

Ventilatory and blood-gas responses to exercise, Control of ventilation.

Temperature Regulation

Overview of heat balance during exercise, Overview of heat production/heat loss, Body's thermostat-hypothalamus, Thermal events during exercise, Exercise in the heat, Exercise in cold environment

The Physiology of Training: Effect on Vo<sub>2</sub> Max, Performance, Homeostasis and Strength

Principles of training, Endurance training and VO<sub>2</sub> max, Detraining and VO<sub>2</sub> max, effects on performance and homeostasis, Endurance training: links between muscle and system physiology, Physiological effects of strength training, Physiological mechanisms causing increased strength.

Physiology of Health and Fitness

Work Tests to Evaluate Cardio Respiratory Fitness

Cardio respiratory fitness, FIELD Tests for estimating CRF, Graded exercise testing protocols

Exercise Prescription for Health and Fitness

Prescription of exercise, General guidelines for improving fitness

Exercise for Special Populations

Diabetes, Asthma, Chronic obstructive pulmonary disease, Hypertension, Cardiac rehabilitation

Physiology of Performance

Factors Affecting Performance:

Sites of fatigue, Factors limiting All-out anaerobic performances and Factors limiting All-out aerobic performances

Laboratory Assessment of Human Performance:

Laboratory assessment of physical performance, Direct testing of maximal aerobic power, Laboratory tests to predict endurance performance, Determination of anaerobic power, Evaluation of muscular strength

Training of Performance

Training principles, Components of a training session: warm-up, workout and cool down, Training to improve aerobic power, Injuries and endurance training, Training for improved anaerobic power, Training to improve muscular strength, Training for improved flexibility, Common training mistakes

Training for the female athlete, children and special population

Factors important to women involved in vigorous training, Sports conditioning for children, Competitive training for diabetics, Training for asthmatics and Epilepsy and physical training

## **ii. HEALTH AND WELLNESS**

Prevention Practice: a Holistic Perspective for Physical Therapy:

Defining Health, Predictions of Health Care, Comparing Holistic Medicine and Conventional Medicine, Distinguishing Three Types of Prevention Practice.

Healthy People:

Definition of healthy people, Health education Resources, Physical Therapist role for a healthy community.

Health, Fitness, and Wellness Issues during Childhood and Adolescence:

Recognizing and Reporting Child abuse, Denver II Developmental Screening, Special Concerns in Pediatrics and Program for Prevention of Obesity

Health, Fitness, and Wellness during Adulthood:

Tasks of Adulthood, Adult Health and Wellness Risks, Screening Tools for Adulthood and Adult Educational Materials

Resources to Optimize Health and Wellness:

Chronic Illness, Nutrition, Progressive Relaxation, Time management and Spirituality.

Health Protection:

Infection Control, Injury Prevention during Childhood, Injury prevention during Adolescence, Injury Prevention during Adulthood, Injury Prevention during Older Adulthood.

### **Practicals:**

Measurement of work, power and energy expenditure by using

Bench step, Ergometer, Treadmill

Testing aerobic endurance:

Predicting VO<sub>2</sub> max using the Harvard step test, Astrand Treadmill Test, Balke Treadmill Test, Time limit test, Astrand Cycle Test, The effects of endurance and strength exercise on CV response, Lactate testing

Testing anaerobic capacity:

Wingate test, Jumping power tests, Quebec 10-second test

Assessing muscular efficiency:

Muscle Length Testing:

Muscle Length Assessment techniques (Lower-Quarter Muscles, Upper-Quarter Muscles) Hypermobility

Muscle strength, speed and power:

Quantitative muscle strength assessment, Core Muscle Strength and Stability Test, Grip Strength Test, Wall Squat Test, 10 Stride Test, Kosmin Test, The LAS (Lactic vs. Speed) Test

Physiological testing protocols for flexibility, Balance and Agility:

Modified Sit & Reach Test, Static Flexibility Test, Standing Stork Test, Hexagonal Obstacle Test, Static balance, quantitative and qualitative assessment of balance, Janda's perturbation test

Body Composition analysis:

Body Mass index, Skin fold caliper Testing, Bioimpedance testing

Physiological Protocols for the Assessment of Athletes in Specific Sports:

Cricket, hockey, football, volleyball, Runners, Rugby, cyclist, Tennis

Monitoring during Training and exercise:

Heart rate measurement, Body weight maintenance and hydration status, Fluid loss evaluation, Evaluation of external and internal trainingload, perceptual wellbeing and physical readiness, stroop test and stretch reflex

### **Recommended Text Book**

1. Exercise Physiology- Theory and Application to Fitness and Performance by: Scott K. Powers, Edward T. Howley.

2. Exercise physiology, A thematic Approach By: Tudor Hale, University College Chichester, UK
3. A Physical Therapist's Guide to Health, Fitness, and Wellness by Catherine R Thompson, PhD, MS, PT
4. ACSM's guidelines for exercise testing and prescription by Linda S. Pescatello
5. 101 Performance Evaluation tests by Brain McKenzie
6. Physiological Tests for Elite Athletes by Rebecca K. Tanner and Christopher J. Gore
7. Assessment and Treatment of Muscle Imbalance by Phil page, Frank, Clark and Lardner, Robert
8. Additional study material as assigned by the tutor

## **REPORT WRITING**

In Final Year the students will be given a particular topic for research report writing. A Supervisor shall be allotted by the Incharge / Chairperson and approved by the concerned Dean, to a group of up to 10-25 students in one group. The Supervisor shall allot a specific topic for research. The group of students shall prepare a research report and submit it to the Incharge / Chairperson of department through allotted Supervisor for approval. This report shall be evaluated by a committee notified by the Dean after recommendation by the Incharge / Chairperson, comprising of 03 senior most teachers of the department. If approved the group of students shall be confirmed for award of degree. The details of the report are given below.

- Title page
- Names of students
- Students I.D number
- Supervisor's name
- Program name
- Name of the department
- Project title
- Abstract

### **Abstract**

A maximum of one page (200 words) on the work performed and your main conclusions. Abstract should be single line spacing, should not contain any figures, contain a maximum of 2 references, and written in Arial / New Times Roman font size 11. The title of the project should be on the first line (Arial / New Times Roman size 11, bold). The name of the student and their supervisor should appear on the next line (Arial / New Times Roman size 11, italic). The abstract should be then be included as a single paragraph. References (if required) should be included at the end (Arial / New Times Roman, size 9).

### **Points into account while writing Abstract**

Explain the purpose of your study/paper. This should optimally be only one sentence long. State the primary objectives and scope of the study or the reasons why the document was written (unless these things are already clear from the title of the document or can be derived from the rest of the abstract). Also state the rationale for your research. Why did you do the research? Is the topic you are researching an ignored or newly discovered one? In terms of Methodology (research methods), clearly states the techniques or approaches used in your study. If you want to introduce new methods or approaches in your abstract, keep in mind the need for clarity.

Describe your results (the findings of your experimentation), the data collected, and effects observed as informatively and concisely as possible. These results of course may be experimental or theoretical, but remember the difference between conjecture and fact and note them in your abstract. Give special priority in your abstract to new and verified events and findings that contradict previous theories. Mention any limits to the accuracy or reliability of your findings.

By stating your conclusions, you are in essence describing the implications of the results: why are the results of your study important to your field and how do they relate to the purpose of your

Investigation? Often conclusions are associated with recommendations, suggestions and both rejected and accepted hypotheses. You may wish to include information that is

incidental to the main purpose of your paper, but is valuable to those outside your area of study. If you choose to include such information, be careful not to exaggerate its relative importance to the abstracted document

### **Declaration of Originality**

Place on a separate page;

"We hereby declare that this project is entirely our own work other than the counsel of our supervisor and that it has not been submitted for any academic award, or part thereof, at this or any other Educational Institution"

Signed:                      Authors

Counter signed:        Supervisor

### **Acknowledgements (Optional)**

To include those individuals or groups of individuals you would like to thank in relation to the support you received.

### **Table of Contents**

You should list all of the sections and sub-sections, together with their corresponding page numbers

List of Tables

List of Figures

List of Appendices

### **Suggested Chapter Structure**

The following outlines a chapter structure suitable to a project, which involved a distinct component of data collection. The structure of the main body is flexible and you should discuss an appropriate structure with your supervisor. The content and importance of each section will depend on the type of project you are undertaking and again should be discussed with your supervisor before submission.

#### **Chapter 1. Introduction**

- i) Introduction (Very brief review of literature and indicate significance of study)
- ii) Statement of Problem (Should include clear purpose of study)
- iii) Questions/Hypothesis
- iv) Outline Methodology
- v) Definition of Terms

The introduction should 'set the scene' for the examiners and enable them to appreciate the relevance of your work in a particular research area.

#### **Chapter 2. Literature Review**

A literature review is an extended essay, which is based on source material. In simple terms, the merit of your literature review is proportional to the comprehensive nature and originality of your sources. Your writing should be confined to the questions/hypothesis being examined. A literature review is more than a listing of references. You should attempt to synthesize a new understanding of your topic, and provide a critique of what other commentators have had to say on the subject.

#### **Chapter 3. Methodology**

- i) Participant Selection (Including ethical considerations)
- ii) Experimental Design
- iii) Measurement Procedures
  - Data collection procedures
  - Rationale for selecting these procedures/questions
- iv) Analysis of Data

The methodology should describe the characteristics of the subjects, award of ethical approval, and where appropriate the apparatus, calibration procedures, reliability of the methods used, experimental protocols and the statistical treatments of the data. Diagrams and photographs may be appropriate to illustrate procedures.

#### **Chapter 4. Analysis of Results**

Your results should consist of tables of your findings, illustrated with graphs where appropriate. The results section should contain text, which takes the reader through your graphs and tables, pointing out the salient features. Tables should wherever possible summarize the data from several subjects in the form of means and standard deviations. You do not need to give tables of every piece of original data. If you feel it is essential to include these put them in an appendix.

#### **Chapter 5. Discussion of Results**

It is good practice to begin with a summary of your findings. This is your opportunity to interpret your data in the context of what is already known from existing literature. However, make every effort to explain your findings first, justifying the arguments by reference to previously published work, NOT the other way around. The discussion is the place for explanations and opinions. Link your findings with the purpose/questions/hypothesis of your project. Include critical appraisal of your own work and that of others. Address what you would do differently with hindsight?

#### **Chapter 6. Conclusion**

- Summary of main findings
- Recommendations (Impact of findings and future research)
- Conclusion

This section should summarize main findings, highlight areas where more work is needed and suggest avenues for future development of this work. An overall conclusion from the study should be included to complete the project.

**References:** A list of references must be included at the end of the project document and appropriately referenced within the text according to a recognized standard of the University.

**Appendices:** In this section, if required, include any raw data, interview transcript, computer program listings, and questionnaires etc., which were not in the results section, but which may need to be consulted.