



DOCTOR OF PHYSICAL THERAPY CURRICULUM

**INSTITUTE OF PHYSICAL MEDICINE AND REHABILITATION
KHYBER MEDICAL UNIVERSITY, PESHAWAR**

Vision & Mission

Khyber Medical University (KMU) Vision:

Khyber Medical University will be the global leader in health sciences academics and research for efficient and compassionate health care.

Khyber Medical University (KMU) Mission:

Khyber Medical University aims to promote professional competence through learning and innovation for providing comprehensive quality health care to the nation.

Doctor of Physical Therapy (DPT) Vision

The vision of a DPT program often focuses on the program's future aspirations for its students, faculty, and the profession of physical therapy. To be a leader in physical therapy education and practice by preparing competent, compassionate, and innovative physical therapists who are committed to improving the quality of life for individuals and communities globally.

IPM&R is a globally recognized institute that champions integrity, Altruism, Collaboration, Prosperity, innovation and research, Community wellbeing, inclusiveness and excellence in all aspects of Physical Therapy. We aspire to create a positive impact on society by fostering a culture of excellence and collaboration in education, research, and community engagement.

Doctor of Physical Therapy (DPT) Mission

To provide a comprehensive, evidence-based physical therapy education that fosters clinical expertise, critical thinking, professionalism, and a commitment to lifelong learning. Our program aims to prepare graduates to deliver high-quality patient care, promote health and wellness, and advance the physical therapy profession through research, advocacy, and community service.

The physical therapy program is dedicated to excellence as demonstrated through national recognition. It is committed to academic inquiry and expression by fostering evidence-based healthcare research, teaching, service and public engagement. It focuses to cultivating leadership, integrity, and engaged citizenship in the students, faculty, staff, and alumni

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PROGRAMME INTRODUCTION

The Doctor of Physical Therapy (DPT) program was started in year 2009 at Institute of Physical Medicine and Rehabilitation (IPM&R), KMU. DPT is a professional doctoral degree designed to prepare individuals for a rewarding career as licensed physical therapists. Physical therapists (PTs) are healthcare professionals who diagnose and treat individuals of all ages with various physical impairments, functional limitations, or disabilities. They use evidence-based interventions to restore and enhance movement, manage pain, and improve the overall quality of life of patients. DPT program offers opportunities for specialization in areas such as: Orthopedics, Neurology, Cardiopulmonary, Gynecology, Pediatrics and Sports Rehabilitation. Hence, Physical therapy covers basic parameters of healing sciences i.e. preventive, promotive, diagnostic, rehabilitative, and curative.

Core Values

- 1) **Integrity:** integrity is a fundamental core value in physical therapy, essential for building trust and promoting positive outcomes in patient care. It encompasses transparency in communication, respect for patient confidentiality, adherence to professional codes of ethics, and to ensures that the therapist prioritizes the patient's well-being.
- 2) **Altruism:** Altruism refers to the selfless concern for the well-being of patients, where physical therapist prioritizes patients' health, recovery, and overall quality of life over personal gain.
- 3) **Collaboration:** Collaboration refers to the active and cooperative effort between physical therapists, patients, and other healthcare professionals to achieve optimal patient outcomes.
- 4) **Prosperity:** prosperity defines the successful achievement of positive, sustainable health outcomes for patients, along with the growth and well-being of the therapy practice and profession.
- 5) **innovation and research:** Innovation and research in physical therapy refer to the continuous pursuit of new treatment methods, technologies, and evidence-based practices to improve patient care.
- 6) **Community well-being:** Community well-being in physical therapy emphasizes a commitment to improving public health, fostering inclusivity, and creating environments where individuals can lead active, healthier lives.
- 7) **Inclusiveness:** Inclusiveness ensures that all individuals, regardless of their background, abilities, or socioeconomic status, have equal access to compassionate and effective care.
- 8) **Excellence:** Excellence in physical therapy embodies a dedication to delivering the highest quality of care, demonstrating professional expertise and commitment to achieving optimal results for patients and elevating standards in the field.

GOALS OF THE PROGRAM:

The purpose of the Doctor of Physical Therapy Program (DPT) is to prepare Physical Therapists who will:

- Be primary providers of physical therapy care.
- Serve as responsible members in the professional community and are willing and able to assume leadership roles in the communities they serve.
- Identify researchable problems, advocate and participate in research, and incorporate research findings into clinical practice.
- Understand and place in context the social, economic and cultural issues of practice and effectively advocate for changes in policy
- Correlate theory with practice and thinks creatively about, react to, adapt or shape new practice environments.
- Participate in and provide education for communities, patients, peers, students and others.

OBJECTIVES OF THE PROGRAM:

Graduates of the Doctor of Physical Therapy Program will:

- Manifest in-depth knowledge of the basic and clinical sciences relevant to physical therapy, both in their fundamental context and in their application to the discipline of physical therapy.
- Apply theoretical foundations of knowledge to the practice of physical therapy; evaluate and clarify new or evolving theory relevant to physical therapy.
- Develop and utilize the process of critical thinking and inquiry, particularly focused on the improvement of the practice of physical therapy and the delivery of health care.
- Engage in reflective practice through sound clinical decision making, critical self-assessment and commitment to lifelong learning.
- Mastery entry level professional clinical skills. Provision of these services is based on the best available evidence and includes physical therapy examination, evaluation, diagnosis, prognosis, intervention, prevention activities, wellness initiatives and appropriate health care utilization.
- Advocate for human health care regulations and policies that are consistent with the needs of the patient and of the society.
- Exhibit leadership, management, and communication skills to effectively participate in physical therapy practice and the health care team.
- Model positive attitudes and behaviors to all persons.
- Adapt professional and social skills to adapt to changing health care environments to effectively provide physical therapy care

LEARNING OUTCOMES

By the end of the program students should be able to;

COGNITIVE DOMAIN

The cognitive domain involves knowledge, understanding, and intellectual skills. In the DPT curriculum, this domain is emphasized in areas such as:

Theoretical knowledge: Anatomy, physiology, pathology, biomechanics, pharmacology, and neurology.

Clinical reasoning and critical thinking: Applying theoretical knowledge to assess, diagnose, and develop treatment plans for patients.

Research and evidence-based practice: Understanding and applying scientific literature to inform patient care.

Ethical decision-making: Understanding the ethical principles related to patient care and professional conduct.

Communication skills: The ability to effectively communicate with patients, families, and other healthcare professionals.

PSYCHOMOTOR DOMAIN

The psychomotor domain refers to physical and motor skills, which are crucial in physical therapy practice. This domain focuses on:

Hands-on skills: Manual therapy techniques, including mobilization, manipulation, soft tissue work, and therapeutic exercises.

Clinical skills: Patient evaluation techniques such as gait analysis, range of motion testing, strength assessment, and special orthopedic tests.

Equipment handling: Proper use of modalities such as ultrasound, electrical stimulation, and assistive devices like walkers, crutches, and wheelchairs.

Coordination and dexterity: Fine motor skills necessary for precise movements and handling of patients during treatment.

AFFECTIVE DOMAIN

The affective domain relates to attitudes, values, and emotional behaviors. In the DPT curriculum, this domain is critical for developing:

Professionalism: Demonstrating responsibility, dependability, and accountability in clinical practice.

Empathy and compassion: Understanding patients' emotional and psychological needs while managing their physical conditions.

Cultural competence: Recognizing and respecting diverse patient backgrounds, beliefs, and values.

Teamwork and collaboration: Working effectively with other healthcare providers in an interdisciplinary team.

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COURSE OUTLINE

Sr. No	General Education Courses	Credit Hours	Inter Disciplinary Subjects	Credit Hours	Discipline Specific Courses	Credit Hours	SCP/ Inter nship	Capstone/ Research Project
	Total Courses:	15	Total Courses:	10	Total Courses:	36	2 Courses	1 Course
1.	Arts And Humanities	2(2-0)	HUMAN PSYCHOLOGY	2(2-0)	KINESIOLOGY-I	3(2-1)	Internship 3 Credits	3 Credits
2.	Natural Sciences-principles of biology	3(2-1)	PRINCIPLES OF BIOCHEMISTRY	3 (3-0)	KINESIOLOGY-II	3(2-1)		
3.	Social Sciences-Introduction to sociology	2(2-0)	PROFESSIONAL PRACTICE	2(2-0)	COMMUNITYMEDICINE&REHABILITATION	3(2-1)		
4.	Functional English	3(3-0)	MOLECULARBIOLOGY&GENETICS	2(2-1)	THERAPEUTIC EXERCISES & TECHNIQUES	3(2-1)		
5.	Expository Writing	3(3-0)	RADIOLOGY& DIAGNOSTICIMAGING	3(2-1)	BIOMECHANICS&ERGONOMICS	3(2-1)		
6.	Applications Of Information And Communication Technologies (ICT)	3(2-1)	PATHOLOGY&MICROBIOLOGY-I	2(2-0)	PHYSICALAGENTS& ELECTROTHERAPY-I	3(2-1)	Supervised Clinical practice (SCP-I to SCP-VI) 23 Credits	
7.	Entrepreneurship *	2(2-0)	ARTIFICIAL INTELLIGENCE IN HEALTH CARE	2(2-0)	PHYSICALAGENTS& ELECTROTHERAPY-II	3(2-1)		
8.	Civics And Community Engagement **	2(2-0)	PATHOLOGY&MICROBIOLOGY-II	3(2-1)	NEUROLOGICALPHYSICALTHERAPY	3(3-0)		
9.	Islamic Studies	2(2-0)	BIOSTATISTICS	3(3-0)	MUSCULOSKELETALPHYSICALTHERAPY	3(2-1)		

10.	Ideology And Constitution Of Pakistan	2(2-0)	MEDICAL PHYSICS	3 (2-1)	SPORTSPHYSICALTHERAPY	2(2-0)		
11.	Quantitative Reasoning I	3(3-0)			EXERCISEPHYSIOLOGY	3(2-1)		
12.	Quantitative Reasoning II	3(3-0)			CARDIOPULMONARYPHYSICALTHERAPY	3(2-1)		
13.	Understanding of Holy Quran-I	1(0-1)			PROSTHETICS&ORTHOTICS	2(2-0)		
14.	Understanding of Holy Quran-II	1(0-1)			CLINICALDECISION MAKING&DIFFERENTIALDIAGNOSIS	3(3-0)		
15.	Pakistan studies	2(2-0)			EMERGENCYPROCEDURES & PRIMARYCAREIN PHYSICAL THERAPY	2(1-1)		
16.					MANUALTHERAPY	3(3-0)		
17.					INTEGUMENTARYPHYSICALTHERAPY	2(1-1)		
18.					WOMENS HEALTH PHYSICAL THERAPY	3(3-0)		
19.					PEDIATRIC & NEONATAL PHYSICALTHERAPY	3(3-0)		
20.					GERIATRIC PHYSICALTHERAPY	3(3-0)		
21.					ANATOMY –I	3(2-1)		
22.					PHYSIOLOGY-I	3(2-1)		
23.					ANATOMY –II	3(2-1)		
24.					PHYSIOLOGY-II	3 (2-1)		
25.					NEUROANATOMY	3(2-1)		
26.					PHYSIOLOGY-III	3(2-1)		
27.					ANATOMY-IV	3(2-1)		
28.					PHARMACOLOGY& THERAPEUTICS–I	2(2-0)		
29.					PHARMACOLOGY& THERAPEUTICS–II	2(2-0)		
30.					SUSTAINABLE DEVELOPMENT GOALS: HEALTH & WELLBEING	2(2-0)		

31.					MEDICINE–I	3(3-0)		
32.					SURGERY–I	3(3-0)		
33.					SCIENTIFICINQUIRY & RESEARCHMETHOD S	3(2-1)		
34.					MEDICINE–II	3(3-0)		
35.					SURGERY–II	3(3-0)		
36.					EVIDENCEBASEDPR ACTICE	3(2-1)		
37.								
TOTAL Cr.Hrs: 189		34 Cr.hrs		25 Cr.hrs		101 Cr.hrs	26 Cr Hrs	3 Cr Hrs

SCHEME OF STUDIES

SEMESTER 1

COURSE CODE	SUBJECT	CREDIT HOUR
RSC-601	ANATOMY –I	3(2-1)
RSC-602	PHYSIOLOGY-I	3(2-1)
RSC-603	KINESIOLOGY-I	3(2-1)
RSC-608	FUNCTIONAL ENGLISH *	3 (3-0)
RSC-609	APPLICATIONS OF ICT *	3 (2-1)
RSC-607	IDEOLOGY & CONSTITUTION OF PAKISTAN *	2 (2-0)
DPT-700	HUMAN PSYCHOLOGY	2 (2-0)
		19

SEMESTER 2

COURSE CODE	SUBJECT	CREDIT HOUR
RSC-611	ANATOMY – II	3 (2-1)
RSC-612	PHYSIOLOGY – II	3 (2-1)
RSC-613	KINESIOLOGY – II	3 (2-1)
RSC-626	SOCIAL SCIENCES – INTRODUCTION TO SOCIOLOGY	2 (2-0)
RSC-616	EXPOSITORY WRITING *	3 (3-0)
RSC-615	ISLAMIC STUDIES *	2 (2-0)
RSC-691	UNDERSTANDING OF HOLY QURAN – I *	1 (0-1)
		17

SEMESTER 3

COURSE CODE	SUBJECT	CREDIT HOUR
RSC-631	NEUROANATOMY	3 (2-1)
RSC-623	PHYSIOLOGY – III	3 (2-1)
RSC-616	MEDICAL PHYSICS	3 (2-1)
RSC-634	PRINCIPLES OF BIOCHEMISTRY & BASIC NUTRITION	3 (3-0)
RSC-692	UNDERSTANDING OF HOLY QURAN – II *	1 (0-1)
RSC-605	PAKISTAN STUDIES	2 (2-0)
RSC-686	QUANTITATIVE REASONING – I *	3 (3-0)
		18

SEMESTER 4

COURSE CODE	SUBJECTS	CREDIT HOURS
RSC-622	ANATOMY IV	3 (2-1)
RSC-624	BIOMECHANICS & ERGONOMICS	3 (2-1)
RSC-635	EXERCISE PHYSIOLOGY	3 (2-1)
RSC-645	QUANTITATIVE REASONING-II *	3 (3-0)
RSC-644	ENTREPRENEURSHIP *	2 (2-0)
RSC-683	CIVICS AND COMMUNITY ENGAGEMENT *	2 (2-0)
RSC-634	NATURAL SCIENCES ****	3 (2-1)
		19

SEMESTER 5

COURSE CODE	SUBJECTS	CREDIT HOURS
RSC-682	ARTS AND HUMANITIES	2 (2-0)
RSC-642	PHARMACOLOGY & THERAPEUTICS – I	2 (2-0)
DPT-641	PHYSICAL AGENTS & ELECTROTHERAPY – I	3 (2-1)
RSC-636	COMMUNITY MEDICINE & REHABILITATION	3 (2-1)
RSC-641	PATHOLOGY & MICROBIOLOGY – I	2 (2-0)
RSC-687	ARTIFICIAL INTELLIGENCE IN HEALTHCARE	2 (2-0)
DPT-640	SUPERVISED CLINICAL PRACTICE – I	3 (0-3)
		17

SEMESTER 6

COURSE CODE	SUBJECTS	CREDIT HOURS
RSC-652	PHARMACOLOGY & THERAPEUTICS – II	2 (2-0)
DPT-651	PHYSICAL AGENTS & ELECTROTHERAPY – II	3 (2-1)
DPT-642	THERAPEUTIC EXERCISES & TECHNIQUES	3 (2-1)
RSC-627	SUSTAINABLE DEVELOPMENT GOALS: HEALTH & WELLBEING	2 (2-0)
RSC-651	PATHOLOGY & MICROBIOLOGY – II	3 (2-1)
RSC-634	MOLECULAR BIOLOGY & GENETICS	2 (2-0)
DPT-650	SUPERVISED CLINICAL PRACTICE – II	4 (0-4)
		19

SEMESTER 7

COURSE CODE	SUBJECTS	CREDIT HOURS
RSC-661	MEDICINE – I	3 (3-0)
RSC-662	SURGERY – I	3 (3-0)
DPT-661	MUSCULOSKELETAL PHYSICAL THERAPY	3 (2-1)
RSC-663	RADIOLOGY & DIAGNOSTIC IMAGING	3 (2-1)
RSC-664	BIOSTATISTICS	3 (3-0)
DPT-660	SUPERVISED CLINICAL PRACTICE – III	4 (0-4)
		19

SEMESTER 8

COURSE CODE	SUBJECTS	CREDIT HOURS
DPT-671	NEUROLOGICAL PHYSICAL THERAPY	3 (2-1)
RSC-671	MEDICINE – II	3 (3-0)
RSC-672	SURGERY – II	3 (3-0)
DPT-693	SPORTS PHYSICAL THERAPY	2 (1-1)
RSC-681	SCIENTIFIC INQUIRY & RESEARCH METHODS	3 (2-1)
DPT-640	PROFESSIONAL PRACTICE IN HEALTHCARE	2 (2-0)
DPT-670	SUPERVISED CLINICAL PRACTICE – IV	4 (0-4)
	TOTAL	20

SEMESTER 9

COURSE CODE	SUBJECTS	CREDIT HOURS
DPT-681	CARDIOPULMONARY PHYSICAL THERAPY	3 (2-1)
RSC-643	PROSTHETICS & ORTHOTICS	2 (2-0)
DPT-683	CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS	3 (3-0)
DPT-682	EMERGENCY PROCEDURES IN PHYSICAL THERAPY	2 (1-1)
RSC-673	EVIDENCE BASED PRACTICE	3 (2-1)
DPT-680	SUPERVISED CLINICAL PRACTICE – V	4 (0-4)
DPT-685	INTEGUMENTARY PHYSICAL THERAPY	2 (1-1)
TOTAL CREDITS		19

SEMESTER 10

COURSE CODE	SUBJECTS	CREDIT HOURS
DPT-652	MANUAL THERAPY	3 (2-1)
DPT-684	GERIATRIC PHYSICAL THERAPY	3 (2-1)
DPT-691	WOMEN'S HEALTH PHYSICAL THERAPY	3 (2-1)
DPT-692	PEDIATRIC & NEONATAL PHYSICAL THERAPY	3 (2-1)
DPT-699	CAPSTON/RESEARCH PROJECT	3 (0-3)
DPT-690	SUPERVISED CLINICAL PRACTICE – VI	4 (0-4)
TOTAL		19

Color Coding

1. Discipline specific courses
2. Interdisciplinary subjects
3. General Education course
4. Supervised clinical practice/Internship
5. Capstone Project /Research Project

SEMESTER I

ANATOMY– I 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Identify major anatomical structures of the human body through dissection and cadaver lab work.
- Demonstrate understanding of regional anatomy focusing on the upper and lower extremities.
- Describe the basic function and inter relation of major organ systems.
- Analyze anatomical variations and their clinical significance through practical lab exercises.

Course Description:

The focus of this course is an in-depth study and analysis of the regional and systemic organization of the body. Emphasis is placed upon structure and function of human movement. A comprehensive study of human anatomy with emphasis on the nervous, musculoskeletal, and circulatory systems is incorporated. Introduction to general anatomy lays the foundation of the 2nd course. Dissection and identification of structures in the cadaver supplemented with the study of charts, models, materials and radiographs are utilized to identify anatomical landmarks and configurations of the upper limb and thoracic region.

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 marking
- Cartilage
- Development of bone and cartilage
- 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
- Nomenclature.
- Microscopic picture of muscle

STRUCTURES RELATED TO MUSCLES & BONES

- Tendons
- Aponeurosis
- Fasciae
- Synovial bursae
- Tendon Synovial sheaths
- Raphaes
- Ligaments
- Condyle
- Epicondyle
- Ridge
- Tuberosity
- Tubercle
- Foramen
- Canal
- Groove
- Process
- 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
- Factors responsible for joint stability.
- Development of joints

CARDIOVASCULAR SYSTEM

- Definition
- Division of circulatory system into pulmonary & systemic
- Classification of blood vessels and their microscopic picture
- Heart and its histology
- Function of the Heart
- 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
- Microscopic picture of nerve
- Introduction of autonomic nervous system
- 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,
- Palmar apouenrosis
- Flexor tendon dorsal digital expansion

NEUROLOGY

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

ANGIOLOGY (CIRCULATION).

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

ARTHROLOGY

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

- 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
- Demonstration on Brachial plexus.
- Demonstration of blood supply of brain.
- 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
- Lymphatic drainage of thoracic wall
- 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 in-ferior vena cava., pulmonary veins
brachiocephalic veins.
- Large Arteries – Aorta & its branches

PRACTICAL

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

RECOMMENDED TEXT BOOKS:

- *Gray's Anatomy* by Prof. Susan Standring 39th Ed., Elsevier.

- *Clinical Anatomy for Medical Students* by Richard S.Snell.
- *Clinically Oriented Anatomy* by Keith Moore.
- *Clinical Anatomy* by R.J. Last, Latest Ed.
- *Cunningham's Manual of Practical Anatomy* by G.J. Romanes, 15th Ed., Vol-I, II and III.
- *The Developing Human. Clinically Oriented Embryology* by Keith L. Moore, 6th Ed.
- *Wheater's Functional Histology* by Young and Heath, Latest Ed.
- *Medical Histology* by Prof. Laiq Hussain.
- *Neuroanatomy* by Richard S.Snell

PHYSIOLOGY–I 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Describe the cellular and molecular basis of physiological processes including cell membrane function and cellular metabolism.
- Explain the physiological mechanisms regulating fluid and electrolyte balance in the body.
- Analyze the physiological responses to exercise and physical stress.
- Perform basic physiological measurements in laboratory settings

Course Description:

- The course is designed to study the function of the human body at the molecular, cellular, tissue and systems levels.
- The major underlying themes are: the mechanisms for promoting homeostasis; cellular processes of metabolism, membrane function and cellular signaling; the mechanisms that match supply of nutrients to tissue demands at different activity levels; the mechanisms that match the rate of excretion of waste products to their rate of production; the mechanisms that defend the body against injury and promote healing.
- These topics are addressed by a consideration of nervous and endocrine regulation of the cardiovascular, hematopoietic, pulmonary, renal, gastrointestinal, and musculoskeletal systems including the control of cellular metabolism. The integrative nature of physiological responses in normal function and disease is stressed throughout the course.
- This course will serve as prerequisite for the further courses i.e. exercise physiology, pathology, etc.

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
- 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
- Triple response and cutaneous circulation
- Foetal circulation and circulatory changes at birth

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

PHYSIOLOGY PRACTICALS

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 BOOKS

Textbook of Physiology by Guyton and Hall, Latest Ed.

Review of Medical Physiology by William F. Ganong, Latest Ed.

Physiology by Berne and Levy, Latest Ed.

Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards

Physiological Basis of Medical Practice by John B. West and Taylor, 12th Ed.

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Identify major skeletal muscles and their actions in human movement.
- Demonstrate proficiency in palpation and surface anatomy for muscle identification.
- Analyze joint mechanics and movement pattern functional activities.
- Apply kinesiological principles to assess and treat movement impairment in physical therapy practice.

Course Description:

- This course covers the definition of kinesiology and its importance to physical therapy and identifies the scope of kinesiology studies and their application.
- The types of human motions and their planes of motions and its relative axes explain the inter-relationship among kinematic variables, and utilize the sknowledge of this inter-relationship to describe and analyze motion.
- The classification of the joints or muscles and their characteristics distinguishing Arthrokinematics movements from Osteo-kinematic movements and explain their relationship and the difference among agonists, antagonists, and synergists integrate the knowledge learned with human motion occurring during daily activities.

Detailed Course Outline:

Introduction to Kinesiology

- Definition of kinesiology
- Definition of rehabilitation

Mechanics:

Mechanical Principles and Mechanics Of Position

- Force - force system - Description units.
- Gravity - Center 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
- Types of muscle contraction
- Types of muscle work
- Range of muscle work
- Strength of muscle contraction
- Group action of muscles
- Patterns of movement
- Timing in movement
- The nervous control of movement
- Rhythm of movement

Starting Positions

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

Muscle Strength and Muscle Action

- Types of Muscles contraction
- Muscles tone
- Physiological application to postural tone
- Group action of muscles
- Pattern of movement
- Timing in movement
- Rhythm of movement
- Overview of muscle structure
- Types of muscle work
- Range of muscle work
- Group action of muscles
- Two joint muscle work
- Group movement of joints
- Muscular weakness and paralysis

Relaxation

- Definition Muscle tone Postural tone
- Voluntary movement Mental attitudes
- Degrees of relaxation Pathological tension
- 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
- Positions 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 Quadrapod
- Frames

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
- Biomechanics of human bone growth and development

Kinematic 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.
- Uses of available instrumentation for measuring kinetic quantities

Angular Kinetics of Human Movement

- Angular analogues of mass, force, momentum and impulse
- Angular analogues of Newton's laws of motion
- Centripetal and Centrifugal forces
- Angular acceleration

Angular Kinematics of Human Movement

- Measuring body angles
- Angular kinematics Relationships
- Relationship between Linear and Angular motion

Practical Training/ Lab Work

- Manual muscle testing
- Fundamentals of muscle testing
- Techniques of muscle recording
- Basic muscle grading system
- Regional upper limb muscle testing as the region is covered in Anatomy I
- Practical demonstrations of relaxation procedures
- Practical demonstrations of various derived positions
- Practical demonstrations of muscles work and its ranges

Recommended text books:

- *Practical exercise therapy* by Margaret Hollis
- *Brunnstrom's Clinical Kinesiology*
- *Clinical kinesiology and anatomy* by Lynn S Lippert
- *Joint structure and function: a comprehensive analysis* by: Pamela. K. Levangie and Cynthia. C. Norkin.
- *Muscle function testing by:* Cunningham and Daniel.
- *Human movement explain* by kimjonas and karenbaker
- *The principles of exercise therapy* by: M Dena Gardiner, 4th Edition

Objectives:

Enhance language skills and develop critical thinking.

Course Contents

- Basics of Grammar
- Parts of speech and use of articles
- Sentence structure, active and passive voice
- Practice in unified sentence
- Analysis of phrase, clause and sentence structure
- Transitive and intransitive verbs
- Punctuation and spelling

Comprehension

Answers to questions on a given text

- **Discussion**
General topics and every-day conversation (topics for discussion to be at the discretion of the teacher keeping in view the level of students)
- **Listening**
To be improved by showing documentaries/films carefully selected by subject teachers
- **Translation skills**
Urdu to English
- **Paragraph writing**
Topics to be chosen at the discretion of the teacher
- **Presentation skills**
Introduction
- *Note: Extensive reading is required for vocabulary building*

Recommended books:

- a) Grammar
 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
- b) Writing
 1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Francoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
- c) Reading/Comprehension
 1. Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
- d) Speaking

Ideology and Constitution of Pakistan 2(2-0)

Course Learning Outcome

By the end of this course, students will be able to:

- Demonstrate enhanced knowledge of the basis of the ideology of Pakistan with special reference to the contributions of the founding fathers of Pakistan.
- Demonstrate fundamental knowledge about the Constitution of Pakistan 1973 and its evolution with special reference to state structure.
- Explain about guiding principles on rights and responsibilities of Pakistani citizens as enshrined in the Constitution of Pakistan 1973.

Content

Introduction to the Ideology of Pakistan

- Definition and significance of ideology.
- Historical context of the creation of Pakistan (with emphasis on socio-political, religious, and cultural dynamics of British India between 1857 till 1947).
- Contributions of founding fathers of Pakistan in the freedom movement including but not limited to Allama Muhammad Iqbal and Muhammad Ali Jinnah, etc.
- Contributions of women and students in the freedom movement for separate homeland for
- Muslims of British India.

Two-Nation Theory:

- Evolution of the Two-Nation Theory (Urdu-Hindi controversy, Partition of Bengal, Simla Deputation 1906, Allama Iqbal's Presidential Address 1930, Congress Ministries 1937 Lahore Resolution 1940).
- Role of communalism and religious differences.

Introduction to the Constitution of Pakistan:

- Definition and importance of a constitution.
- Ideological factors that shaped the Constitution(s) of Pakistan (Objectives 1949).
- Overview of constitutional developments in Pakistan.

Constitution and State Structure:

- Structure of Government (executive, legislature, and judiciary).
- Distribution of powers between federal and provincial governments.
- 18th Amendments and its impact on federalism.

Fundamental Rights, Principles of Policy and Responsibilities:

- Overview of fundamental rights guaranteed to citizens by the Constitution of Pakistan 1973 (articles 8-28).
- Overview of Principles of policy (Articles 29-40).
- Responsibilities of the Pakistani citizens (Article 5).

Constitutional Amendments:

- Procedures for amending the Constitution.
- Notable constitutional amendments and their implications.

SUGGESTED INSTRUCTIONAL/ READING MATERIALS

- The Idea of Pakistan” by Stephen P. Cohen.
- Ideology of Pakistan” by Javed Iqbal.
- The Struggle for Pakistan” by I.H. Qureshi.
- Pakistan the formative Phase” by Khalid Bin Sayeed.
- Pakistan: Political Roots and Development” by Safdar Mahmood.
- Ideology of Pakistan” by Sharif-ul-Mujahid.
- The Struggle for Pakistan: A Muslim Homeland and Global Politics” by Ayesha Jalal.
- Jinnah, Pakistan and Islamic Identity: The Search for Saladin” by Akbar S. Ahmed.
- The Making of Pakistan: A Study in Nationalism” by K.K. Aziz.
- Pakistan: A New History” by Ian Talbot.
- Pakistan in the Twentieth Century: A Political History” by Lawrence Ziring.
- The Constitution of Pakistan 1973”. Original.
- Constitutional and Political Development of Pakistan” by Hamid Khan.
- The Parliament of Pakistan” by Mahboob Hussain.
- Constitutional Development in Pakistan” by G.W. Choudhury.
- Constitution-Making in Pakistan: The Dynamics of Political Order” by G.W. Choudhury

APPLICATIONS OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) 3(2-1)

Course Learning Outcomes:

By the end of this course, students will be able to:

- Explain the fundamental concepts, components, and scope of Information and Communication Technologies (ICT)
- Identify uses of various ICT platforms and tools for different purposes.
- Apply ICT platforms and tools for different purposes to address basic needs in different domains of daily, academic, and professional life
- Understand the ethical and legal considerations in use of ICT platforms and tools.

Content

Introduction to Information and Communication Technologies:

- Components of Information and Communication Technologies (basics of hardware, software, ICT platforms, networks, local and cloud data storage etc.).
- Scope of Information and Communication Technologies (use of ICT in education, business, governance, healthcare, digital media and entertainment, etc.).
- Emerging technologies and future trends.

Basic [CT Productivity Tools:

- Effective use of popular search engines (e.g., Google, Bing, etc.) to explore World Wide Web.
- Formal communication tools and etiquettes (Gmail, Microsoft Outlook, etc.).
- Microsoft Office Suites (Word, Excel, PowerPoint).
- Google Workspace (Google Docs, Sheets, Slides).
- Dropbox (Cloud storage and file sharing), Google Drive (Cloud storage with Google Docs integration) and Microsoft OneDrive (Cloud storage with Microsoft Office integration).
- Evernote (Note-taking and organization applications) and OneNote (Microsoft's digital notebook for capturing and organizing ideas).
- Video conferencing (Google Meet, Microsoft Teams, Zoom, etc.).
- Social media applications (LinkedIn, Facebook, Instagram, etc.).

ICT in Education:

- Working with learning management systems (Moodle, Canvas, Google Classrooms, etc.).
- Sources of online education courses (Coursera, edX, Udemy, Khan Academy, etc.).
- Interactive multimedia and virtual classrooms.

ICT in Health and Well-being:

- Health and fitness tracking devices and applications (Google Fit, Samsung Health, Apple Health, Xiaomi Mi Band, Runkeeper, etc.).
- Telemedicine and online health consultations (OLADOC, Sehat Kahani, Marham, etc.).

ICT in Personal Finance and Shopping:

- Online banking and financial management tools (JazzCash, Easypaisa, Zong PayMax, ILINK and MNET, Keenu Wallet, etc.).

- E-commerce platforms (Daraz.pk, Telemart, Shophive, etc.)

Digital Citizenship and Online Etiquette:

- Digital identity and online reputation,
- etiquette and respectful online communication.
- Cyberbullying and online harassment.

Ethical Considerations in Use of ICT Platforms and Tools:

- Intellectual property and copyright issues.
- Ensuring originality in content creation by avoiding plagiarism and unauthorized use of
- information sources,
- Content accuracy and integrity (ensuring that the content shared through ICT platforms is free from misinformation, fake news, and manipulation).

As part of the overall learning requirements, the course will include:

- Guided tutorials and exercises to ensure that students are proficient in commonly used software applications such as word processing software (e.g., Microsoft Word), presentation software (e.g., Microsoft PowerPoint), spreadsheet software (e.g., Microsoft Excel) among such other tools.
- Students may be assigned practical tasks that require them to create documents,
- presentations, and spreadsheets etc.
- Assigning of tasks that involve creating, managing, and organizing files and folders on both local and cloud storage systems. Students will practice file naming conventions, creating directories, and using cloud storage solutions (e.g., Google Drive, OneDrive).
- The use of online learning management systems (LMS) where students can access course
- materials, submit assignments, participate in discussion forums, and take quizzes and tests.
- This will provide students with the practical experience with online platforms commonly used in education and the workplace.

SUGGESTED INSTRUCTIONAL /READING MATERIALS

- "Discovering Computers" by Vermaat, Shaffer, and Freund.
- "GO! with Microsoft Office" Series by Gaskin, Vargas, and McLellan.
- "Exploring Microsoft Office" Series by Grauer and Poatsy.
- "Computing Essentials" by Morley and Parker,
- "Technology in Action" by Evans, Martin, and Poatsy.

COURSE LEARNING OUTCOMES

By the end of this course, students will be able to:

- Describe basic principles of human behavior and psychological development.
- Apply psychological theories to understand patients' attitudes, beliefs and motivations related to health behavior.
- Collaborate with mental health professionals to address psychosocial factors impacting patients care.

Content

Foundational Concepts in Psychology

- Introduction to Psychology:
- History of psychology.
- Major schools of thought (e.g., behaviorism, psychoanalysis, cognitive psychology, humanistic psychology).
- Methods of research in psychology (e.g., experiments, observational studies, surveys).

Biological Basis of Behavior:

- Brain structure and function.
- Neural communication and neurotransmitters.
- The relationship between biology and behavior (e.g., sensation, perception, movement).
- Hormones and behavior.

Sensation and Perception:

- Mechanisms of sensory systems (vision, hearing, taste, touch, smell).
- Perceptual processes and how they influence experience.
- Perceptual organization and interpretation.

Cognitive Psychology

Learning and Memory:

- Theories of learning (classical conditioning, operant conditioning, observational learning).
- Types of memory (short-term, long-term, working memory).
- Mechanisms of forgetting and memory distortion.

Attention and Perception

- Mechanisms of attention (selective attention, divided attention).
- Theories of perception and pattern recognition.
- The impact of attention on learning and memory.

Social Cognition:

- Attitudes, beliefs, and stereotypes.
- Attribution theory and error (how we explain others' behaviors).

- Social influence (conformity, compliance, obedience).

Group Dynamics:

- Theories of group behavior (e.g., social facilitation, deindividuation, groupthink).
- Leadership and decision-making in groups.
- Intergroup relations, prejudice, and discrimination.

Interpersonal Relationships:

- Attraction and relationship formation.
- Theories of love and attachment in adulthood.
- Conflict and cooperation in relationships.

SEMESTER II

ANATOMY–II 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Analyze the structure and function of the central nervous system through cadaveric dissection.
- Identify and explain the anatomy of the head, neck, and thorax.
- Demonstrate proficiency in identifying anatomical landmarks through palpation and hands-on lab activities.
- Discuss the anatomical basis of common clinical conditions and injuries relevant to physical therapy practice.

Course Description:

- The focus of this course is an in-depth study and analysis of the regional and systemic organization of the body. Emphasis is placed upon structure and function of human movement.
- A comprehensive study of human anatomy with emphasis on the nervous, musculoskeletal and circulatory systems is incorporated. Introduction to general anatomy lays the foundation of the course.
- Dissection and identification of structures in the cadaver supplemented with the study of charts, models, prosected materials and radiographs are utilized to identify anatomical landmarks and configurations of the lower limb and abdomen pelvis

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)
- Muscles of lower leg and foot.

NEUROLOGY

- Course, distribution, supply of all nerves of lower limb and gluteal region
- 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
- Surface marking of lower limb

ABDOMEN

Abdominal Wall:

- Structures of anterior abdominal wall: superficial and deep muscles
- Structure of rectus sheath
- Structures of Posterior abdominal wall
- 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
- Nerves of perineum

GENERAL HISTOLOGY

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

Practical

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

Recommended Text Books:

- *Gray's Anatomy* by Prof. Susan Standring 39th Ed., Elsevier.
- *Clinical Anatomy for Medical Students* by Richard S. Snell.
- *Clinically Oriented Anatomy* by Keith Moore.
- *Clinical Anatomy* by R.J. Last, Latest Ed.
- *Cunningham's Manual of Practical Anatomy* by G.J. Romanes, 15th Ed., Vol-I, II and III.
- *The Developing Human. Clinically Oriented Embryology* by Keith L. Moore, 6th Ed.

- *Wheater's Functional Histology* by Young and Heath, Latest Ed.
- *Medical Histology* by Prof. Laiq Hussain.
- *Neuroanatomy* by Richard S. Snell.

PHYSIOLOGY–II 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Identify the anatomical structures and functions of the cardiovascular and respiratory systems.
- Explain the regulation of cardiovascular and respiratory function under normal and pathological conditions.
- Analyze physiological responses to environmental stress and changes in altitude.
- Interpret physiological data including vital signs and pulmonary function tests.

Course Description:

- The course is designed to study the function of the human body at the molecular, cellular, tissue and systems levels. The major underlying themes are: the mechanisms for promoting homeostasis; cellular processes of metabolism, membrane function and cellular signaling; the mechanisms that match supply of nutrients to tissue demands at different activity levels; the mechanisms that match the rate of excretion of waste products to their rate of production; the mechanisms that defend the body against injury and promote healing.
- These topics are addressed by a consideration of nervous and endocrine regulation of the cardiovascular, hematopoietic, pulmonary, renal, gastrointestinal, and musculoskeletal systems including the control of cellular metabolism. The integrative nature of physiological responses in normal function and disease is stressed throughout the course.
- This course will serve as pre-requisite for the further courses i.e. exercise physiology, pathology, etc.

CONTENT

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 O₂ therapy
- Clinical significance of hypoxia, cyanosis, and dyspnoea

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.
- Endocrine & exocrine pancreas and functions of pancreas in digestion

Clinical Module

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

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

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,
- The endocrine functions of the kidney and Physiology of growth.

Clinical Module

1. Acromegaly, gigantism and dwarfism.
2. Effects of panhypopituitarism.
3. Diabetes insipidus.
4. Thyrotoxicosis and myxoedema.
5. Pheochromocytoma.
6. Cushing's disease.
7. Adrenogenital syndrome.
8. Diabetes mellitus and hypoglycaemia.

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

RECOMMENDED BOOKS

Textbook of Physiology by Guyton and Hall, Latest Ed.

Review of Medical Physiology by William F. Ganong, Latest Ed.

Physiology by Berne and Levy, Latest Ed.

Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards

Physiological Basis of Medical Practice by John B. West and Taylor, 12TH ED

KINESIOLOGY-II 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain the biomechanical principles underlying muscle contraction and joint stability.
- Apply principles of joint arthrokinematics to clinical assessment and intervention.
- Analyze the relationship between muscle length, tension, and force production.
- Design therapeutic exercises and manual techniques to restore normal movement patterns.

Course Description:

This course aims to develop appreciation of how mechanical principles can be applied to understand the underlying causes of human movement. It also examines selected anatomical, structural and functional properties of human connective, muscular, and nervous tissues, as well as skeletal structures. Emphasis is placed on the mechanical, neuroregulatory, and muscular events that influence normal and pathological motion

DETAILED COURSE OUTLINE:

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
- 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
- Biomechanical contributions to common injuries of the upper extremity

Practical Training/ Lab Work

- Biomechanical assessment of Upper extremity
- Special test for joints of upper extremity

SOCIAL SCIENCES – INTRODUCTION TO SOCIOLOGY 2(2-0)

COURSE DESCRIPTION

This course covers the basic knowledge and concepts of sociology to with the aim to help them understand the impact of group, culture and environment on the behavior and health of the patients. Make them realize the importance of the relationship of the physical therapist and the patient and the environment around them.

COURSE OBJECTIVES

- Understand the role of family and community in the development of human behaviour.

- Develop a holistic outlook toward the structure of the society and community resources.
- Identify the subtle influence of culture in the development of human personality, the role of beliefs and value as determinants of individual and group behaviour.
- Understand the social and economic aspect of community that influence the health of the people
- Learn to assess the social problem and participate in social planning.
- Identify Social Institution and resources.
- Understand the significance of social interaction in the process of rehabilitation.
- Appreciate the role of therapist as a member of society and the interdependence of individuals and society

INTRODUCTION TO SOCIOLOGY

- Definition
- Subject matter
- Sociology
- The science of society

SOCIAL ACTION AND INTERACTION

- Social processes
- Co-operation
- Competition
- Conflict and Accommodation

SOCIAL GROUPS

- Primary-Secondary
- In and Out Group
- Reference group

CULTURE

- Meanings
- Materials
- Non-material aspects of culture
- Values
- Beliefs
- Sanctions
- Cultural relativism and Ethnocentrism
- Norms
- Folk ways
- Mores and Laws
- Role and Status
- Conflict
- Deviancy
- Social control

SOCIALIZATION AND PERSONALITY

Socialization and personality formation

SOCIAL INSTITUTION

- Meanings
- Social stratification
- Meanings and Forms (Classes and Castes)

SOCIAL AND CULTURAL CHANGE

Factors of promoting and resisting social change

THE FIELD OF MEDICAL SOCIOLOGY

- Contribution of sociology to medicine
- Social causes of diseases
- Aging and its socio-medical implication
- Environmental pollution and health
- Patient perspective of Illness
- Patient, Physiotherapist relationship
- Role of Physiotherapists and attendants in the managements of patient

Recommended Text Books

- Text book of Community Medicine by: Park J E. Latest Edition
 - David, Tucket (ed), 1976, An Introduction to Medical Sociology, Lahore, Tavistock Publication.
 - Horton, Paul B. and Chester L. Hunt, 1984 Sociology, Singapore: Megraw Hill Book Co.
 - Moon, Graham, 1995. Society and Health; An introduction to Social Science for Processionals, London: Routledge.
 - Smelter Heil J. 1993. Sociology, New Delhi, Prentice Hall of India
- /

EXPOSITORY WRITING 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, students will be able to:

- Understand the essentials of the writing process integrating pre-writing, drafting, editing and proof reading to produce well-structured essays.
- Demonstrate mastery of diverse expository types to address different purposes and audiences.
- Uphold ethical practices to maintain originality in expository writing.

CONTENT

Introduction to Expository Writing:

- Understanding expository writing (definition, types, purpose and applications)
- Characteristics of effective expository writing (clarity, coherence and organization)
- Introduction to paragraph writing

The Writing Process:

- Pre-writing techniques (brainstorming, free-writing, mind-mapping, listing, questioning and outlining etc.)
- Drafting (three stage process of drafting techniques)
- Revising and editing (ensuring correct grammar, clarity, coherence, conciseness etc.)
- Proof reading (fine-tuning of the draft)
- Peer review and feedback (providing and receiving critique)

Essay Organization and Structure:

- Introduction and hook (engaging readers and introducing the topic)
- Thesis statement (crafting a clear and focused central idea)
- Body Paragraphs (topic sentences, supporting evidence and transitional devices)
- Conclusion (types of concluding paragraphs and leaving an impact)
- Ensuring cohesion and coherence (creating seamless connections between paragraphs)

Different Types of Expository Writing:

- Description
- Illustration
- Classification
- Cause and effect (exploring causal relationships and outcomes)
- Process analysis (explaining step-by-step procedures)
- Comparative analysis (analyzing similarities and differences)

Writing for Specific Purposes and Audiences:

- Different types of purposes (to inform, to analyze, to persuade, to entertain etc.)
- Writing for academic audiences (formality, objectivity, and academic conventions)
- Writing for public audiences (engaging, informative and persuasive language)
- Different tones and styles for specific purposes and audiences

Ethical Considerations:

- Ensuring original writing (finding credible sources, evaluating information etc.)
- Proper citation and referencing (APA, MLA, or other citation styles)
- Integrating quotes and evidences (quoting, paraphrasing, and summarizing)
- Avoiding plagiarism (ethical considerations and best practices)

SUGGESTED PRACTICAL ACTIVITIES (OPTIONAL)

As part of the overall learning requirements, students will be required to build a writing portfolio

having a variety of expository texts and present the same at the end of the course showcasing proficiency in expository writing.

SUGGESTED INSTRUCTIONAL / READING MATERIALS

- The St. Martin's Guide to Writing" by Rise B. Axelrod and Charles R. Cooper.
- They Say / I Say: The Moves That Matter in Academic Writing" by Gerald Graff and Cathy Birkenstein.
- Writing Analytically" by David Rosenwasser and Jill Stephen.

- Style: Lessons in Clarity and Grace" by Joseph M. Williams and Joseph Bizup.
- The Elements of Style" by William Strunk Jr. and E.B. White.
- Good Reasons with Contemporary Arguments" by Lester Faigley and Jack Selzer.
- Writing to Learn: How to Write - and Think - Clearly About Any Subject at All" by William Zinsser.
- The Norton Field Guide to Writing" by Richard Bullock, Maureen Daly Goggin, and Francine Weinberg.
- The Art of Styling Sentences" by Ann Longknife and K.D. Sullivan.
- Writing Today" by Richard Johnson-Sheehan and Charles Paine.

ISLAMIC STUDIES

CREDIT 2 (2-0)

COURSE LEARNING OBJECTIVES

- To provide Basic information about Islamic Studies
- To enhance understanding of the students regarding Islamic Civilization
- To improve Students skill to perform prayers and other worships
- To enhance the skill of the students for understanding of issues related to faith and religious life.

CONTENT

INTRODUCTION TO QURANIC STUDIES

- Basic Concepts of Quran
- History of Quran
- Uloom-ul -Quran

STUDY OF SELECTED TEXT OF HOLLY QURAN

- Verses of Surah Al-Baqra Related to Faith (Verse No-284-286)
- Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18)
- Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11)
- Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77)
- Verses of Surah Al-Inam Related to Ihkam (Verse No-152-154)

STUDY OF SELECTED TEXT OF HOLLY QURAN

- Verses of Surah Al-Ihzab Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.)
- Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment
- Verses of Surah Al-Saf Related to Tafakar,Tadabar (Verse No-1,14)

SEERAT OF HOLY PROPHET (S.A.W) I

- Life of Muhammad Bin Abdullah (Before Prophet Hood)
- Life of Holy Prophet (S.A.W) in Makkah
- Important Lessons Derived from the life of Holy Prophet in Makkah

SEERAT OF HOLY PROPHET (S.A.W) II

- Life of Holy Prophet (S.A.W) in Madina
- Important Events of Life Holy Prophet in Madina
- Important Lessons Derived from the life of Holy Prophet in Madina

INTRODUCTION TO SUNNAH

- Basic Concepts of Hadith
- History of Hadith
- Kinds of Hadith
- Uloom –ul-Hadith
- Sunnah & Hadith
- Legal Position of Sunnah

SELECTED STUDY FROM TEXT OF HADITH

- INTRODUCTION TO ISLAMIC LAW & JURISPRUDENCE
- Basic Concepts of Islamic Law & Jurisprudence
- History & Importance of Islamic Law & Jurisprudence
- Sources of Islamic Law & Jurisprudence
- Nature of Differences in Islamic Law
- Islam and Sectarianism

ISLAMIC CULTURE & CIVILIZATION

- Basic Concepts of Islamic Culture & Civilization
- Historical Development of Islamic Culture & Civilization
- Characteristics of Islamic Culture & Civilization
- Islamic Culture & Civilization and Contemporary Issues

ISLAM & SCIENCE

- Basic Concepts of Islam & Science
- Contributions of Muslims in the Development of Science
- Quranic & Science

ISLAMIC ECONOMIC SYSTEM

- Basic Concepts of Islamic Economic System
- Means of Distribution of wealth in Islamic Economics
- Islamic Concept of Riba
- Islamic Ways of Trade & Commerce

POLITICAL SYSTEM OF ISLAM

- Basic Concepts of Islamic Political System
- Islamic Concept of Sovereignty
- Basic Institutions of Govt. in Islam

ISLAMIC HISTORY

- Period of Khlaft-E-Rashida
- Period of Ummayyads

- Period of Abbasids

SOCIAL SYSTEM OF ISLAM

- Basic Concepts of Social System of Islam
- Elements of Family
- Ethical Values of Islam

RECOMMENDED BOOKS

- Hameed ullah Muhammad, "Emergence of Islam" , IRI, Islamabad
- Hameed ullah Muhammad, "Muslim Conduct of State"
- Hameed ullah Muhammad, 'Introduction to Islam
- Mulana Muhammad Yousaf Islahi,"
- Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law" leaf Publication Islamabad, Pakistan.
- Ahmad Hasan, "Principles of Islamic Jurisprudence" Islamic Research Institute, International Islamic University, Islamabad (1993)
- Mir Waliullah, "Muslim Jrisprudence and the Quranic Law of Crimes" Islamic Book Service (1982)
- H.S. Bhatia, "Studies in Islamic Law, Religion and Society" Deep & Deep Publications New Delhi (1989)
- Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia" Allama Iqbal Open University, Islamabad (2001)

Introduction to the Quran

- Definition and meaning of the Quran
- Difference between Quran, Hadith, and other Islamic texts
- Revelation process (Wahi) and the role of Angel Jibril
- Meccan vs. Medinan Surahs: characteristics and themes
- Preservation and compilation of the Quran

Historical and Contextual Background

- Life of the Prophet Muhammad (PBUH) and the Quranic revelation
- Asbab al-Nuzul (occasions of revelation)
- Early Muslim society and the Quran's influence

Structure and Style of the Quran

- Surahs, Ayahs, and Rukus
- Linguistic beauty and rhetorical features
- Literary styles: narrative, legal, metaphorical, etc.

Key Quranic Themes (Part 1)

- Tawheed (Oneness of God)
- Risalah (Prophethood)
- Akhirah (Hereafter)

Personal Reflection and Recitation

- Basics of Tajweed (rules of proper recitation)
- Selected short Surahs with meanings (e.g., Al-Fatiha, Al-Ikhlās, Al-Asr)
- Reflection (Tadabbur) techniques

SEMESTER III

NEUROANATOMY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Identify anatomical structures of the central and peripheral nervous systems.
- Describe the functional organization of the brain and spinal cord.
- Apply neuroanatomical knowledge to understand neurological disorders and their clinical manifestations.
- Perform neuroanatomical dissection and identify relevant structures in the laboratory setting.

Course Description:

The focus of this course is an in-depth study and analysis of the regional and systemic organization of the body. Emphasis is placed upon structure and function of human movement. A comprehensive study of human anatomy with emphasis on the nervous, skeletal, muscle, and circulatory systems is incorporated. Introduction to general anatomy lays the foundation of the course. Dissection and identification of structures in the cadaver supplemented with the study of charts, models, prosected materials and radiographs are utilized to identify anatomical landmarks and configurations of the region

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
- 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
- Autonomic Nervous system

Practical

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

Recommended Text Books:

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

PHYSIOLOGY–III 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Describe the structure and function of the gastrointestinal, renal, and endocrine systems.
- Explain the physiological mechanisms regulating digestion, metabolism, and hormone secretion.
- Analyze the impact of physiological adaptations on homeostasis and health outcomes.
- Perform physiological experiments to investigate organ system function.

Course Description:

- These topics are addressed by a consideration of nervous and endocrine regulation of the, renal, and reproduction including the control of cellular metabolism. The integrative nature of physiological responses in normal function and disease is stressed throughout

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,
- Mechanism of temperature regulation,
- Function of the autonomic nervous system and the physiological changes of aging.

Clinical Module

1. Significance of dermatomes.
2. Injuries of the spinal cord.
3. Hemiplegia and paraplegia.
4. Parkinsonism.
5. Effects of cerebellar dysfunction.

REPRODUCTION

- Function of the male reproductive system, Spermatogenesis.,
- Mechanism of erection and ejaculation.,
- 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,
- Pregnancy and the physiological changes taking place in the mother.
- Function of the placenta,
- Parturition and lactation.
- Neonatal physiology.

Clinical Module

1. Male infertility.

2. Female infertility.
3. Contraception.
4. Basis for pregnancy tests.

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.,
- Micturition and its control.

Clinical Module

1. Renal function tests and their clinical importance.
2. Fluid excess and depletion.
3. Renal failure and dialysis.
4. Metabolic acidosis and alkalosis.
5. Abnormalities of micturition.

PHYSIOLOGY PRACTICALS

Nervous System

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

Special Senses

- Measurement of the field of vision.
- Measurement of light reflex.
- Ophthalmoscopy.
- Colour vision.
- Hearing tests.
- Testing taste and smell.

Pregnancy tests

RECOMMENDED BOOKS

Textbook of Physiology by Guyton and Hall, Latest Ed.

Review of Medical Physiology by William F. Ganong, Latest Ed.

Physiology by Berne and Levy, Latest Ed.

Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D. Richards

Physiological Basis of Medical Practice by John B. West and Taylor, 12th Ed.

MEDICAL PHYSICS 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain basic principles of physics as they apply to medical imaging and radiation therapy.
- Describe the interactions of radiation with matter and biological tissues.
- Analyze medical imaging modalities and their diagnostic applications.
- Discuss radiation safety measures and regulatory guidelines in medical physics practice.

Course Description:

- This course will cover the basic principles of Physics which are applicable in medical equipment used in Physical therapy. Also help to understand the fundamentals of currents, sound waves, Heat & its effects, electromedical radiations and their effects as well as their application in physical therapy.

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
- Simple Voltage Cell
- Wet and dry Leclanché Cell

- 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, hot wire type and Thermocouple type meter
- Measurement of high frequency and alternate current with meters
- Electromagnetic induction
- Faradays law and Lenses law
- Mutual and self Induction
- Eddy currents
- Transformer
- Construction and types
- Static and auto Transformer
- Dynamo, construction
- A.C & D.C Dynamo

Electromechanics:

- Current for treatment
- Rectification
- Rectification of A.C
- Half wave and full wave Rectification
- Valve rectification circuits and metal rectifier
- Surging of current
- Lewis surger and valve surger
- Reverser
- Metronome interrupter and Reverse Jones motor interrupter
- Vibrations and Multivibrators circuit

Classification Of Currents (overview)

Low frequency current

- Sinusoidal current
- Faradic current
- Galvanic current (constant and interrupted)
- Diadynamic current TENS
- Smart Bristow faradic coil
- Super imposed current and their graphical representation

Medium frequency current

- Interferential current

- Russian current

High frequency current

- Produced by
- Spark
- Valves
- Transistors
- Long waves, medium waves short waves micro waves

Sound Waves

- Wave motion in sound
- Infrasonic
- Normal hearing band
- Characteristics of the sound waves and their velocities
- Ultrasonic
- Reflection and refraction of sound waves
- Characteristics of tone resonance and beats
- Interference of sound waves

Heat

- Scales of temp and its conversion to other scales
- Nature of heat energy
- Specific heat and three modes of heat energy transfer effect of impurities on melting and boiling points

Electromagnetic Radiation

Electromagnetic spectrum

- Relationship between frequency and wave length
- Laws of reflection, refraction and absorptions
- Total internal reflection
- Cosine law and inverse square law
- Concave and convex mirrors
- Lenses and prisms
- Reflectors
- Radio wave (long, medium, short, micro waves)
- Infra red rays
- Visible rays
- Ultra violet rays
- X-rays
- Nuclear waves (alpha beta and gamma)

Safety In Biomedical Instruments

- Electrical outlets, hot, neutral and ground connections
- House wiring
- Pervasiveness of electricity and of electric shocks
- Causes of electric shocks and precaution

- Effect of electric current on human body
- Techniques to reduce the effect of electric shock
- Earth shocks and precaution against earth shocks

Radiation Protection

- Ionizing and non ionizing radiations
- Quantities and associated units of radiations
- Effect of ionizing and non ionizing radiation's
- Internal and external hazards
- Main principle to control external hazard
- Distance and shielding

Practical

To verify the ohm's Law

To find the specific resistance by using the potential divider

To verify the joules law of electrical methods

To calibrate a thermo couple and an unknown temperature

To find the acceleration due to gravity by simple pendulum

To verify the law of reflection of light

To verify the law of refraction of light

To verify the refraction index of glass using rectangular slab.

RECOMMENDED TEXT BOOKS

Clayton's Electrotherapy and actinotherapy by: PM Scott

Medical physics for physical therapists by: AD Moore

Preliminary Electricity for Physiotherapists by B. Savage.

Basic Electronics by Grob.

Principles of Bio-instrumentation by Richard A. Normann.

Hand book of Biomedical Instrumentation by R.S. Khanpur.

Basic Radiation Protection Technology by Gollnick

PRINCIPLES OF BIOCHEMISTRY and Basic nutrition 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain fundamental concepts of biochemistry including molecular structure and function.
- Demonstrate understanding of biochemical pathways involved in cellular metabolism.
- Apply knowledge of biochemistry to explain the physiological basis of therapeutic interventions.
- Perform basic biochemical laboratory techniques to analyze biomolecules.

Course Description:

- This course provides the knowledge and skills in fundamental organic chemistry and introductory biochemistry that are essential for further studies. It covers basic biochemical, cellular, biological and microbiological processes, basic chemical

reactions in the prokaryotic and eukaryotic cells, the structure of biological molecules, introduction to the nutrients i.e. carbohydrates, fats, enzymes, nucleic acids and amino acids. The nutritional biochemistry concludes the course.

Detailed Course Outline:

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

Nutritional Biochemistry

Minerals & Trace Elements

- Sources
- RDA
- Biochemical Functions & Clinical Significance of Calcium & Phosphorus
- Sources
- RDA
- Biochemical Functions & Clinical Significance of Sodium Potassium & Chloride
- Metabolism of Iron, Cu, Zn, Mg, Mn, Se, 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
- Balanced Diet

Molecular Biology

- DNA Replication & Repair in Prokaryotes
- DNA Replication & Repair in Eukaryotes

CONTENT of Basic nutrition

Introduction to Nutrition

- Definition and Importance: What is nutrition, and why is it important?
- Dietary Guidelines: Overview of dietary guidelines and recommendations.

- **Balanced Diet:** Understanding a balanced diet and its components.

Nutrients and Their Functions

- **Macronutrients:**
- **Carbohydrates:** Types, sources, and functions.
- **Proteins:** Importance, sources, and daily requirements.
- **Fats:** Types (saturated, unsaturated, trans fats), functions, and sources.
- **Micronutrients:**
- **Vitamins:** Types (water-soluble and fat-soluble), sources, and functions.
- **Minerals:** Essential minerals, sources, and functions.
- **Water:** Importance of hydration and water's role in the body.
- **Digestion and Metabolism**
- **Digestive System Overview:** How the body processes food.
- **Metabolism:** Understanding metabolic rate and its impact on weight management.

Healthy Eating Habits

- **Portion Control:** Understanding serving sizes and controlling portions.
- **Reading Food Labels:** How to interpret nutritional information on packaging.
- **Meal Planning:** Tips for planning balanced and nutritious meals.

Special Diets and Considerations

- **Vegetarian and Vegan Diets:** Nutritional considerations and benefits.
- **Food Allergies and Intolerances:** Identifying and managing common food allergies.
- **Cultural and Ethical Food Choices:** How culture and ethics influence diet.

Nutrition Through the Life Stages

- **Infants and Children:** Nutritional needs and recommendations.
- **Adolescents:** Special considerations during growth and development.
- **Adults and Seniors:** Nutritional needs for maintaining health and preventing disease.

Weight Management and Physical Activity

- **Energy Balance:** Understanding calories and energy expenditure.
- **Healthy Weight Loss Strategies:** Tips for losing weight safely and effectively.
- **Physical Activity:** The role of exercise in maintaining a healthy lifestyle.

Nutrition and Chronic Diseases

- **Impact of Nutrition on Health:** How diet influences the risk of chronic diseases such as heart disease, diabetes, and obesity.
- **Preventive Nutrition:** Strategies for using diet to prevent and manage chronic diseases
-

Recommended Text Books:

Harper's Biochemistry by Robbert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, Latest Ed.

Lippincott's Illustrated Review of Biochemistry by Pamela C. Champe and Richard A. Harvey, Latest Ed.

Practical Clinical Biochemistry by Varley.

Textbook of Biochemistry by Devlin, 5th Ed.

Textbook of Medical Biochemistry Vol-I and II by M.A. Hashmi.

Biochemistry by Stryer, Lubert, Latest Ed

- Quantitative Reasoning (I) is an introductory-level undergraduate course that focuses on the fundamentals related to the quantitative concepts and analysis.
- The course is designed to familiarize students with the basic concepts of mathematics and statistics and to develop students' abilities to analyze and interpret quantitative information.
- Through a combination of theoretical concepts and practical exercises, this course will also enable students cultivate their quantitative literacy, problem-solving skills while effectively expanding their academic horizon and breadth of knowledge of their specific major / field of study.

COURSE LEARNING OUTCOMES

By the end of this course, students shall have:

- Fundamental numerical literacy to enable them work with numbers, understand their meaning and present data accurately;
- Understanding of fundamental mathematical and statistical concepts;
- Basic ability to interpret data presented in various formats including but not limited to tables, graphs, charts, and equations etc.

SYLLABUS

Numerical Literacy

Number system and basic arithmetic operations;
Units and their conversions, dimensions, area, perimeter and volume;
Rates, ratios, proportions and percentages;
Types and sources of data;
Measurement scales;
Tabular and graphical presentation of data;
Quantitative reasoning exercises using number knowledge.

Fundamental Mathematical Concepts

Basics of geometry (lines, angles, circles, polygons etc.);
Sets and their operations;
Relations, functions, and their graphs;
Exponents, factoring and simplifying algebraic expressions;
Algebraic and graphical solutions of linear and quadratic equations and inequalities;
Quantitative reasoning exercises using fundamental mathematical concepts.

Fundamental Statistical Concepts

Population and sample;
Measures of central tendency, dispersion and data interpretation;
Rules of counting (multiplicative, permutation and combination);
Basic probability theory;
Introduction to random variables and their probability distributions;
Quantitative reasoning exercises using fundamental statistical concepts

Introduction/Objectives

- Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.
- Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Outline**1. Historical Perspective**

- a. Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-i-Azam Muhammad Ali Jinnah.
- b. Factors leading to Muslim separatism
- c. People and Land
 - i. Indus Civilization
 - ii. Muslim advent
 - iii. Location and geo-physical features.

2. Government and Politics in Pakistan

Political and constitutional phases:

- a. 1947-58
- b. 1958-71
- c. 1971-77
- d. 1977-88
- e. 1988-99
- f. 1999 onward

3. Contemporary Pakistan

- a. Economic institutions and issues
- b. Society and social structure
- c. Ethnicity
- d. Foreign policy of Pakistan and challenges
- e. Futuristic outlook of Pakistan

Books Recommended

1. Burki, Shahid Javed. *State & Society in Pakistan*, The Macmillan Press Ltd 1980.
2. Akbar, S. Zaidi. *Issue in Pakistan's Economy*. Karachi: Oxford University Press, 2000.
3. S.M. Burke and Lawrence Ziring. *Pakistan's Foreign policy: An Historical analysis*. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. *Pakistan Political Roots & Development*. Lahore, 1994.
5. Wilcox, Wayne. *The Emergence of Banglades.*, Washington: American Enterprise, Institute of Public Policy Research, 1972.

6. Mehmood, Safdar. *Pakistan Kayyun Toota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. *Ethno - National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. *Enigma of Political Development*. Kent England: WmDawson & sons Ltd, 1980.
9. Zahid, Ansar. *History & Culture of Sindh*. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. *Political Parties in Pakistan*, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. *The Political System of Pakistan*. Boston: Houghton Mifflin, 1967.
12. Aziz, K.K. *Party, Politics in Pakistan*, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, *Pakistan Under Martial Law*, Lahore: Vanguard, 1987.
14. Haq, Noor ul. *Making of Pakistan: The Military Perspective*. Islamabad: National Commission on Historical and Cultural Research, 1993.

Understanding of holy Quran-II

(COMPULSORY)

CREDIT HOURS 1(0-1)

Deeper Themes and Morals

- Justice and social equity
- Compassion and forgiveness
- Ethics in personal and public life
- Rights and responsibilities in family and society

Quran and Science

- Quranic verses related to creation, universe, and nature
- Contemporary reflections and scholarly opinions

Quranic Guidance on Daily Life

- Worship and spirituality (Salah, Sawm, etc.)
- Financial ethics: Zakat, interest, trade
- Quranic view on gender, modesty, and interpersonal conduct

Comparative Understanding

- The Quran and previous scriptures
- Interfaith respect and dialogue in the Quran
- Misinterpretations and clarifications

Module 5: Advanced Study of Selected Surahs

- In-depth study of selected Surahs (e.g., Al-Baqarah, Al-Kahf, Al-Hujurat)
- Translation and Tafsir excerpts
- Applying lessons to real-life scenarios

SEMESTER 4

ANATOMY–IV 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explore advanced anatomical concepts related to the abdomen, pelvis, and perineum.
- Apply anatomical knowledge to clinical scenarios through case studies and problem-solving exercises.
- Investigate the anatomical basis of human movement and its implications for physical therapy interventions.
- Synthesize knowledge of regional and systemic anatomy to develop comprehensive patient assessment skills.

Course Description:

The focus of this course is an in-depth study and analysis of the regional and systemic organization of the body. Emphasis is placed upon structure and function of human movement. A comprehensive study of human anatomy with emphasis on the nervous, skeletal, muscle, and circulatory systems is incorporated. Introduction to general anatomy lays the foundation of the course. Dissection and identification of structures in the cadaver supplemented with the study of charts, models, prosected materials and radiographs are utilized to identify anatomical landmarks and configurations of the head and neck

EMBRYOLOGY:

GENERAL

- Male and female reproductive organs.
- 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).
- Developmental defects

SPECIAL:

- Musculoskeletal system
- Cardiovascular system
- CNS

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
- Structures passing through foramina

Practical

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

Recommended Text Books:

Gray's Anatomy by Prof. Susan Standring 39th Ed., Elsevier.

Clinical Anatomy for Medical Students by Richard S.Snell.

Clinically Oriented Anatomy by Keith Moore.

Clinical Anatomy by R.J. Last, Latest Ed.

Cunningham's Manual of Practical Anatomy by G.J. Romanes, 15th Ed., Vol-I, II and III.

The Developing Human. Clinically Oriented Embryology by Keith L. Moore, 6th Ed.

Wheater's Functional Histology by Young and Heath, Latest Ed.

Medical Histology by Prof. Laiq Hussain.

Neuroanatomy by Richard S.Snell

BIOMECHANICS & ERGONOMICS 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain basic principles of biomechanics related to human movement.
- Apply biomechanical concepts to analyze movement patterns and identify deviations.
- Demonstrate proficiency in using biomechanical tools and equipment for motion analysis.

- Discuss ergonomic principles and the application in injury prevention and workplace design.

Course Description:

- This course aims to develop appreciation of how mechanical principles can be applied to understand the underlying causes of human movement. It also examines selected anatomical, structural and functional properties of human connective, muscular, and nervous tissues, as well as skeletal structures. Emphasis is placed on the mechanical, neuroregulatory, and muscular events that influence normal and pathological motion

DETAILED COURSE OUTLINE:

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

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
- Biomechanical contribution to common injuries of the lower extremity

- **Applied Biomechanics**

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

ERGONOMICS

- **OVERVIEW AND CONCEPTUAL FRAMEWORK.**
- Ergonomics and Therapy: An Introduction.
- A Client-Centered Framework for Therapists in Ergonomics.
- Macroergonomics.

KNOWLEDGE, TOOLS, AND TECHNIQUES.

- Ergonomic Assessments/Work Assessments.
- Anthropometry
- Cognitive and Behavioral Occupational Demands of Work.
- Psychosocial Factors in Work-Related Musculoskeletal Disorders.
- Physical Environment.
- Human Factors in Medical Rehabilitation Equipment: Product Development and Usability

Testing

ERGONOMICS II

- **SPECIAL CONSIDERATIONS.**
- Lifting Analysis.
- Seating.
- Computers and Assistive Technology.
- Advanced gait analysis
- **APPLICATION PROCESS.**
- Ergonomics of Children and Youth.
- Ergonomics of Aging.
- Ergonomics in Injury Prevention and Disability Management.
- Ergonomics of Play and Leisure.

Practical & Labs

Biomechanical assessment of cervical spine

Biomechanical assessment of thoracic spine

Biomechanical assessment of lumbar spine

Biomechanical assessment of sacral spine

Biomechanical assessment of sacroiliac joint

Biomechanical assessment of lower extremity joint

Assessment of deformities of spine and lower extremity

- Biomechanical assessment of Gait
- Ergonomic analysis
- Practical demonstrations gait analysis Practical demonstrations of various fundamental positions and posture analysis.
- Practical demonstrations of the techniques of active, passive movements
- Goniometry
- Introduction to Goniometry
- Basic concepts in Goniometry

Recommended text books

Basic biomechanics of musculoskeletal system By: Nordin & Frankel, 3rd edition.

Basic Biomechanics, By: Susan J. Hall 4th edition.

Additional study material as assigned by the tutor.

Ergonomics for the therapist by Karen Jacobs 3rd edition mosby and Elsevier publishers

EXERCISE PHYSIOLOGY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain physiological responses to exercise including cardiovascular and respiratory adaptations.
- Demonstrate proficiency in exercise testing and prescription techniques.
- Apply principles of exercise physiology to design individualized exercise programs.
- Monitor and evaluate physiological responses to exercise to optimize training outcomes.

Course Description:

This course aims to develop a critical appreciation of exercise and applied physiology, enabling design of specialist injury prevention, rehabilitation and performance enhancement programmes and strategies

PHYSIOLOGY OF EXERCISE**Control of internal environment**

Homeostasis

Control systems of the body

Nature of the control system

Examples of homeostatic control

Exercise : A test of homeostatic control

Hormonal responses to exercise (brief revision)

Neuroendocrinology

Hormones: Regulation and action

Hormonal control of substrate mobilization 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

Calculation of exercise efficiency

Circulatory responses to exercise (brief revision):

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)

Function of the lung

Structure of respiratory system

Mechanics of breathing

Pulmonary ventilation

Pulmonary volumes and capacities

Diffusion of gases

Blood flow to the lungs

Ventilation-perfusion relationships

O₂ and CO₂ transport in blood

Ventilation and acid base balance

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 Vo2 Max, Performance, Homeostasis and Strength

Principles of training

Research designs to study training

Endurance training and VO2 max

VO2 max: cardiac output and arterio-venous oxygen difference

Detraining and VO2 max

Endurance training: 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

Testing procedures

FIELD Tests for estimating CRF

Graded exercise tests: measurements

VO2 max

Graded exercise tests : protocols

Exercise prescription for health and fitness

Prescription of exercise

General guidelines for improving

Exercise prescription for CRF

Sequence of physical activity

Strength and flexibility training

Exercise for special populations

Diabetes

Asthma

Chronic obstructive pulmonary disease

Hypertension

Cardiac rehabilitation

Exercise for older adults

Exercise during pregnancy

PHYSIOLOGY OF PERFORMANCE

Factors affecting performance:

Sites of fatigue

Factors limiting All-out anaerobic performances

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

Year-round conditioning for athletes

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

Epilepsy and physical training

Recommended Textbooks:

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

Exercise physiology, A thematic Approach By: Tudor Hale, University College Chichester, UK

Additional study material as assigned by the tutor

QUANTITATIVE REASONING II 3(3-0)

Quantitative Reasoning (II) is a sequential undergraduate course that focuses on logical reasoning

supported with mathematical and statistical concepts and modeling / analysis techniques to equip

students with analytical skills and critical thinking abilities necessary to navigate the complexities of

the modern world.

The course is designed to familiarize students with the quantitative concepts and techniques required to interpret and analyze numerical data and to inculcate an ability in students the

logical reasoning to construct and evaluate arguments, identify fallacies, and think systematically.

Keeping the pre-requisite course of Quantitative Reasoning (I) as its base, this course will enable students further their quantitative, logical and critical reasoning abilities to complement their specific major / field of study

COURSE LEARNING OBJECTIVE

By the end of this course, students shall have:

- Understanding of logic and logical reasoning;
- Understanding of basic quantitative modeling and analyses;
- Logical reasoning skills and abilities to apply them to solve quantitative problems and evaluate arguments; Ability to critically evaluate quantitative information to make evidence based decisions

through appropriate computational tools.

Logic, Logical and Critical Reasoning

Introduction and importance of logic;

Inductive, deductive and abductive approaches of reasoning;

Propositions, arguments (valid; invalid), logical connectives, truth tables and propositional equivalences;

Logical fallacies;

Venn Diagrams;

Predicates and quantifiers;

Quantitative reasoning exercises using logical reasoning concepts and techniques.

Mathematical Modeling and Analyses

Introduction to deterministic models;

Use of linear functions for modeling in real-world situations;

Modeling with the system of linear equations and their solutions;

Elementary introduction to derivatives in mathematical modeling;

Linear and exponential growth and decay models;

Quantitative reasoning exercises using mathematical modeling.

Statistical Modeling and Analyses

Introduction to probabilistic models;

Bivariate analysis, scatter plots;

Simple linear regression model and correlation analysis;

Basics of estimation and confidence interval;

Testing of hypothesis (z-test; t-test);

Statistical inference in decision making;

Quantitative reasoning exercises using statistical modeling.

SUGGESTED INSTRUCTIONAL / READING MATERIAL

- “Using and Understanding Mathematics: A Quantitative Reasoning Approach” by Bennett, J. O., Briggs, W. L., & Badalamenti, A.
- “Discrete Mathematics and its Applications” by Kenneth H. Rosen.
- “Discrete Mathematics with Applications” by Susanna S. Epp.
- “Applied Mathematics for Business, Economics and Social Sciences” by Frank S Budnick.
- “Elementary Statistics: A Step by Step Approach” by Allan Bluman.
- “Introductory Statistics” by Prem S. Mann.
- “Applied Statistical Modeling” by Salvatore Babones.
- “Barrons SAT” by Sharvon Weiner Green, M.A and Ira K.Wolf

NATURAL SCIENCES- PRINCIPLES OF BIOLOGY 3(2-1)

Course Description

An "Introduction to Biology" course tailored for a Rehabilitation Sciences degree program should focus on fundamental biological concepts while emphasizing topics relevant to human health, anatomy, physiology, and the biological basis of rehabilitation

CONTENT

Introduction to Biology and Health Sciences

- What is Biology?
- Definition and scope
- Importance of biology in health sciences
- The Scientific Method
- Steps of the scientific method
- Application in health research and evidence-based practice

Basic Chemistry of Life

- Basic Chemistry
- Atoms, molecules, and compounds
- Chemical bonds relevant to biology (ionic, covalent, hydrogen)
- Biological Molecules
- Carbohydrates, lipids, proteins, and nucleic acids
- Enzymes and biochemical reactions in the body

Cell Biology

- Cell Theory and Structure
- Prokaryotic vs. eukaryotic cells
- Structure and function of cell organelles
- Cell Membrane and Transport
- Structure of the cell membrane
- Passive and active transport mechanisms

Human Anatomy and Physiology

- Tissues and Organs
- Types of tissues: epithelial, connective, muscle, and nervous

- Overview of major organ systems
- Musculoskeletal System
- Bone and muscle structure
- Mechanisms of movement and coordination

Metabolism and Homeostasis

- Energy in Biological Systems
- ATP production and energy transfer
- Overview of metabolic pathways (e.g., glycolysis, Krebs cycle)
- Homeostasis
- Mechanisms of maintaining internal balance
- Role in health and disease

Genetics and Human Health

- DNA Structure and Function
- DNA replication and repair
- Gene expression and regulation
- Mendelian and Modern Genetics
- Inheritance patterns and genetic variation
- Role of genetics in health and disease

Human Development and Aging

- Cell Division and Development
- Mitosis and meiosis
- Embryonic development and differentiation
- Aging and Cellular Senescence
- Biological processes of aging
- Implications for rehabilitation sciences

Introduction to Pathophysiology

- Basics of Disease Mechanisms
- Inflammation and immune response
- Tissue repair and regeneration
- Chronic Diseases and Disorders
- Cardiovascular, respiratory, and neurological disorders
- Impact on function and mobility

Ecology and Human Health

- Human Impact on the Environment
- Effects on health and rehabilitation
- Epidemiology and Public Health
- Study of disease patterns and prevention

Teaching Methods and Assessment

- Lectures and Discussions
- Focus on relevance to rehabilitation sciences
- Laboratory Experiments
- Hands-on activities, including microscopy and dissections

- Case Studies and Clinical Applications
- Applying biological concepts to rehabilitation scenarios

Assignments and Projects

- Research projects and presentations on relevant topics

Quizzes and Exams

- To assess understanding and application of material

Additional Resources

- Textbooks and Online Resources
- Current textbooks on biology and human health
- Interactive Models and Simulations
- Virtual labs and tools for exploring complex processes

CIVICS AND COMMUNITY ENGAGEMENT 2(2-0)

This course is designed to provide students with fundamental knowledge about civics, citizenship, and community engagement.

COURSE LEARNING OUTCOMES

By the end of this course, students will be able to:

- Demonstrate fundamental understanding of civics, government, citizenship and civil society.
- Understand the concept of community and recognize the significance of community engagement for individuals and groups.
- Recognize the importance of diversity and inclusivity for societal harmony and peaceful co-existence.

CONTENT

Civics and Citizenship:

- Concepts of civics, citizenship, and civic engagement.
- Foundations of modern society and citizenship.
- Types of citizenship: active, participatory, digital, etc.

State, Government and Civil Society:

- Structure and functions of government in Pakistan.
- The relationship between democracy and civil society.
- Right to vote and importance of political participation and representation.

Rights and Responsibilities:

- Overview of fundamental rights and liberties of citizens under Constitution of Pakistan 1973.
- Civic responsibilities and duties.
- Ethical considerations in civic engagement (accountability, non-violence, peaceful dialogue, civility, etc.)

Community Engagement:

- Concept, nature and characteristics of community.
- Community development and social cohesion.

- Approaches to effective community engagement.
- Case studies of successful community driven initiatives.

Advocacy and Activism:

- Public discourse and public opinion.
- Role of advocacy in addressing social issues.
- Social action movements.

Digital Citizenship and Technology:

- The use of digital platforms for civic engagement.
- Cyber ethics and responsible use of social media.
- Digital divides and disparities (access, usage, socioeconomic, geographic, etc.) and their impacts on citizenship.
- Diversity, Inclusion and Social Justice:
 - Understanding diversity in society (ethnic, cultural, economic, political etc.).
 - Youth, women and minorities' engagement in social development.
 - Addressing social inequalities and injustices in Pakistan.
 - Promoting inclusive citizenship and equal rights for societal harmony and peaceful co-existence.

SUGGESTED PRACTICAL ACTIVITIES (OPTIONAL)

As part of the overall learning requirements, the course may have one or a combination of the following practical activities:

SUGGESTED INSTRUCTIONAL / READING MATERIALS

- Community Storytelling: Students can collect and share stories from community members.
- This could be done through oral histories, interviews, or multimedia presentations that capture the lived experiences and perspectives of diverse individuals,
- Community Event Planning: Students can organize a community event or workshop that
 - addresses a specific issue or fosters community interaction. This could be a health fair,
 - environmental cleanup, cultural festival, or educational workshop.
- Service-Learning: Students can collaborate with a local nonprofit organization or community
 - group. They can actively contribute by volunteering their time and skills to address particular community need, such as tutoring, mentoring, or supporting vulnerable populations.
- Cultural Exchange Activities: Students can organize a cultural exchange event that celebrates the diversity within the community. This could include food tastings, performances, and presentations that promote cross-cultural understanding.
- Civics Today: Citizenship, Economics, & You" by McGraw-Hill Education.
- Citizenship in Diverse Societies" by Will Kymlicka and Wayne Norman.
- Engaging Youth in Civic Life" by James Youniss and Peter Levine.
- Digital Citizenship in Action: Empowering Students to Engage in Online Communities"

by Kristen Mattson.

- Globalization and Citizenship: In the Pursuit of a Cosmopolitan Education" by Graham Pike and David Selby.
- Community Engagement: Principles, Strategies, and Practices" by Becky J. Feldpausch and Susan M. Omilian.
- Creating Social Change: A Blueprint for a Better World" by Matthew Clarke and Marie-Monique Steckel.

ENTREPRENEURSHIP 2(2-0)

This course is designed to think critically, identify opportunities, and transform their ideas into successful ventures. It aims at parting them with the requisite knowledge, skills, abilities, enabling them to seize the identified opportunities for initiating ventures that come with starting a business and managing it. The course topics relevant to entrepreneurship including setting up and initiation of business, market research, opportunity identification, financial literacy for managing finances and securing funding, marketing and sales, team building and innovation.

Course Learning Outcome:

By the end of this course, students shall have:

- Knowledge of fundamental entrepreneurial concepts, skills and process.
- Understanding on different personal, social and financial aspects associated with entrepreneurial activities.
- Ability to apply knowledge, skills and competencies acquired in the course to develop a feasible business plan.

CONTENT

Introduction to Entrepreneurship:

Definition and concept of entrepreneurship.

Why to become an entrepreneur?

Entrepreneurial process.

Role of entrepreneurship in economic development.

Entrepreneurial Skills:

Characteristics and qualities of successful entrepreneurs (including stories of successes and failures).

Areas of essential entrepreneurial skill and ability such as creative and critical thinking, innovation and risk-taking abilities etc.

Opportunity Recognition and Idea Generation:

Opportunity identification, evaluation and exploitation;

Innovative idea generation techniques for entrepreneurial ventures.

Marketing and Sales

Target market identification and segmentation;

Four P's of Marketing.

Developing a marketing strategy.

Branding.

Financial Literacy:

Basic concepts of income, savings and investments.

Basic concepts of assets, liabilities and equity.

Basic concepts of revenue and expenses.

Overview of cash-flows.

Overview of banking products

Sources of funding for start ups (angel financing, debt financing, equity financing etc.).

Team Building for Startups

Regulatory Requirements to Establish Enterprises in Pakistan:

Types of enterprises

Intellectual property rights and protection.

Regulatory requirements to register an enterprise in Pakistan, with special emphasis on export firms.

Taxation and financial reporting obligation.

Learning resources

- Entrepreneurship: Successfully Launching New Ventures" by Bruce R. Barringer and R. Duane Land.
- Entrepreneurship: Theory, Process, and Practice" by Donald F. Kuratko.
- New Venture Creation: Entrepreneurship for the 21st Century" by Jeffrey A. L'Immones, Stephen Spinelli Jr, and Rob Adams.
- Entrepreneurship: A Real-World Approach" by Rhonda Abrams.
- The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" by Eric Ries.
- Effectual Entrepreneurship" by Stuart Read, Saras Sarasvathy, Nick Dew, Robert Wiltbank, and Anne-Valérie Ohlsson.

SEMESTER 5

ARTS AND HUMANITIES (Physical Education and Sports) 2(2-0)

Course Description

This course explores the intersection of physical education, sports, and the arts and humanities, examining how physical activities can be understood and appreciated through cultural, historical, philosophical, and artistic lenses.

Course Objectives

1. Understand the historical and cultural significance of sports and physical activities.
2. Analyze the role of physical education in personal and social development.
3. Explore the artistic expressions related to sports and movement.

4. Develop skills in various physical activities and appreciate their aesthetic aspects.
5. Critically assess the influence of sports on society and culture.

CONTENT

Historical and Cultural Perspectives

- History of Physical Education and Sports
- Ancient Olympics and cultural rituals
- Evolution of sports through the ages

Cultural Significance of Sports

- Sports in different cultures and traditions
- Globalization and the spread of sports

Philosophical and Ethical Considerations

- Philosophy of Sport
- Theories of play and competition
- Sportsmanship and ethics in sports

Ethical Issues in Sports

- Doping, gender, and race in sports
- Fair play and justice in athletic competitions
- Artistic Expressions and Aesthetics

Art and Sports

- Depictions of sports in visual arts and literature
- The Aesthetics of Movement
- Understanding form, grace, and technique in sports

Physical Skills and Techniques

- Fundamental Movement Skills
- Developing coordination, balance, and agility
- Exercises and drills for physical fitness

Team Sports and Cooperation

- Strategies and teamwork in sports like soccer, basketball, and volleyball
- The role of leadership and communication in team dynamics

Sports and Society

- Sports and Identity
- The role of sports in shaping personal and group identity
- Influence of athletes as cultural icons

Social Impact of Sports

- Community building through sports
- Sports and social change movements

Assessment Methods

- Participation in class discussions and activities
- Written essays and reflections on course topics
- Creative projects exploring the intersection of sports and the arts
- Practical demonstrations of skills learned in class

PHARMACOLOGY & THERAPEUTICS–I 2(2-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Describe pharmacokinetic and pharmacodynamic principles of commonly prescribed medications.

Identify medication classes used to manage pain and inflammation in physical therapy practice.

Discuss adverse drug reactions and drug interactions relevant to physical therapy interventions.

Collaborate with healthcare providers to monitor medication efficacy and safety in patient care.

Course Description:

This course covers the basic knowledge of pharmacology including administration, physiologic response and adverse effects of drugs under normal and pathologic conditions. Topics focus on the influence of drugs in rehabilitation patient/client management. Drugs used in iontophoresis and phonophoresis will be discussed in detail.

GENERAL PRINCIPLES OF PHARMACOLOGY;

- Basic Principles of Pharmacology
- Pharmacokinetics; Drug Administration, Absorption, and Distribution
- Pharmacokinetics; Drug Elimination
- Drug Receptors

PHARMACOLOGY OF THE CENTRAL NERVOUS SYSTEM;

- Central Nervous System Pharmacology, General Principles
- Sedative-Hypnotic and Anxiety Agents
- Drugs used to treat affective Disorders; Depression and Manic-Depression
- Antipsychotic Drugs
- Antiepileptic Drugs
- Pharmacologic Management of Parkinson Disease
- General Anesthetics
- Local Anesthetics

DRUGS AFFECTING SKELETAL MUSCLE;

- Skeletal Muscle Relaxants

DRUGS USED TO TREAT PAIN AND INFLAMMATION

- Opioid Analgesics
- Nonsteroidal Anti-Inflammatory Drugs (NSAID)
- Pharmacologic Management of Rheumatoid Arthritis and Osteoarthritis
- Patient-Controlled Analgesia

AUTONOMIC AND CARDIOVASCULAR PHARMACOLOGY

- Introduction to Autonomic Pharmacology
- Cholinergic Drugs
- Adrenergic Drugs
- Antihypertensive Drugs
- Treatment of Angina Pectoris
- Treatment of Cardiac Arrhythmias
- Treatment of Congestive Heart Failure
- Treatment of Coagulation Disorders and Hyperlipidemia

Recommended text book

Pharmacology in Rehabilitation (3rd Edition) By Charles D. Ciccone

Pharmacology, Richard A. Harvey, 2nd Edition, Lippincott's

Mutlianthore text book of Pharmacology and Therapeutics, M. Cheema, A vol 1 and Vol 2

PHYSICAL AGENTS & ELECTROTHERAPY-I 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Describe the physiological effects of physical agents including heat, cold, and compression.
- Demonstrate safe and effective application of physical agents in clinical practice.
- Evaluate patient responses to physical agent interventions and adjust treatment parameters as needed.
- Discuss indications and contraindications for the use of physical agents in rehabilitation.

Course Description

This course tends to explore fundamental skills in application of electromodalities and knowledge of indications, contraindications and physiological principles needed for appropriate patient care. It includes topics such as electric stimulation, T.E.N.S. Iontophoresis, ultrasound /Phonophoresis, diathermy and electro diagnostic testing etc.

INTRODUCTION & GENERAL CONSIDERATION OF ELECTROTHERAPY

TYPES OF CURRENT USED

Low frequency current

Medium frequency current

LOW FREQUENCY CURRENT

- Faradic current
- Sinusoidal current
- Galvanic current
- constant galvanic current
- modified galvanic current
- Superimposed currents

- Transcutaneous electrical nerve stimulation (TENS)
- Dia-dynamic currents
- Medium Frequency Current:
- Interferential Current
- Introduction, physical principles, electro-physiological effects
- Clinical applications, methods of application
 - Treatment consideration & contraindications
- Faradic current
- Detailed description of faradic current
- Treatment techniques
- Methods of application
- Sinusoidal current
- Detailed description of sinusoidal current
- Treatment
- Methods of application
- Galvanic current
- *Constant galvanic current*
- Detailed description of galvanic current treatment
- Methods of application
- Dangers, precautions, contraindications
- Ionization
- Medical ionization
- Theory & proof of ionization
- Effects of various ions, i.e iodine, salicylate, albucid, copper, zinc, histamine, carbachol, renitinenovocaine, lithium
- Techniques of medical ionization with vasodilator drugs
- techniques for special areas
- 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 ,feed back technique
- Super imposed current
- Introduction
- Definition
- Effects & uses
- Technique, Methods, Dangers & Precautions
- Transcutaneous electrical stimulation (TENS)
- Definition
- Theoretical basis of pain
- Equipment selection
- Electrode placement
- Clinical indications
- Dia dynamic current
- Definition and introduction
- Basic currents (MF,DF)
- Derivative of basic current
- Brief description of Dia dynamic and basic currents
- Characteristics of diadynamic current,
 - Techniques of application & treatment, frequency of treatment.
 - Clinical indication e.g. Sprain ankle, Sciatica. Facial neuralgia. Trigeminal neuralgia & Qtitis media.

Practical Training/ Lab Work

- 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, feed back technique
- Practical application of TENS in physical therapy treatment ward
- Reflective clinical case studies
- Iontophoresis
- Demonstration of techniques during practical classes, later on techniques practiced

by students on patients attending the department under supervision of trained physiotherapists.

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 books:

Clayton's Electrotherapy and Actinotherapy, 10th edition by PM Scott
Electrotherapy: Evidence based Practice, 11th edition by Shelia Kitchen
Michelle H Cameron's Physical Agent in Rehabilitation: From research to Practice
Electrotherapy and Electrodiagnosis by S. Lient
Applications of Shortwave Diathermy by P.M. Scott
Practical Electrotherapy by Savage

PATHOLOGY & MICROBIOLOGY-I 2(2-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Describe the etiology, pathophysiology, and clinical manifestations of common infectious diseases.

Identify microorganisms responsible for infectious diseases and their modes of transmission.

Perform basic microbiological techniques for the identification and characterization of pathogens.

Course Description:

Students will develop an understanding of pathology underlying clinical disease states and involving the major organ systems. Epidemiological issues will be presented and discussed. Students will learn to recognize pathology signs and symptoms that are considered "red flags" for serious disease. Students will use problem-solving skills and information about pathology to decide when referral to another health care provider or alternative intervention is indicated. Students will be expected to develop the ability to disseminate pertinent information and findings, and ascertain the appropriate steps to follow.

GENERAL PATHOLOGY

- Cell injury and death:
- Causes of cell injury
- Necrosis

- Apoptosis
- Subcellular responses
- Cell adaptations:
 - Hyperplasia
 - Hypertrophy
 - Atrophy
 - Metaplasia
- Intracellular accumulation
- Inflammation:
 - Acute inflammation
 - Vascular events
 - Cellular events
 - Chemical mediators
 - Chronic inflammation
 - General
 - Granulomatous
 - Morphologic patterns of acute and chronic inflammation
- Healing and repair:
 - Normal controls
 - Repair by connective tissue
 - Wound healing
- Haemodynamic disorders
 - Edema
 - Hyperemia / congestion
 - Hemorrhage
 - Thrombosis
 - Embolism
 - Infarction
 - Shock
- Diseases of immunity
 - General features
 - Hypersensitivity reactions
 - Immune deficiencies
 - Autoimmunity
 - Amyloidosis
- Neoplasia:
 - Nomenclature
 - Molecular basis
 - Carcinogenic agents
 - Clinical aspects

MICROBIOLOGY

- The Bacteria
- Bacterial cell structure
- Bacterial forms and function
- Bacterial identification and classification
- The gram stain
- Methods of studying micro-organism
- Culturing, inoculation and identification
- Types of media
- Physical states of media
- Microbial growth
- Stages in the normal growth curve
- Microbial genetics
- Prokaryotic transcriptions and translations
- Conjugations
- Mutation and its causes
- Mechanism of drug resistances
- Pathogenesis
- Gateway to infection
- Resident flora
- Mechanism of invasions
- Classic stages of clinical infection
- Sterilization and disinfection

INTRODUCTION TO AI

- Overview of AI and machine learning
- History and current trends of AI in healthcare
- Types of AI applications in healthcare (diagnosis, treatment, drug discovery, etc.)
- Benefits and challenges of AI in healthcare Regulatory frameworks and healthcare compliance
- Fundamentals of AI
- Robotic technologies
- Computer languages

Data in Healthcare: Acquisition, Management, and Preprocessing

- Understand different types of healthcare data and their unique characteristics.
- Learn how to preprocess healthcare data for machine learning models.
- Discuss data privacy concerns and compliance with regulations.
- Gain familiarity with data standards that ensure healthcare system interoperability.

Machine Learning for Healthcare Applications

- Supervised, unsupervised, and reinforcement learning in healthcare
- Regression and classification techniques for disease prediction and diagnosis
- Time series analysis for patient monitoring
- Clustering techniques for patient stratification
- Evaluation metrics for healthcare models

Deep Learning for Medical Imaging

- Medical imaging techniques (CT, MRI, X-ray)
- Segmentation and detection tasks in medical imaging (tumor detection, organ segmentation)
- AI-assisted diagnostics in radiology and pathology

Predictive Analytics and Personalized Medicine

- Predictive modeling for patient outcomes (e.g., readmission, mortality)
- Risk stratification using AI models
- Personalized medicine: treatment recommendations using AI
- Precision health: leveraging AI for personalized drug discovery and genomics
- Case studies in predictive analytics (sepsis prediction, heart failure risk prediction)

Robotics and AI in Surgery and Rehabilitation

- Robotics and automation in surgery (robot-assisted surgery)
- AI in rehabilitation and physical therapy (e.g., exoskeletons, prosthetics)
- Role of AI in planning and execution of minimally invasive surgeries

- AI-powered robotics for elderly care and patient assistance

CLINICAL APPLICATION OF AI

History taking
Pattern recognition
Decision-making
AI technology to clinical practice

VIRTUAL REALITY

Radiology
Pathology

ADVANCE (AI)

AI Algorithms for Movement Analysis
Personalized Treatment Planning
Tele-rehabilitation Technologies
Predictive Analytics in Physical Therapy.
Machine Learning for personalized Physical Therapy
Computer Vision for Medical Imaging
Ethics and Privacy in AI for healthcare

COMMUNITY MEDICINE & REHABILITATION 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Identify community resources and referral networks to support patients' rehabilitation goals.
- Collaborate with interdisciplinary teams to develop comprehensive community-based rehabilitation plans.
- Implement strategies to promote health education and injury prevention within the community.
- Evaluate the impact of community rehabilitation programs on patient outcomes and satisfaction.

COURSE DESCRIPTION

- The course is organized to introduce the concept of health care and management issues in Health Services. It will help them in assuming a leadership role in their profession and assume the responsibility of guidance. It will help them assume wider responsibilities at all levels of health services. It will help them in improving their performance through better understanding of the total function of the institution.
- This course is designed for the physiotherapists in order to develop strong knowledge background regarding the community health and well being. It also gives knowledge about issues in community health and policies and procedures for their effective management

CONTENT

- History of Community Medicine
- Definition, concept of Health & illness of diseases
- Natural History of diseases, levels & prevention

Environmental sanitation & Medical entomology

- water
- waste disposal
- Environmental problems & pollution

Genetics

- Prevention of genetic diseases
- Genetic counseling
- General Epidemiology

Descriptive epidemiology

- Time
- Place
- Person

Analytical epidemiology

- Case control
- Cohort studies

Experimental Epidemiology

randomized control trial

- Systemic epidemiology
- i)Vector borne diseases
- ii)Water borne diseases
- iii)Air borne diseases
- iv)Contact diseases
- v)Diseases of major public health
- importance alongwith national
- health programmes wherever
- Applicable

Non-communicable diseases:

- i)Diabetes
- ii)Hypertension
- iii) Heart diseases
- IV) Blindness
- v) Accidents
- vi) Geriatric problems

Occupational Health problems:

- M.C.H. and family welfare
- Programmes
- Health care delivery in the community

National Health Policy

- National Health programmes including Rehabilitation, Evaluation of Health Programmes, Health Planning Organization,
- Structure of Health care system in the Country including P.H.C. district level

State level and central level.

ii) P.H.C. Organization and Function

iii) Role of Non Governmental Organization

Health Education

i) Principles of Health Promotion

ii) Methods, approaches and media for

I.E.C (Information, Education & Communication)

Medical and Health/Information system

Mental Health

Nutrition

TEXT BOOKS

1-Textbooks of Community Medicine, by Prof. H. A. Siddique (2nd Edition).

2- Parks text book of preventive & social medicine –K Park

SUPERVISED CLINICAL PRACTICE - I 3(0-3)

Minimum Performing Standards:

Focus Area: History taking.

It is mandatory for each student to document minimum 16 cases per semester (1 cases per week) in clinical log-book duly checked and signed by clinical supervisor on weekly basis and head of institute at completion.

This learning requirement must be performed in all types of wards and be supervised by a trained Physical Therapist (PT)

Learning Outcomes:

By the end of the practice, students will be able to:

Demonstrate proficiency in reviewing pertinent medical records and conducting comprehensive patient interviews to collect essential data including past and current medical history, demographics, chief complaint, medications, and social history.

Apply history taking skills across diverse patient populations including surgical, non-surgical, pediatric, geriatric, and those with musculoskeletal, integumentary, cardiovascular, pulmonary, and neurological conditions.

Adapt history taking skills to different clinical settings including inpatient and outpatient environments, recognizing the unique challenges and requirements of each setting.

Maintain accurate records of history-taking encounters, documenting all relevant information in a systematic and organized manner.

SEMESTER VI

PHARMACOLOGY & THERAPEUTICS–II 2(2-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain the mechanisms of action and therapeutic uses of medications for cardiovascular and pulmonary conditions.
- Discuss pharmacological interventions for neurological disorders including muscle relaxants and anti-spasticity agents.
- Evaluate the role of pharmacotherapy in the management of endocrine and metabolic disorders.
- Educate patients on medication adherence and potential side effects in physical therapy practice

Course Description:

This course covers the basic knowledge of pharmacology including administration, physiologic response and adverse effects of drugs under normal and pathologic conditions. Topics focus on the influence of drugs in rehabilitation patient/client management. Drugs used in iontophoresis and phonophoresis will be discussed in detail.

RESPIRATORY AND GASTROINTESTINAL PHARMACOLOGY;

Respiratory drugs

Gastrointestinal Drugs

ENDOCRINE PHARMACOLOGY;

Introduction to Endocrine Pharmacology

Adrenocorticosteroids

Male and Female hormones

Thyroid and Parathyroid Drugs; Agents affecting bone mineralization

Pancreatic Hormones and the Treatment of Diabetes Mellitus

CHEMOTHERAPY OF INFECTIOUS AND NEOPLASTIC DISEASES;

Treatment of Infections; Antibacterial Drugs

Treatment of Infections; Antiviral Drugs

Treatment of Infections; Antifungal and Ant parasitic drugs

Cancer Chemotherapy

Immunomodulating Agents

DRUGS USED IN CURRENT PHYSICAL THERAPY PRACTICE:

Drugs administered by Iontophoresis and Phonophoresis

Potential Interactions Between Physical Agents and Therapeutic drugs

Recommended Textbook:

Pharmacology in Rehabilitation (3rd Edition) By Charles D. Ciccone

Pharmacology ,RichardA,Harvey ,2ndEddition ,Lippincott's
Mutlianthore text book of Pharmacology and Therapeutics ,M.Cheema,A vol 1 and Vol 2

THERAPEUTIC EXERCISES & TECHNIQUES 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Demonstrate proficiency in prescribing and progressing therapeutic exercises for various patient populations.

Implement manual therapy techniques including joint mobilization and soft tissue mobilization.

Adapt therapeutic exercises and techniques to address individual patient needs and goals.

Monitor patient response to interventions and modify treatment plans as necessary to achieve desired outcomes

Course Description:

This course presents anatomical and physiological principles to allow students to develop integrated therapeutic exercise interventions. Students have the opportunity to develop an acquired understanding of physiological responses to various types of training and develop skills in prescription, implementation, and modeling of exercise programs. Exercise components of strength, aerobic/ anaerobic conditioning, flexibility, balance and stage of healing/rehabilitation are examined. Evidence of appropriate, safe and effective exercise design and proper exercise biomechanics and prescription parameters are addressed with all interventions. Exercise considerations for special populations and across the age span are covered. Concepts are presented in lecture and practiced in the laboratory.

GENERAL CONCEPTS

Detailed Course Outline:

GENERAL CONCEPTS

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

Instruction:

Prevention, Health, and Wellness

role of physical therapy in healthy people

APPLIED SCIENCE OF EXERCISE AND TECHNIQUES

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

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 Joints

Principles of Aerobic Exercise

Key terms and concepts

Fitness, maximum oxygen consumption, endurance, aerobic exercise training (conditioning), adaptation, myocardial oxygen consumption, deconditioning, energy systems, energy expenditure, and efficiency, functional implications, energy expenditure, efficiency

Physiological response to aerobic exercise

Testing as a basis for exercise programs

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 deconditioned individual and the patient with chronic illness

Age differences; children, young adults, older adults

Exercise for Impaired Balance

Background and concepts

Impaired balance

Management of impaired balance

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

Aerobic Conditioning

PNF

Proprioceptive neuromuscular facilitation-principles and technique

Diagonal patterns

PNF techniques

Basic procedures with PNF patterns
Upper and lower extremity diagonal patterns

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
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

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
Equipment for resistance training

Practical training:

Practical demonstration of ROM techniques
Practical demonstration of stretching techniques
Practical demonstration of resisted exercise techniques
Practical demonstration of PNF patterns and techniques
Practical demonstration of peripheral joint mobilization techniques
Aerobic exercises
Balance training
Hydrotherapy
Reflective clinical case studies
Supervised and independent Practical application of therapeutic techniques on patients in outdoor and indoor physiotherapy 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

Recommended text books:

Therapeutics Exercises and Technique, By: Carolyn Kisner & Lynn Allen Colby 4th 5th edition.
Therapeutics Exercises: Techniques for Intervention By: Willim D. Bandy
Clinical decision making in therapeutic exercise By: Patricia E. Sullivan & Prudence D. Markos, Appleton & Lange Norwalk, Connecticut

PHYSICAL AGENTS & ELECTROTHERAPY–II 3(2-1)**COURSE LEARNING OUTCOMES**

By the end of this course, the students will be able to:

- Explain the principles of electrotherapy modalities including electrical stimulation and ultrasound.
- Apply electrotherapy modalities to manage pain, promote tissue healing, and improve neuromuscular function.
- Monitor patient tolerance and response to electrotherapy treatments.
- Incorporate evidence-based guidelines and safety precautions into the use of electrotherapy modalities.

Course Description:

This course tends to explore further fundamental skills in application of electromodalities and knowledge of indications, contraindications and physiological principles needed for appropriate patient care. It includes topics such as infra red, ultra violet, cryotherapy, hydrotherapy, Iontophoresis, ultrasound /Phonophoresis, electrodiagnostic testing, traction, compression laser therapy etc.

Medium Frequency Current:

Interferential Current

Introduction, physical principles, electro-physiological effects

Clinical applications, methods of application

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

Laws governing radiation

Infra-Red Rays

Definition

Production, luminous & non-luminous generators

Physiological effects

Therapeutic effects

Uses

Techniques of application

Dangers and contraindications

Ultra Violet Rays

Production, U.V. rays

Mercury Vapor Lamp: Air cooled mercury vapor lamp & Kromayer lamp

Fluorescent Tubes

Penetration of rays into the skin

Physiological effects (local & general)

Therapeutic effects

Sensitizers

Assessment of doses

Test dose

Techniques of local and general radiation with special techniques of treatment of wounds

Techniques with compression

Dangers & precautions

Contraindications

Heliotherapy

Introduction

Effects

Uses

dangers and contraindications

Ultrasonic Therapy

Introduction

Production

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

Cryotherapy

Definition
Methods
Physiological & therapeutic effects
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
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
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
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
Methods of Treatment

Practical Training/ Lab Work

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

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 physiotherapists.

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 books:

Clayton's Electrotherapy and Actinotherapy, 10th edition by PM Scott

Electrotherapy: Evidence based Practice, 11th edition by Shelia Kitchen

Michelle H Cameron's Physical Agent in Rehabilitation: From research to Practice

Electrotherapy and Electrodagnosis by S. Lient

Applications of Shortwave Diathermy by P.M. Scott

Practical Electrotherapy by Savage

SUSTAINABLE DEVELOPMENT GOALS: HEALTH & WELLBEING 2(2-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Promote health and wellness through lifestyle modification and behavior change strategies.
- Assess individuals' health status and risk factors to develop personalized wellness plans.
- Implement evidence-based interventions to prevent chronic diseases and promote

overall well-being.

- Evaluate the effectiveness of health promotion programs in improving health outcomes.

Course Description:

This course includes discussion on the theories of health and wellness, including motivational theory, locus of control, public health initiative, and psycho-Social, spiritual and cultural consideration. Health risks, screening, and assessment considering epidemiological principles are emphasized. Risk reduction strategies for primary and secondary prevention, including programs for special populations are covered.

CONTENT

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

Key Concepts of Fitness:

Defining & Measuring Fitness
Assessment of Stress with a Survey
Visualizing Fitness
Screening for Mental and Physical Fitness
Body Mass Index calculations

Fitness Training:

Physical Activities Readiness Questionnaire
Physical Activities Pyramid
Exercise Programs
Evidence-Based Practice

Screening for Health, Fitness, and Wellness:

Distinguishing Screening, Examination, and Evaluation
Interviewing for Health, Fitness and Wellness
Vital Signs, 3-minute Step Test, and Borg perceived Scale of Exertion
Seven Dimensions of Wellness
Physical Health Screening

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

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

Health, Fitness, and Wellness During Adulthood:

Tasks of Adulthood

- Adult Health and Wellness Risks
- Screening Tools for Adulthood
- Adult Educational Materials

Women's Health Issues: Focus on Pregnancy:

- Screening for Women's Health
- Women's Heart Disease
- Female Athlete Triad
- Educational Material for Women
- Prepartum and Postpartum Exercises

Prevention Practice for Older Adults :

- Ageism
- Anatomical and Physiological Changes with Aging
- Common Health Problems of Older Adults
- Screening Older Adult for Health Fitness and Wellness
- Fitness for Older Adults

Resources to Optimize Health and Wellness:

- Chronic Illness
- Nutrition
- Progressive Relaxation
- Time management
- Spirituality

Health Protection:

- Infection Control
- Injury Prevention during Childhood
- Injury prevention during Adolescence
- Injury Prevention during Adulthood
- Injury Prevention during Older Adulthood

Prevention Practice for Musculoskeletal Conditions:

- Musculoskeletal, Changes in Childhood and Adolescence
- Musculoskeletal Changes with Aging
- Ergonomics
- Workplace Screening for Musculoskeletal Risk

Prevention Practice for Cardiopulmonary Conditions:

- Common Cardiopulmonary Disorders
- Screening for Cardiopulmonary Conditions
- Prevention of Cardiovascular Conditions
- Prevention of pulmonary Conditions
- Recommended Exercises for Chronic Diseases

Prevention Practice for Neuromuscular Conditions:

- Prevention Practice for Stroke
- Prevention Practice for spinal Cord Injury
- Prevention Practice for Parkinson's disease
- Prevention practice for Multiple Sclerosis

Prevention Practice for Integumentary Disorders:

Lifespan Changes of the integumentary System
Skin Care

Prevention Practice for Individuals with Developmental Disabilities:

Defining Developmental Disabilities
Misconceptions about Disabilities
Promoting Health for Individuals with Developmental Disabilities
Quality of life for Individuals with Developmental Disabilities

Marketing Health and Wellness:

Definition of Marketing
Marketing Strategies for health and wellness Centers

RECOMMENDED BOOK:

A Physical Therapist's Guide to Health, Fitness, and Wellness
By Catherine R Thompson, PhD, MS, PT

MOLECULAR BIOLOGY & GENETICS 2(2-0)

Course Description:

This course provides the knowledge and skills in fundamental organic chemistry and introductory biochemistry that are essential for further studies. It covers basic biochemical, cellular, biological and microbiological processes, basic chemical reactions in the prokaryotic and eukaryotic cells, the structure of biological molecules, introduction to the nutrients i.e. carbohydrates, fats, enzymes, nucleic acids and amino acids. The nutritional biochemistry concludes the course.

Detailed Course Outline:

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

Nutritional Biochemistry

Minerals & Trace Elements

- Sources
- RDA
- Biochemical Functions & Clinical Significance of Calcium & Phosphorus
- Sources
- RDA
- Biochemical Functions & Clinical Significance of Sodium Potassium & Chloride
- Metabolism of Iron, Cu, Zn, Mg, Mn, Se, 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
- Balanced Diet

Molecular Biology

- DNA Replication & Repair in Prokaryotes
- DNA Replication & Repair in Eukaryotes

Recommended Text Books:

- *Harper's Biochemistry* by Robbert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, Latest Ed.
- *Lippincott's Illustrated Review of Biochemistry* by Pamela C. Champe and Richard A. Harvey, Latest Ed.
- *Practical Clinical Biochemistry* by Varley.
- *Textbook of Biochemistry* by Devlin, 5th Ed.
- *Textbook of Medical Biochemistry* Vol-I and II by M.A. Hashmi.
- *Biochemistry* by Stryer, Lubert, Latest Ed

PATHOLOGY & MICROBIOLOGY–II 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Explain the pathogenesis and clinical features of neoplastic diseases.

- Describe the role of immunology in the body's defense against infectious and autoimmune diseases.
- Analyze laboratory test results to aid in the diagnosis and management of pathological conditions.
- Discuss the principles of tumor staging and grading in cancer diagnosis and treatment.

Course Description:

Students will develop an understanding of pathology underlying clinical disease states and involving the major organ systems. Epidemiological issues will be presented and discussed. Students will learn to recognize pathology signs and symptoms that are considered “red flags” for serious disease. Students will use problem-solving skills and information about pathology to decide when referral to another health care provider or alternative intervention is indicated. Students will be expected to develop the ability to disseminate pertinent information and findings, and ascertain the appropriate steps to follow.

The Integumentary System

Skin Lesions

Signs and Symptoms of Skin Disease

Aging and the Integumentary System

Common Skin Disorders

Skin Infections

Skin Cancer

Skin Disorders Associated With Immune

Dysfunction

Thermal Injuries

Miscellaneous Integumentary Disorders

The Cardiovascular System

Signs and Symptoms of Cardiovascular Disease

Aging and the Cardiovascular System

Gender Differences and the Cardiovascular System

Diseases Affecting the Heart Muscle

Disease Affecting the Cardiac Nervous System

Diseases Affecting the Heart Valves

Diseases Affecting the Pericardium

Diseases Affecting the Blood Vessels

Other Cardiac Considerations

The Lymphatic System

Anatomy and Physiology

Inflammation and Infection in the Lymphatic System

The Respiratory System

Aging and the Pulmonary System
Infectious and Inflammatory Diseases
Obstructive Diseases
Environmental and Occupational Diseases
Near Drowning
Congenital Disorders
Parenchymal Disorders
Disorders of the Pulmonary Vasculature
Disorders of the Pleural Space

Pathology of the musculoskeletal System

Introduction to Pathology of the Musculoskeletal System

Advances in Musculoskeletal Biotechnology
Biologic Response to Trauma
Aging and the Musculoskeletal System
The Musculoskeletal System and Exercise
Musculoskeletal System Disease

Genetic and Developmental Disorders

Down syndrome
Scoliosis
Kyphoscoliosis
Spina Bifida Occulta, Meningocele, Myelomeningocele
Developmental Dysplasia of the Hip
Neuromuscular Disorders
Torticollis
Erb's Palsy
Osteogenesis Imperfecta
Arthrogryposis Multiplex Congenita

Metabolic Disorders

Osteoporosis
Osteomalacia
Paget's Disease

Infectious Diseases of the Musculoskeletal System

Osteomyelitis
Infections of Prostheses and Implants
Diskitis
Infectious (Septic) Arthritis
Infectious (Inflammatory) Muscle Disease
Extra pulmonary tuberculosis
Summary of Special Implications for the Therapist

Musculoskeletal Neoplasms

Primary Tumors
Primary Benign Bone tumors
Primary Malignant Bone tumors

Multiple Myeloma
Primary Soft Tissue Tumors
Metastatic Tumors
Soft Tissue , Joint , and Bone Disorders
Soft Tissue
Joint
Bone

Pathology Of The Nervous System

Introduction to Central Nervous System Disorders

Overview
Pathogenesis
Clinical Manifestations
Diagnosis
Treatment
Prognosis

Infectious Disorders of the Central Nervous System

Overview
Meningitis
Encephalitis
Brain Abscess
Prion Disease

Central Nervous System Neoplasms

Primary Brain Tumors
Specific Primary Brain Tumors
Primary Intraspinal Tumors
Metastatic Tumors
Paraneoplastic Syndromes
Leptomeningeal Carcinomatosis
Pediatric Tumors

Degenerative Diseases of the Central Nervous System

Amyotrophic Lateral Sclerosis,
Alzheimer's Disease, Alzheimer's Dementia, and Variants
Dystonia,
Huntington's Disease
Multiple Sclerosis
Parkinsonism and Parkinson's Disease

Stroke

Stroke
Vascular Disorders of the Spinal Cord

Medical Microbiology

G +ve cocci
Staphylococci

Streptococci

G -ve cocci

Nessessia

G +ve spore forming rods

Bacillies

Clostridia

G –ve rods (introduction to Enterics)

Acid fast bacilli

Mycobacteria

Spirochetes

Introduction

Treponemes

Basic virology

General characteristics

Viral structure

Nomenclature and classification

Mycology

Introduction to mycology

Parasitology

Introduction to protozoan

Practical Training/ Lab Work

To study the microscope

To study the calcification

To study the osteogenic sarcoma

To study the granulation tissue

To study the chronic inflammation (cholecystitis)

To study the acute inflammation (appendicitis)

To Fibroedenoma

To study the carcinoma of breast

To study the actinomycosis

To study the culture media

To study the gram staining

To study the Z-N staining

To study the giant cell tumor

Examination of urine

Recommended Text Books

Pathology: implications for the Physical therapist by: Catherine cavallaro Goodman, 3rd edition

Basics &advanced Human Pathology

Pathology by Robbins

Introduction to Pathology by Weight

Lecture notes on Pathology by Thomas and Cotton

Course Description:

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to neurological disorders. Students become familiar with performance of these skills in all settings (inpatient and outpatient) as well as on all types of conditions (surgical, non-surgical, pediatric and geriatric.) 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.

Competencies:

Examination:

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 such as:

Balance during functional activities with or without the use of assistive, adaptive, orthotic, protective, supportive, or prosthetic devices or equipment

Balance (dynamic and static) with or without the use of assistive, adaptive, orthotic, protective, supportive, or prosthetic devices or equipment

Gait and locomotion during functional activities with or without the use of assistive, adaptive, orthotic, protective, supportive, or prosthetic devices or equipment to include:

Bed mobility

Transfers (level surfaces and floor)

Wheelchair management

Uneven surfaces

Safety during gait, locomotion, and balance

Perform gait assessment including step length, speed, characteristics of gait, and abnormal gait patterns.

Characterize or quantify body mechanics during self-care, home management, work, community, tasks, or leisure activities.

Characterize or quantify ergonomic performance during work (job/school/play):

Dexterity and coordination during work

Safety in work environment

Specific work conditions or activities

Tools, devices, equipment, and workstations related to work actions, tasks, or activities

Characterize or quantify environmental home and work (job/school/play) barriers:

Current and potential barriers

Physical space and environment

Community access

Observe self-care and home management (including ADL and IADL)

Measure and characterize pain to include:

Pain, soreness, and nociception

Specific body parts

Recognize and characterize signs and symptoms of inflammation.

Perform neurological tests and measures including:

1. Perform arousal, attention and cognition tests and measures to characterize or quantify (including standardized tests and measures)*:

A. Arousal

B. Attention

C. Orientation

D. Processing and registration of information

E. Retention and recall

F. Communication/language

2. Perform cranial and peripheral nerve integrity tests and measures*:

A. Motor distribution of the cranial nerves (eg, muscle tests, observations)

B. Motor distribution of the peripheral nerves (eg, dynamometry, muscle tests, observations, thoracic outlet tests)

C. Response to neural provocation (e.g. tension test, vertebral artery compression tests)

D. Response to stimuli, including auditory, gustatory, olfactory, pharyngeal, vestibular, and visual (eg, observations, provocation tests)

3. Perform motor function tests and measures to include*:

A. Dexterity, coordination, and agility

B. Initiation, execution, modulation and termination of movement patterns and voluntary postures

4. Perform neuromotor development and sensory integration tests and measures to characterize or quantify:

A. Acquisition and evolution of motor skills, including age-appropriate development

B. Sensorimotor integration, including postural responses, equilibrium, and righting reactions

5. Perform tests and measures for reflex integrity including:

A. Deep reflexes (eg, myotatic reflex scale, observations, reflex tests)

B. Postural reflexes and reactions, including righting, equilibrium and protective reactions

C. Primitive reflexes and reactions, including developmental

D. Resistance to passive stretch

E. Superficial reflexes and reactions

F. Resistance to velocity dependent movement

6. Perform sensory integrity tests and measures that characterize or quantify including:

A. Light touch

B. Sharp/dull

C. Temperature

D. Deep pressure

- E. Localization
- F. Vibration
- G. Deep sensation
- H. Stereognosis
- I. Graphesthesia

Evaluation:

- Clinical reasoning
 - Clinical decision making
1. Synthesize available data on a patient/client expressed in terms of the International Classification of Function, Disability and Health (ICF) model to include body functions and structures, activities, and participation.
 2. Use available evidence in interpreting the examination findings.
 3. Verbalize possible alternatives when interpreting the examination findings.
 4. Cite the evidence (patient/client history, lab diagnostics, tests and measures and scientific literature) to support a clinical decision.

Diagnosis:

1. Integrate the examination findings to classify the patient/client problem in terms of body functions and structures, and activities and participation (ie, practice patterns in the Guide)
2. Identify and prioritize impairments in body functions and structures, and activity limitations and participation restrictions to determine specific body function and structure, and activities and participation towards which the intervention will be directed.*

Prognosis:

1. Determine the predicted level of optimal functioning and the amount of time required to achieve that level.*
 2. Recognize barriers that may impact the achievement of optimal functioning within a predicted time frame including*:
- A. Age
 - B. Medication(s)
 - C. Socioeconomic status
 - D. Co-morbidities
 - E. Cognitive status
 - F. Nutrition
 - G. Social Support
 - H. Environment

Plan of Care:

- Goal setting

- Coordination of Care
- Progression of care
- Discharge

SEMESTER VII

MUSCULOSKELETAL PHYSICAL THERAPY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Demonstrate proficiency in musculoskeletal assessment techniques including range of motion and strength testing.
- Develop individualized treatment plans based on musculoskeletal impairments and functional limitations.
- Apply manual therapy techniques and therapeutic exercises to improve musculoskeletal function.
- Evaluate treatment outcomes and modify interventions as needed to optimize patient progress.

Course Description:

This course includes a study of anatomy and physiology of the musculoskeletal system and pathological changes of the system and function, including diagnostic tests and measurements. Relevant tests and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment instruments as related to patients with musculoskeletal conditions are discussed. The use of evidence-based physical therapy intervention for musculoskeletal conditions is emphasized. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

MEDICAL TERMINOLOGY REGARDING MUSCULOSKELETAL SYSTEM

PRINCIPLES AND CONCEPTS OF MUSCULOSKELETAL EVALUATION/ASSESSMENT

Patient history

Observation

Examination

Principles, vital signs, examination of specific joints, functional assessment, specific diagnostic test, reflexes and cutaneous distribution, joint play movements, palpation

Evaluation /Assessment of spine and peripheral joints

Causes

Effects of range limitation on functional activities

Documentation

Physical Therapy Treatment protocol for pain relief and movement dysfunctions

PRINCIPLES OF INTERVENTION

Soft Tissue Injury, Repair, and Management

Soft tissue lesions

Management during the acute stage
Management during the sub acute
Management during the chronic stage
Cumulative trauma—chronic recurring pain

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

Indications for surgical intervention
Guidelines for preoperative and Postoperative management; considerations for preoperative management, considerations for postoperative management, potential postoperative complications
Overview of common orthopedic surgeries and postoperative management; surgical approaches—open, arthroscopic, and arthroscopically assisted procedures, use of tissue grafts, repair, reattachment, reconstruction, stabilization, or transfer of soft tissues, release, lengthening, or decompression of Soft tissues

Peripheral Nerve Disorders and Management

Review of peripheral nerve structure; nerve structure, nervous system mobility characteristics, common sites of injury to peripheral nerves
Impaired nerve function
Nerve injury and recovery
Neural tension disorders and their managements
Musculoskeletal diagnoses involving impaired
Nerve function thoracic outlet syndrome
Carpal tunnel syndrome
Compression in tunnel of Guyon
Complex regional pain syndrome: reflex sympathetic Dystrophy and causalgia

EXERCISE INTERVENTIONS BY BODY REGION

The Shoulder and Shoulder Girdle

Examination, evaluation and assessment of shoulder joint
Referred pain and nerve injury
Management of shoulder disorders and surgeries
Joint Hypomobility: nonoperative management
Glenohumeral joint surgery and postoperative management
Painful shoulder syndromes (rotator cuff disease, impingement syndromes, shoulder instabilities):
Nonoperative management
Painful shoulder syndromes: surgery and postoperative management
Shoulder dislocations: nonoperative management

Shoulder instabilities: surgery and postoperative management
Exercise interventions for the shoulder
Girdle Exercise Techniques During Acute and Early Subacute Stages of tissue healing
Exercise techniques to increase flexibility and range of motion
Exercises to develop and improve muscle performance and functional control
OMT principles
Kaltenborn principles
Manual technique

The Elbow and Forearm Complex

Examination, evaluation and assessment of elbow and forearm complex
Referred pain and nerve injury in the elbow region
Management of elbow and forearm disorders and surgeries
Joint Hypomobility: nonoperative management
Joint surgery and postoperative management
Myositis ossificans
Overuse syndromes: repetitive trauma syndromes
Exercise interventions for the elbow and Forearm
Exercise techniques to increase flexibility and range of Motion
Exercises to develop and improve muscle performance and functional
OMT principles
Kaltenborn principles
Manual technique

The Wrist and Hand

Examination, evaluation and assessment of wrist and hand
Major nerves subject to pressure and trauma at the Wrist and hand
Management of wrist and hand disorders and surgeries
Joint Hypomobility: nonoperative management
Joint surgery and postoperative management
Repetitive trauma syndromes/overuse
Traumatic lesions in the wrist and hand
Exercise interventions for the wrist and Hand
Techniques for musculotendinous mobility
Exercise techniques to increase flexibility and range of motion
Exercises to develop and improve muscle Performance, neuromuscular control, and coordination.
OMT principles
Kaltenborn principles
Manual technique

The Hip

Examination, evaluation and assessment of hip joint
The hip and gait
Referred pain and nerve injury

Management of hip disorders and surgeries
Joint Hypomobility: nonoperative management
Joint surgery and postoperative management
Fractures of the hip—surgical and postoperative management
Painful hip syndromes/overuse syndromes: nonoperative management
Exercise interventions for the hip region
Exercise techniques to increase flexibility and range of motion
Exercises to develop and improve muscle performance and functional control
OMT principles
Kaltenborn principles
Manual technique

The Knee

Examination, evaluation and assessment of knee joint
Referred pain and nerve injuries
Management of knee disorders and surgeries
Joint Hypomobility: nonoperative management
Joint surgery and postoperative management
Patellofemoral dysfunction: nonoperative management
Patellofemoral and extensor mechanism dysfunction: Surgical and postoperative management
Ligament injuries: nonoperative management
Ligament injuries: surgical and postoperative Management
Meniscal tears: nonoperative management
Meniscal tears: surgical and postoperative management
Exercise interventions for the knee
Exercise techniques to increase flexibility and range of motion
Exercises to develop and improve muscle performance and functional control
OMT principles
Kaltenborn principles
Manual technique

The Ankle and Foot

Examination, evaluation and assessment of ankle and foot joint
Referred pain and nerve injury
Management of foot and ankle disorders and surgeries
Joint Hypomobility: nonoperative management
Joint surgery and postoperative management
Overuse (repetitive trauma) syndromes: nonoperative management
Ligamentous injuries: nonoperative management
Traumatic soft tissue injuries: surgical and postoperative management
Exercise interventions for the ankle and foot
Exercise techniques to increase flexibility and range of motion
Exercises to develop and improve muscle performance and functional control

OMT principles
Kaltenborn principles
Manual technique

OMT Kaltenborn-Evjenth Concept

History
Special features
Overview

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

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

Translatory joint play

The Kaltenbom Treatment Plane
Translatory Joint Play Movements
Determining the direction of restricted gliding
Glide test
Kaltenbom 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
Using translatory grades of movement

Tests of function

Principles of function testing
Assessing quantity of movement
Measuring rotatory movement with a device
Manual grading of rotatory movement (-scale)
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 rotatory movements
Testing rotatory 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

Manual therapy assessment

The Maitland's and Mulligan concept

TECHNIQUES

Maitland and Mulligan Technique 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

Course Title: Nutrition in Musculoskeletal Physical Therapy

Course Description:

This course explores the role of nutrition in the management and treatment of musculoskeletal conditions. Students will learn how nutritional strategies can support physical therapy interventions, enhance recovery, and improve overall musculoskeletal health.

Learning Objectives:

Understand the basic principles of nutrition and how they relate to musculoskeletal health.

Analyze the impact of various nutrients on muscle and bone physiology.

Develop nutrition plans to support patients undergoing physical therapy for musculoskeletal conditions.

Evaluate current research on nutrition and its effects on musculoskeletal recovery and performance.

Course Outline:

Introduction to Nutrition and Musculoskeletal Health

Overview of nutrition principles

The role of nutrition in musculoskeletal health

Introduction to macronutrients and micronutrients

Macronutrients and Muscle Physiology

Protein metabolism and muscle repair

Carbohydrates and energy supply for physical activity

Fats and their role in inflammation and recovery

Micronutrients and Bone Health

Calcium and Vitamin D in bone health

Other essential vitamins and minerals for musculoskeletal health

Nutrient deficiencies and their impact on bone density

Nutritional Assessment in Physical Therapy

Methods for assessing nutritional status

Interpreting dietary intake data

Identifying nutritional deficiencies in patients with musculoskeletal conditions

Inflammation and Nutrition

The role of diet in modulating inflammation

Anti-inflammatory diets and their components

Omega-3 fatty acids and their impact on inflammation

Nutritional Strategies for Injury Prevention and Recovery

Nutritional interventions for acute injuries

Chronic musculoskeletal conditions and dietary management

Role of hydration in musculoskeletal health

Integrating Nutrition into Physical Therapy Practice

Case studies: Developing nutrition plans for physical therapy patients

Collaboration between dietitians and physical therapists

Ethical considerations in providing nutritional advice

Special Populations

Nutritional needs of athletes

Elderly patients and musculoskeletal nutrition

Children and adolescents: supporting growth and development

Supplementation in Musculoskeletal Health

Evidence-based use of supplements

Common supplements for musculoskeletal conditions

Risks and benefits of supplementation

Practical training:

The practical training will be sought in physiotherapy 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 gynaecological conditions

Reflective clinical case studies

Supervised and independent Practical application of therapeutic techniques on patients in outdoor and indoor physiotherapy 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.

Recommended text books:

Therapeutics Exercises and Technique, By: Carolyn Kisner & Lynn Allen Colby 4th 5th edition.

Therapeutics Exercises: Techniques for Intervention By: Willim D. Bandy

Clinical decision making in therapeutic exercise By: Patricia E. Sullivan & Prudence D. Markos, Appleton & Lange Norwalk, Connecticut

Hertling, D, and Kessler RM. *Management of Common Musculoskeletal Disorders: Physical Therapy Principles and Methods*. 3rd ed. Philadelphia, PA: WB Saunders 1995

Orthopaedic Physical Therapy By: Donatelli & Michael J. Wooden 4th Edition.

Physiotherapy in Orthopaedics, A problem-solving approach By: Atkinson, Coutts & Hassenkamp 2nd Edition
Clinical orthopaedic rehabilitation By S. Brent. Brotzman & Kevin. E. Wilk, 2nd edition, Mosby publishers.
Management of Common Musculoskeletal Disorder by: Hertling, D, and Kessler RM
 Physical Therapy Principles and Methods. 3rd ed. Philadelphia, PA: WB Saunders
Orthopedic Physical Assessment. Magee, D. 4th ed. Philadelphia PA: WB Saunders 1995
Physical Rehabilitation Assessments and Treatment”. By Susan B, O’Sullivan & Thomas J. Schmitz, 4th edition
Tidy’s Physiotherapy by Thomas A Skinner & Piercy

MEDICINE-I 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Describe the pathophysiology and clinical manifestations of common medical conditions.

Identify pharmacological interventions used in the management of medical conditions.

Apply medical knowledge to recognize red flags and refer patients for further evaluation.

Collaborate with physicians and other health care providers in interdisciplinary patient care.

Course Description:

This course intends to familiarize students with medical terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores select systemic diseases, focusing on epidemiology, pathology, histology, etiology, as well as primary and secondary clinical characteristics and their management. Discusses and integrates subsequent medical and surgical management to formulate appropriate intervention indications, precautions and contraindications.

CARDIOVASCULAR DISEASES

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
Cardiac arrhythmias and heart in pregnancy

Vascular Diseases:

Arteriosclerosis
Acute & Chronic ischemia of leg
Aortic aneurysm
Buerger's disease
Raynaud's disease
Varicose veins
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
Neck pain

Soft Tissue Rheumatism

Bone diseases

Paget's disease
Infections of bones
Neoplastic disease

Skeletal dysplasia
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
Pneumothorax

Recommended Text Books:

Practice of medicine by: Davidson
Clinical medicine by: Parveen j Kumar & Michael Clark
Short text book by medicine by: M. Inam Danish
Hutchison's clinical methods by: Michael swash. 21st edition

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Describe common surgical procedures and their indications in orthopedic and musculoskeletal conditions.
- Identify preoperative and postoperative considerations for physical therapy management.
- Discuss potential complications and rehabilitation challenges following orthopedic surgery.
- Collaborate with surgeons and other health care providers to optimize surgical outcomes for patients.

Course Description:

This course intends to familiarize students with principles orthopaedic surgery along with familiarization with terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores various orthopaedic conditions needing surgical attention, focusing on epidemiology, pathology, as well as primary and secondary clinical characteristics and their surgical management. The purpose of this course is to make physiotherapy students aware of various surgical conditions so these can be physically managed effectively both pre as well as postoperatively.

ORTHOPEDIC SURGERY

- Fractures
- Definition
- Classification
- Causes
- Clinical features
- Healing of fractures
- Complications

Principles of general management of

- Fracture of the Upper Extremity
- Fracture of the Lower Extremity
- Fracture of the vertebral column, thorax and pelvis
- Basic and advanced trauma life support

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

- Knee joint
- Soft Tissue Injuries
- Introduction

Anatomy & physiology general description and management of injuries of:

- Ligaments
- Tendons
- Muscles
- Fascia
- Bursae

Detailed description of physiotherapy management of individual tissue injuries around:

- Shoulder region
- Elbow region
- Wrist and hand region
- Knee region
- Ankle region
- Muscles and tendons injuries of upper and lower limb
- Cervicolumbar injuries
- Whiplash of the cervical spine
- Crush injuries
- Spinal pain
- Degenerative and Inflammatory Conditions:
- Osteo-arthrosis/Arthritis
- Spondylosis
- Spondylolysis
- Pyogenic arthritis
- Rheumatoid arthritis
- Juvenile arthritis
- Tuberculosis arthritis
- Gouty arthritis
- Haemophilic arthritis
- Neuropathic arthritis
- Ankylosing spondylitis
- psoriatic arthritis

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:

- Classification
- Principles of general management
- General description of benign and malignant tumors of musculoskeletal system
- Deformities and Anomalies
- Definition
- Causes
- Classification
- Congenital and acquired deformities
- Physical and clinical and radiological features
- Complications
- Principles of medical and surgical management of the deformities
- General description of following deformities:

Deformities of the spine:

- Torticollis
- Scoliosis
- Kyphosis
- Lordosis
- flat back

Deformities of the Lower Limb:

- CDH
- coxa vera
- coxa valga
- anteversion
- Retroversion
- Genu valgum

- Genu varum
- Genu recurvatum
- CDK
- Talipes calcaneus equinus, varus & valgus
- Talipes calcaneovarus
- Talipes calcaneovalgus
- Talipes equinovarus
- Pes cavus
- Pes planus
- Hallux valgus & varum,
- Hallux rigidus and hammer toe

Deformities of Shoulder and Upper limb:

- Sprengel's shoulder
- Cubitus varum
- Cubitus valgus
- Dupuytren's contracture

RECOMMENDED TEXT BOOKS:

Short practice of surgery by Bailey and Love's

Text Book of Surgery by Ijaz Ahsan

Outline of Fractures

RADIOLOGY & DIAGNOSTIC IMAGING 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Identify radiographic anatomy and landmarks relevant to physical therapy practice.

Interpret common radiographic findings and imaging studies including X-rays and MRIs.

Recognize indications and contraindications for diagnostic imaging in patient assessment.

Course Description:

This course 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.

From the Watching of Shadows:

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:

Equipment components
Procedures for Radiography & Mammography
Benefits versus Risks and Costs
Indications and contraindications

Fluoroscopy:

What is Fluoroscopy?
Equipment used for fluoroscopy
Indications and Contra indications
How it helps in diagnosis
The Findings in Fluoroscopy
Benefits versus Risks and Costs

Computed Tomography (CT):

What is Computed Tomography?
Equipment used for Computed Tomography
Indications and Contra indications
How it helps in diagnosis
The Findings in Computed Tomography
Benefits versus Risks and Costs

Magnetic Resonance Imaging (MRI)

What is MRI?
Equipment used for MRI
Indications and Contra indications
How it helps in diagnosis
The Findings in MRI
Benefits versus Risks and Costs
Functional MRI

Ultrasound:

What is Ultrasound?
Equipment used for Ultrasound
Indications and Contra indications
How it helps in diagnosis
The Findings in Ultrasound
Benefits versus Risks and Costs

Endoscopy:

What is Endoscopy?
Equipment used for Endoscopy
Indications and Contra indications
How it helps in diagnosis
The Findings in Endoscopy
Benefits versus Risks and Costs

Nuclear Medicine:

What is Nuclear Medicine?
Equipment used for Nuclear Medicine
Indications and Contra indications
How it helps in diagnosis.
Benefits versus Risks and Costs

Interventional Radiology

Recommended Text Book:

Looking Within (How X-ray, CT, MRI, Ultrasound and Other Medical Images Created and How They Help Physicians Save Lives) By Anthony Brinton Wolbarst
A–Z of Musculoskeletal and Trauma Radiology By: James R. D. Murray
Essentials of Radiology by Fred. A. Mettler, 2nd edition.
Imaging in rehabilitation, By: Terry. R. Malone, Charles Hazle & Michael L. Grey. McGraw Hill Publishers.

BIOSTATISTICS 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:
Understand fundamental concepts of biostatistics including data analysis and interpretation.
Apply statistical methods to analyze research findings in physical therapy literature.
Interpret statistical measures to assess treatment outcomes and patient progress.
Utilize statistical software for data management and analysis in research projects.

BIOSTATISTICS

CREDIT HRS: 3 (3-0)

What is Statistics?

Definition of Statistics, Population, sample Descriptive and inferential Statistics, Observations, Data, Discrete and continuous variables, Errors of measurement, Significant digits, Rounding of a Number, Collection of primary and secondary data, Sources, Editing of Data. Exercises.

Presentation of Data

Introduction, basic principles of classification and Tabulation, Constructing of a frequency

distribution, Relative and Cumulative frequency distribution, Diagrams, Graphs and their Construction, Bar charts, Pie chart, Histogram, Frequency polygon and Frequency curve, Cumulative Frequency Polygon or Ogive, Histogram, Ogive for Discrete Variable. Types of frequency curves. Exercises.

Measures of Central Tendency

Introduction, Different types of Averages, Quantiles, The Mode, Empirical Relation between Mean, Median and mode, Relative Merits and Demerits of various Averages. properties of Good Average, Box and Whisker Plot, Stem and Leaf Display, definition of outliers and their detection. Exercises.

Measures of Dispersion

Introduction, Absolute and relative measures, Range, The semi-Inter-quartile Range, The Mean Deviation, The Variance and standard deviation, Change of origin and scale, Interpretation of the standard Deviation, Coefficient of variation, Properties of variance and standard Deviation, Standardized variables, Moments and Moments ratios. Exercises.

Probability and Probability Distributions.

Discrete and continuous distributions: Binomial, Poisson and Normal Distribution. Exercises

Sampling and Sampling Distributions

Introduction, sample design and sampling frame, bias, sampling and non sampling errors, sampling with and without replacement, probability and non-probability sampling, Sampling distributions for single mean and proportion, Difference of means and proportions. Exercises.

Recommended Books

Walpole, R. E. 1982. "Introduction to Statistics", 3rd Ed., Macmillan Publishing Co., Inc. New York.

Muhammad, F. 2005. "Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad.

Hypothesis Testing

Introduction, Statistical problem, null and alternative hypothesis, Type-I and Type-II errors, level of significance, Test statistics, acceptance and rejection regions, general procedure for testing of hypothesis. Exercises.

Testing of Hypothesis- Single Population

Introduction, testing of hypothesis and confidence interval about the population mean and proportion for small and large samples, Exercises

Testing of Hypotheses-Two or more Populations

Introduction, Testing of hypothesis and confidence intervals about the difference of population means and proportions for small and large samples, Analysis of Variance and ANOVA Table. Exercises

Testing of Hypothesis-Independence of Attributes

Introduction, Contingency Tables, Testing of hypothesis about the Independence of attributes. Exercises.

Regression and Correlation

Introduction, cause and effect relationships, examples, simple linear regression, estimation of parameters and their interpretation. r and R^2 . Correlation. Coefficient of linear correlation, its estimation and interpretation. Multiple regression and interpretation of its parameters. Examples

Recommended Books

Walpole, R. E. 1982. "Introduction to Statistics", 3rd Ed., Macmillan Publishing Co., Inc. New York. Muhammad, F. 2005.

"Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad

SUPERVISED CLINICAL PRACTICE III 4(0-4)

Minimum Performing Standards:

Focus Area: Musculoskeletal.

It is mandatory for each student to document minimum 16 cases per semester (1 cases per week) in clinical log-book duly checked and signed by clinical supervisor on weekly basis and head of institute at completion.

This learning requirement must be performed in all types of wards and be supervised by a trained Physical Therapist (PT).

Course Learning Outcomes:

By the end of the practice, students will be able to:

Demonstrate the ability to perform a comprehensive examination by selecting appropriate tests and measures based on the best available evidence.

Perform posture tests, gait analysis, and balance assessments utilizing both qualitative and quantitative measures across various functional activities and environments.

Conduct musculoskeletal system tests and measures, including accessory movement tests, joint integrity assessments, muscle strength evaluations, and range of motion

measurements.

Perform thorough assessments of orthotic, prosthetic, and assistive devices, evaluating components, alignment, fit, and functional use during activities of daily living.

Determine appropriate interventions to address impairments and enhance function with the use of orthotic, prosthetic, and assistive devices, considering safety and patient/client preferences.

Apply clinical reasoning skills to synthesize examination findings within the International Classification of Functioning, Disability, and Health (ICF) model, considering body functions and structures, activities, and participation.

Utilize available evidence to interpret examination findings and formulate clinical decisions, including referral to other health care professionals when necessary.

SEMESTER VIII

NEUROLOGICAL PHYSICAL THERAPY 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Assess sensory and motor impairments in patients with neurological conditions.
- Implement evidence-based interventions to promote neuroplasticity and motor recovery.
- Utilize assistive devices and adaptive techniques to facilitate functional independence.
- Collaborate with interdisciplinary teams to optimize rehabilitation outcomes for patients with neurological disorders.

Course Description:

This course provides an in-depth exploration of the assessment and intervention procedures used with persons with various neurological pathologies. The focus of this course will be on neurological problems acquired in adulthood. Theories of motor control and motor learning will be studied and applied to assessment and treatment. Laboratories will be used to strengthen evaluation and intervention skills, especially the analysis of movement as well as planning, practicing, and modifying treatment. The format of this course includes lectures, discussions, laboratory experiences, problem-based learning activities, community based experiences, and patient-centred case study learning activities. There will also be contact with persons with neurological dysfunction as part of this course. Clinical competence in the evaluation and treatment of persons with neurological impairments is to be developed. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

MEDICAL TERMINOLOGY REGARDING NEUROLOGICAL SYSTEM

Anatomy and Physiology of the Nervous System (Brief Revision)

Brain

Spinal cord

CNS Support Structures

Neurons

PNS

Spinal Level Reflexes

Neurological Examination:

History

System review

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
Normal Reach, Grasp and Manipulation
vestibular rehabilitation
BobathNeuro developmental technique
Virtual Reality techniques in Rehabilitation

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
Poly Neuropathies

WHEEL CHAIR TRAINING

Purpose of Wheelchair Training

- To enhance mobility and independence for individuals requiring wheelchairs.
- To ensure safety, comfort, and long-term health through appropriate wheelchair usage.
- To empower users with the knowledge and skills needed for effective wheelchair operation and maintenance.

Sitting Upright

- Importance of proper posture to prevent pressure sores and improve breathing and digestion.
- Techniques for achieving and maintaining an ergonomic sitting posture.
- Role of adjustable features like backrests and footrests in posture support.

Selecting an Appropriate Wheelchair

- Factors to consider: user's weight, height, mobility needs, and lifestyle.
- Types of wheelchairs: manual, powered, and sport-specific models.
- Customization options for individual requirements.

Cushions and Pressure Relief

- Overview of cushion types (foam, gel, air, etc.) and their benefits.
- Proper positioning to distribute weight and reduce pressure points.
- Routine checks to ensure cushions are in good condition.

Transfers

- Techniques for safe and efficient transfers between wheelchair and bed, car, or other surfaces.
- Use of transfer aids like sliding boards or lift systems.
- Training caregivers in safe transfer practices to prevent injuries.

Physical Assessment

- Evaluating user's physical abilities and limitations.
- Assessing range of motion, strength, and coordination.
- Identifying medical conditions that may affect wheelchair use.

Wheelchair Preparation

- Adjusting the wheelchair to fit the user's body dimensions.
- Setting up armrests, footrests, and headrests for comfort and functionality.
- Importance of brake function and anti-tip devices for safety.

Cushion Fabrication

- Importance of custom-made cushions for complex seating needs.
- Materials and technologies used in cushion design.
- Steps for fitting and testing fabricated cushions.

User Training

- Instruction on basic wheelchair operations like starting, stopping, and turning.
- Maneuvering in different terrains and navigating obstacles.
- Emergency protocols, such as recovering from a fall or managing a flat tire.

Maintenance and Repair

- Routine cleaning and inspection to prolong the wheelchair's lifespan.
- Common repairs like fixing tires, brakes, and upholstery.
- When and how to seek professional servicing.

Follow-Up

- Periodic reassessments to ensure the wheelchair continues to meet user needs.
- Addressing changes in mobility, body size, or health conditions.
- Providing resources for upgrades or replacements as needed.

PRACTICAL/ CLINICAL TRAINING:

In the laboratory sessions, neurological physiotherapy skills will be demonstrated and practiced. Various reflective case studies related to the neurological rehabilitation 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. This log book will be an integral part of the Physiotherapy in Practice I and Physiotherapy in Practice II.

Course Title: Nutrition in Neurological Physical Therapy

Course Description:

This course provides an in-depth understanding of the role of nutrition in neurological health and rehabilitation. Students will learn how nutritional interventions can complement physical therapy in the treatment of neurological conditions. The course covers the fundamentals of nutrition, the relationship between diet and neurological health, and practical strategies for integrating nutritional guidance into physical therapy practice.

Course Objectives:

Understand the basic principles of nutrition and their impact on neurological health.
Explore the relationship between diet, neurological diseases, and rehabilitation outcomes.
Learn to assess and address nutritional needs in patients with neurological conditions.
Develop skills to integrate nutritional advice into physical therapy treatment plans.
Evaluate current research and evidence-based practices in nutritional neuroscience and physical therapy.

Course Outline:

Introduction to Nutrition and Neurological Health

Basic Nutrition Principles

Macronutrients: Carbohydrates, Proteins, and Fats

Micronutrients: Vitamins and Minerals

Hydration and its importance in neurological function

Overview of the Nervous System

Structure and function of the central and peripheral nervous systems

Common neurological disorders and their impact on function

Nutrition and Neurological Disorders

Nutritional Neuroscience

The gut-brain axis

Neurotransmitters and their nutritional precursors

Inflammation and neurodegeneration

Specific Neurological Conditions

Stroke: Nutritional considerations during recovery

Multiple Sclerosis: Diet and symptom management

Parkinson's Disease: Nutritional strategies for motor and non-motor symptoms

Cognitive Disorders

Alzheimer's Disease and other dementias

Nutritional interventions for cognitive health

Recommended text books:

- Neurological Physiotherapy Bases of evidence for practice *Treatment and management of patients described by specialist clinicians* by Cecily Partridge
- *Neurological Physiotherapy A problem-solving approach* By Susan Edwards, second edition.
- *Neurologic examination* By Robert j. Schwartzman , first edition

Basic Level Wheel chair training by WHO

MEDICINE–II 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Explain the principles of pharmacokinetics and pharmacodynamics.

Identify commonly prescribed medications and their indications, contraindications, and side effects.

Evaluate medication regimens for potential drug interactions and adverse reactions.

Educate patients on medication management and adherence strategies.

Course Description:

This course intends to familiarize students with medical terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores select systemic diseases, focusing on epidemiology, pathology, histology, etiology, as well as primary and secondary clinical characteristics and their management. Discusses and integrates subsequent medical and surgical management to formulate appropriate intervention indications, precautions and contraindications

Detailed Course Outline:**Dermatology**

Introduction to disorders and diseases

Acne vulgaris

Psoriasis

Boils

Carbuncles

Alopecia

Mycosis fungoides

Polymorphic light eruptions

Vitiligo

Pityriasis

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

Unconsciousness and Coma

Renal diseases

Glomerulonephritis

Acute nephritic syndrome

Nephrotic syndrome

Urinary tract infection

Renal hypertension

Renal failure

Benign enlargement of prostate gland
Prostatic carcinoma

Diseases of the Blood:

Anaemia

Brief description of types of Anaemia

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

Recommended Text Books:

Practice of medicine by: Davidson

Clinical medicine by: Parveen j Kumar & Michael Clark

Short text book by medicine by: M. Inam Danish

Hutchison's clinical methods by: Michael swash. 21st edition

SURGERY–II 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Explain surgical techniques and interventions for neurological and cardiovascular conditions.

Describe pre operative and post operative care protocols for patients undergoing neurological and cardiovascular surgeries.

Discuss potential complications and rehabilitation goals following neurosurgical and cardiovascular procedures.

Implement evidence-based rehabilitation strategies to optimize functional outcomes post-surgery.

Course Description:

This course intends to familiarize students with principles orthopaedic surgery along with familiarization with terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores various orthopaedic conditions needing surgical attention, focusing on epidemiology, pathology, as well as primary and secondary clinical characteristics and their surgical management. The purpose of this course is to make physiotherapy students aware of various surgical conditions so these can be physically managed effectively both pre as well as postoperatively

Detailed Course Outline:

GENERAL SURGERY

Introduction

Indications for surgery
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
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
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

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
Problems related to diaphragm

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 diseases
Acquired heart diseases
Diseases of the pericardium
Cardiac transplantation

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

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

Intra cranial aneurysm and hydrocephalus

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

Brief description of lesions of cranial and spinal nerves and their management

Recommended Text Books:

Short practice of surgery by Baily and Love's

Text Book of Surgery by Ijaz Ahsan

Outline of Fractures by davidhamblen, Hamish Simpsons

Outline of orthopedics. by davidhamblen, Hamish Simpsons

Apley's systems of orthopedics and fractures by Louis Solomon 9thed , publisher holder
Arnold

SPORTS PHYSICAL THERAPY 2(2-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Perform sports-specific assessments to identify biomechanical and musculoskeletal imbalances.

Develop individualized rehabilitation programs to address athletic injuries and optimize performance.

Implement injury prevention strategies including taping, bracing, and neuromuscular training.

Collaborate with coaches and athletic trainers to facilitate safe return to sport for injured athletes.

Course Description

The main focus of this course is related to the understanding of the role that physical therapists play in both the industrial continuum and sports physical therapy. Emphasis is placed on acute management of traumatic injuries and/or sudden illness. In addition, injury prevention with an emphasis on the advanced clinical competencies related to the practice of sports physical therapy will also be covered.

Introduction to sports rehabilitation

Introduction to sport injury management

Injury screening and assessment of performance

Injury prevention and screening

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

Peripheral nerve injuries

Effective clinical decision making

An introduction to periodisation

Management of acute sport injury

Musculoskeletal assessment

Progressive systematic functional rehabilitation

Strength and conditioning

Nutritional considerations for performance and rehabilitation

Psychology and sports rehabilitation

Clinical reasoning

Joint specific sport injuries and pathologies

Shoulder injuries in sport

The elbow

Wrist and hand injuries in sport

The groin in sport

The knee

Ankle complex injuries in sport

The foot in sport

Traveling with a Team

Drugs and the Athlete

Ethics and Sports Medicine

NUTRITION IN SPORTS PHYSICAL THERAPY

Learning objective

This curriculum provides a blend of theoretical knowledge and practical skills essential for sports physical therapists to effectively integrate nutrition into their practice. By covering a wide range of topics, this course can prepare students to address the diverse nutritional needs of athletes and active individuals

Course Outline

Introduction to Sports Nutrition

Basic Nutrition Principles

Role of Nutrition in Athletic Performance

Nutritional Assessment Techniques

Dietary intake analysis

Body composition analysis

Developing Nutrition Plans

Goal setting (performance, weight management, muscle gain)

Customizing plans for different sports and activity levels

Special considerations for age, gender, and specific health conditions

Nutrition and Exercise Physiology

Muscle Physiology and Nutrition

Hydration and Thermoregulation

Nutrition for Injury Prevention and Rehabilitation

Nutritional Strategies for Injury Prevention

Role of antioxidants and anti-inflammatory foods

Nutrient deficiencies and injury risk

Nutritional Support for Rehabilitation

Enhancing tissue repair and healing

Managing inflammation through diet

Supplements for recovery (e.g., omega-3 fatty acids, amino acids)

Supplements and Ergogenic Aids

Common Sports Supplements

Protein supplements

Creatine

Branched-chain amino acids (BCAAs)

Safety and Efficacy of Supplements

Potential risks and side effects

Doping regulations and banned substances

Recommended Books:

Sports Rehabilitation and Injury Prevention by: Paul Comfort & Earle Abrahamson, 1st Edition, 2010, Wiley Blackwell Publishers

Clinical Sports Medicine by: Brukner & Khan, 4ed, McGraw-Hill Publishers

A guide to sports and injury management by: Mike Bundy & Andy Leaver, 1st edition, 2010, Churchill Livingstone.

SCIENTIFIC INQUIRY & RESEARCH METHODS 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Describe research methodologies used in physical therapy and related fields.

Formulate research questions and hypotheses based on clinical observations and literature review.

Apply ethical principles and regulatory guidelines in research design and conduct.

Collect, analyze, and interpret research data using appropriate statistical methods.

Course Description:

This course includes discussion on basic quantitative methods and designs, including concepts of reliability and validity, interpretation of inferential statistics related to research designs, correlational statistics & designs, interclass correlation coefficients, and critical appraisal of the literature.

Research Fundamentals

- Rehabilitation Research
- Theory in Rehabilitation Research
- Research Ethics

Research Design

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

Experimental Designs

- Group Designs
- Single-System Design

NON EXPERIMENTAL RESEARCH

- Overview of Non experimental Research
- Clinical Case Reports
- Qualitative Research
- Epidemiology
- Outcomes Research
- Survey Research

MEASUREMENT

- Measurement Theory
- 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
- Statistical Analysis of Relationships; Advanced and special Techniques

BEING A CONSUMER

- Locating the Literature
- Evaluating Evidence One Article at a time
- Synthesizing Bodies of Evidence

IMPLEMENTING RESEARCH

- Implementing a Research Project
- Publishing and Presenting Research

PRACTICAL

- Literature review
- Preparation, presentation and defence of research proposal
- Poster presentation

RECOMMENDED TEXTBOOK

- Essentials of clinical research By Stephan P. Glasser
- Rehabilitation Research (Principles and Applications) 3rd Edition By Elizabeth Domholdt
- Walpole, R. E. 1982. "Introduction to Statistics", 3rd Ed., Macmillan Publishing Co., Inc. New York. Muhammad, F. 2005.
- "Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad

PROFESSIONAL PRACTICE

2(2-0)

Course description:

The course will discuss the role, responsibility, ethics administration issues and accountability of the physical therapists. The course will also cover the change in the profession to the doctoral level and responsibilities of the professional to the profession, the public and to the health care team. The topic of health care system in Pakistan with comparison with current health system abroad will be discussed too.

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
- 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
- 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
- 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
- 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
- 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 Books:

Professionalism in Physical Therapy: History, Practice, & Development, Lisa L. Dutton, PT, PhD

APTA. *Guide to Physical Therapy Practice: Revised second edition*. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-

SUPERVISED CLINICAL PRACTICE –IV 4(0-4)

Course Description:

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to sports and metabolic disorders. Students become familiar with performance of these skills in all settings (inpatient and outpatient) as well as on all types of conditions (surgical, non surgical sports). 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.

Minimum Performing Standards:

Focus Area: Evaluation, examination and intervention.

It is mandatory for each student to document minimum 16 cases per semester (1 cases per week) in clinical log-book duly checked and signed by clinical supervisor on weekly basis and head of institute at completion.

Course Learning Outcomes:

By the end of the practice, students will be able to:

- Analyze patient/client data using evidence-based practices to select appropriate examination tests and measures.
- Perform posture tests, gait analysis, and balance assessments, including both qualitative and quantitative measures across various functional activities and environments.
- Utilize available evidence to interpret examination findings, verbalizing possible alternatives and citing relevant evidence to support clinical decisions.
- Integrate examination findings to classify patient/client problems, prioritize impairments, and determine specific intervention goals based on body functions and structures, activities, and participation.
- Determine the predicted level of optimal functioning and the time required to achieve it, considering potential barriers such as age, medication, socioeconomic status, and cognitive status.
- Design a patient-centered plan of care with measurable functional goals, short-term and long-term, incorporating patient/client goals, expectations, and preferences.
- Establish criteria for discharge based on patient goals and current functioning, ensuring coordination of care and identification of referral needs beyond the scope of physical therapy practice.
-

SEMESTER IX

CARDIOPULMONARY PHYSICALTHERAPY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Identify common cardiopulmonary pathologies and their impact on physical function.
- Perform cardiopulmonary assessment techniques including auscultation and vital signs monitoring.
- Develop exercise prescription programs for patients with cardiopulmonary conditions.
- Implement evidence-based interventions to optimize cardiopulmonary function and improve patient outcomes.

Course Description:

This course includes a study of anatomy and physiology of the cardiovascular, pulmonary, and lymphatic systems and pathological changes of the systems and function, including diagnostic tests and measurements. This course discuss relevant testes and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment instruments as related to patients with cardiovascular, pulmonary, and lymphatic systems disorders. The use of evidence-based physical therapy intervention for cardiovascular, pulmonary, and lymphatic systems disorders is emphasized Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

MEDICAL TERMINOLOGY REGARDING CARDIOPULMONARY SYSTEM

INTRODUCTION

Anatomy and Physiology

Anatomy of the Cardiovascular and Respiratory Systems

Physiology of the Cardiovascular and Respiratory Systems

Patho-physiology

Ischemic Cardiac Condition

Cardiac Muscle Dysfunction

Restrictive Lung Dysfunction

Chronic Obstructive Pulmonary Diseases

Cardiopulmonary Implications of Specific Diseases

Diagnostic Tests and Procedures

Cardiovascular Diagnostic Tests and procedures

Electro cardio-graphy

Pulmonary Diagnostic Tests and Procedures

Surgical Interventions, Monitoring and Support

Cardiovascular and Thoracic interventions

Thoracic Organ Transplantation; Heart, Lung, and heart-Lung

Monitoring and Life-Support Equipment

Pharmacology

Cardiovascular Medications

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

Assessment of the critically ill patient in the intensive care unit (ICU)

Mechanical ventilation - implications for physiotherapy

Musculoskeletal problems

Patient groups with specific needs

Systemic inflammatory response syndrome (SIRS) and sepsis

Acute respiratory distress syndrome (ARDS)

Disseminated intravascular coagulation (DIC)

Inhalation burns

Trauma

Neurological conditions requiring intensive care

Physiotherapy techniques

Emergency situations

Pulmonary rehabilitation

Definition and aims of pulmonary rehabilitation

Benefits of pulmonary rehabilitation

Setting up pulmonary rehabilitation

Resources

Selection of patients

Patient assessment for pulmonary rehabilitation

Structure of pulmonary rehabilitation

Pulmonary rehabilitation team

Exercise component

Outcome measures

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
Physiotherapy
Assessment
Recording
Treatment
Outcome evaluation
Complications of exercise
Other considerations
The older patient
Cardiac failure
Valvular heart disease
Congenital heart disease
Compliance
Cost-effectiveness
Legal aspects

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
Physiotherapy 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
Group therapy

Bronchiectasis, primary ciliary dyskinesia and cystic fibrosis

Bronchiectasis
Medical management
Physiotherapy
Evaluation of physiotherapy
Primary ciliary dyskinesia
Medical management
Physiotherapy
Evaluation of physiotherapy
Cystic fibrosis
Medical management
Physiotherapy
Evaluation of physiotherapy
Continuity of care

NUTRITION IN CARDIOPULMONARY PHYSICAL THERAPY

Learning objective

- Understand the Role of Nutrition in Cardiopulmonary Health
- Conduct comprehensive dietary assessments for patients with cardiopulmonary conditions.
- Develop and Implement Nutritional Plans
- Integrate Nutrition into Cardiopulmonary Rehabilitation

Course Outline

Introduction to Nutrition

Definition and importance of nutrition
Macronutrients: carbohydrates, proteins, fats
Micronutrients: vitamins, minerals
Hydration and water balance

Dietary Factors in Cardiovascular Disease

Impact of fats, cholesterol, and fiber
Role of sodium and potassium
Antioxidants and heart health
Dietary Patterns and Heart Health

Nutritional Needs in Pulmonary Disease

Energy requirements and metabolism
Impact of malnutrition on respiratory function
Role of specific nutrients (e.g., antioxidants, omega-3 fatty acids)

Nutritional Interventions

Nutritional support in pulmonary rehabilitation
Strategies to manage weight and muscle mass

Assessment Techniques

Dietary intake assessment methods
Anthropometric measurements
Biochemical markers and lab tests
Clinical evaluation and physical examination

Developing Nutritional Plans for Cardiopulmonary Patients

Setting nutritional goals based on patient assessment
Meal planning and dietary modifications
Role of multidisciplinary teams in nutrition care

Recommended Text Book:

Essentials of Cardiopulmonary Physical Therapy (2nd Edition) By Hillegass and Sadowsky
Physiotherapy for respiratory and cardiac problems, By: Jennifer A. Pryor & Barbara A. Webber, 2nd edition, Churchill Livingstone.
Tidy's Physiotherapy by Thomas A Skinner & Piercy
Therapeutics Exercises and Technique by Carolyn Kisner & Laynn Allen Colby 4th 5th edition
Cash's Text book of General Medical & Surgical Condition for Physiotherapists by Patricia A. Downie
Cash's Textbook of chest, heart and vascular condition for physiotherapist by Patricia A. Downie

PROSTHETICS & ORTHOTICS 2(2-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:
Identify indications for prosthetic and orthotic interventions in rehabilitation.
Perform prosthetic and orthotic assessments to determine appropriate device selection and fit.
Fabricate and adjust prosthetic and orthotic devices according to patient needs.
Educate patients on proper use and care of prosthetic and orthotic devices.

Course Description:

This course intends to study prosthetic and orthotic management as applied to a variety of patient populations across a life span. It also addresses the considerations of various pathologies and medical, surgical management to formulate appropriate patient examinations, evaluation, diagnosis, prognosis and intervention that are consistent

with physical therapy practice guidelines. Principles of normal biomechanics, pathomechanics, physiology and Pathophysiology will be a major focus for evaluation, intervention and education of the vascular, neuromuscular, and / or musculoskeletal compromised patient who may utilize prosthetic or orthotic devices. Basic principles of mechanical physics and material characteristics will be applied.

Detailed Course Outline:

ORTHOTICS

Introduction to Orthotics

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

Foot Orthoses

Shoe Style
Parts of Shoes
Special Purpose Shoes
Foot Examination
Orthotics Interventions
Fabrication Options
Pediatric Foot Orthoses
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
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
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
- 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)
- 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
- 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
- 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
Psychological Consequences of Amputation

Rehabilitation of Adults With Lower-Limb Amputations

Partial Foot and Syme's Amputations and Prosthetic Designs
Transfemoral 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
Future Surgical and Educational Advances and Challenges

Recommended Text Books

Prosthetics and Patient Management: A Comprehensive Clinical Approach By: [Kevin Carroll](#)
; [Joan Edelstein](#)

Orthotics a comprehensive clinical approach By: Joan E Edelstein & Jan Bruckner

CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS 3(3-0)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:
Utilize clinical reasoning to formulate differential diagnoses based on patient history and examination findings.
Apply diagnostic tests and measures to support clinical decision making in physical therapy practice.
Demonstrate proficiency in conducting thorough patient assessments to inform treatment planning.

Evaluate the effectiveness of interventions through on going assessment and modification of treatment plans.

Course Description:

The course will cover the principles and methods of clinical screening in physical therapy practice. A basic format for musculoskeletal, neuromuscular, Integumentary, and cardiopulmonary screening in physical therapy will be presented, with a focus on differential diagnosis within the scope of physical therapy practice, and incorporation of the role of the physical therapist as it interfaces with the role of the physician. A clarification of red-flags that differentiate a systemic condition from a neuromusculoskeletal condition will be a continuing theme throughout the course. Decision-making skills related to physical therapy will be emphasized through the use of patient case scenarios with a focus on when to treat, and when to refer. Strategies to effectively and appropriately communicate with health care colleagues and patients regarding medical diagnostic information and medical status will be introduced.

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
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
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
Physician Referral

Screening For Hematologic Disease

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

Screening For Cardiovascular Disease

Signs and Symptoms of Cardiovascular Disease
Cardiac Pathophysiology
Cardiovascular Disorders
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 Gastrointestinal Disease

Signs and Symptoms of Gastrointestinal Disorders
Gastrointestinal 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 For Urogenital Disease

Signs and Symptoms of Renal and Urological Disorders,
The Urinary Tract
Renal and Urological Pain
Renal and Urinary Tract Problems
Physician Referral

Screening For Endocrine And Metabolic Disease

Associated Neuromuscular and Musculoskeletal Signs and Symptoms
Endocrine Pathophysiology
Introduction to Metabolism
Physician Referral

Screening For Immunologic Disease

Using the Screening Model
Immune System Pathophysiology
Physician Referral
Screening for Cancer
Cancer Statistics
Risk Factor Assessment
Cancer Prevention
Major Types of Cancer
Metastases
Clinical Manifestations of Malignancy
Oncologic Pain
Side Effects of Cancer Treatment
Cancers of the Musculoskeletal System
Primary Central Nervous System Tumors
Cancers of the Blood and Lymph System
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
Physician Referral

Screening The Sacrum, Sacroiliac, And Pelvis

The Sacrum and Sacroiliac Joint

The Coccyx

The Pelvis

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

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

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

Physician Referral

Recommended Text Books

Goodman CC, Snyder TEK. *Differential Diagnostics for Physical Therapists: Screening for Referral*. Saint Louis, MO: Saunders: Elsevier; 2006. ISBN: 978-0-7216-0619-4

APTA. *Guide to Physical Therapy Practice: Revised second edition*. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-

Additional readings as assigned by the instructors

EMERGENCY PROCEDURES IN PHYSICAL THERAPY 2(1-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

- Demonstrate proficiency in basic life support techniques including CPR and first aid.
- Identify signs and symptoms of medical emergencies and initiate appropriate interventions.
- Perform emergency procedures within the scope of physical therapy practice.
- Collaborate with other health care providers in emergency settings to ensure timely and effective patient care.
- Incorporate patient preferences and values into clinical decision making processes.

Course Description:

This course provides the student with all of the skills necessary to take appropriate action in an emergency in any practice setting. Basic life support, advanced cardiac life support, and first aid and emergency preparedness are the content areas of this course. The course is designed to provide knowledge and skill in emergency techniques and in the application of appropriate action necessary to take care of the patient/client.

Detailed Course Outline:

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

Legal need and documentation

PHYSICAL EXAMINATION OF THE CRITICALLY INJURED PATIENT/ATHLETE

Scene assessment and safety

Body substance isolation precautions

Primary survey

Secondary survey

Vital signs

AIRWAY MANAGEMENT

Air way anatomy

Air way compromise

Oxygen therapy
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
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
Wake ups and rest

EMERGENCY CARE OF CERVICAL SPINE INJURIES

Anatomy
Mechanism of injuries
Injuries to the spinal cord
Assessment
Management

EMERGENT GENERAL MEDICAL CONDITIONS

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

ENVIRONMENT-RELATED CONDITIONS

Heat related emergencies and their prevention
Cold related injuries

Lightning
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
Fractures and dislocations of spine

ABDOMINAL INJURIES

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

THORACIC INJURIES

Assessment
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
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
The psychological interventions recommendations.

PRIMARY CARE

Foundation

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
The patient interview: the science behind the art

EXAMINATION/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

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

Wound Management.

SPECIAL POPULATIONS

The Pediatric and adolescent population

The obstetric client

The geriatric population

Health and wellness perspective in primary care

Recommended Books:

Emergency Care in Athletic Training by: Keith M.Gorse, Robert O. Blanc, Francis Feld, Matthew Radelet, 1st edition, 2010, FA Davis Company

Acute care hand book for Physical Therapists by: Jaime C paz, Michelle P West, 2nd edition, 2002, Butterworth Heinemann

INTEGUMENTARY PHYSICAL THERAPY 2(1-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Identify common integumentary conditions and their underlying pathophysiology.
Perform wound assessment and wound care techniques according to evidence-based practice guidelines.
Implement interventions to promote tissue healing and prevent complications in patients with integumentary disorders.
Evaluate treatment outcomes and adjust interventions as needed to optimize wound healing.

Course Description:

This course includes a study of anatomy and physiology of the Integumentary system and pathological changes of the system and function, including diagnostic tests and measurements. The use of evidence-based physical therapy intervention for Integumentary conditions is emphasized. Topics will focus on comparing contemporary and traditional interventions and the impact of evolving technology in this area. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

Medical Terminology Regarding Cardiopulmonary System

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
Wound Care; where we were, where we are, and where we are going

Course Title: Nutrition in Integumentary Physical Therapy

Course Description:

This course explores the vital role of nutrition in the maintenance, repair, and overall health of the integumentary system. Students will learn how specific nutrients affect skin health, wound healing, and recovery in the context of physical therapy. The course includes both theoretical knowledge and practical applications relevant to clinical practice

Course Objectives:

Understand the anatomy and physiology of the integumentary system.

Identify the nutritional needs for maintaining healthy skin.

Explore the role of nutrition in wound healing and prevention.

Integrate nutritional strategies into physical therapy for skin conditions.

Assess and design nutritional plans for patients undergoing integumentary physical therapy

COURSE OUTLINES

Introduction to the Integumentary System

Anatomy and physiology of the skin, hair, and nails

Functions of the integumentary system

Common integumentary system disorders

Nutritional Foundations for Skin Health

Macronutrients and their roles in skin health

Essential micronutrients: vitamins (A, C, E, D, K) and minerals (zinc, selenium)

Antioxidants and their impact on skin health

Wound Healing and Nutrition

Stages of wound healing

Nutritional requirements for each stage

Role of protein, amino acids, and other key nutrients in wound healing

Nutritional Assessment in Physical Therapy

Methods for assessing nutritional status

Nutritional screening tools

Case studies on nutritional assessments

Designing Nutritional Plans for Skin Health

Principles of creating balanced nutritional plans

Dietary modifications for patients with specific skin conditions (e.g., eczema, psoriasis, pressure ulcers)

Collaboration with dietitians and other healthcare professionals

Nutritional Interventions in Wound Care

Evidence-based nutritional interventions for wound care

Supplements and their efficacy in wound healing

Clinical guidelines for integrating nutrition into wound care protocols

Special Populations and Considerations

Nutritional needs for pediatric and geriatric populations

Impact of comorbidities (e.g., diabetes, obesity) on skin health and nutrition

Cultural and socioeconomic factors affecting nutrition and skin health

RECOMMENDED TEXTBOOK:

Wound Care Essentials, practice principles, By Sharon Baranoski& Elizabeth A. Ayello

APTA. *Guide to Physical Therapy Practice: Revised second edition*. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85-

EVIDENCE BASED PRACTICE

3(2-1)

Course Description:

This course introduces the concept of evidence-based practice in physical therapy including the formulation of answerable clinical questions, methods of obtaining peer-reviewed evidence to those clinical questions, and how to critically appraise evidence once located. This course is a lecture and seminar course that will focus on developing the skills need for evaluating, critiquing, and consuming the literature germane to physical therapy practice. Current journal articles, texts, and online resources will be used in the course to develop critical reading and writing skills.

Evidence-Based Physiotherapy

An introduction about evidence-based Physiotherapy:

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

The process of clinical decision-making

Importance of evidence-based Physiotherapy:

For patients

For physiotherapists and the profession

For funders of physiotherapy services

History of Evidence-Based Health Care

Steps for practicing evidence-based Physiotherapy

What do we need to know?

Relevant clinical questions

Refining your question

Effects of intervention

Experiences

Prognosis

Diagnosis

What constitutes evidence?

Evidence about effects of interventions

Different forms of evidence

Different sources of evidence

Hierarchy of evidence

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 Physiotherapy

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
Strategies for Effective Critical Thinking

PRACTICAL

Identify the different sources of evidence
Critically appraised topics (CAT)
How to evaluate web page
Ways of searching strategies for different databases
Selection of search terminology
Retrieving of articles from data bases

RECOMMENDED TEXT BOOKS:

Practical Evidence based physiotherapy By, Rob Herbert, Gro Jamtdvedt, Judy Mead & Kare Birger Hagen.
Asking the right question-A guide to critical thinking, 8th Edition By, M.Neil.Browne & Stuart M Keeley
Additional reading material as assigned.

SUPERVISED CLINICAL PRACTICE V 4(0-4)

Minimum Performing Standards:

Focus Area: Evaluation, examination and intervention (cardiopulmonary and Geriatric)

It is mandatory for each student to document minimum 16 cases per semester (1 cases per week) in clinical log-book duly checked and signed by clinical supervisor on weekly basis and head of institute at completion.

This learning requirement must be performed in cardiovascular, pulmonary and Geriatric (IPD/OPD, surgical I& non-surgical) wards and be supervised by a trained Physical Therapist (PT).

Course Learning Outcomes:

By the end of the practice, students will be able to:

- Analyze patient/client data using evidence-based practices to select appropriate examination tests and measures.
- Perform Lung assessment, chest and thoracic assesment
- Utilize available evidence to interpret Chest-xray findings, and other cardiorespiratory assessment.
- Integrate examination findings to classify patient/client problems, prioritize impairments, and determine specific intervention goals based on body functions and structures, activities, and participation.
- Determine the predicted level of optimal functioning and the time required to achieve it, considering potential barriers such as age, medication, socioeconomic status, and cognitive status among geriatric patients
- To interpret conditions commonly seen among geriatric and their Rehabilitation.
- Design a patient-centered plan of care with measurable functional goals, short-term and long-term, incorporating patient/client goals, expectations, and preferences.
- Establish criteria for discharge based on patient goals and current functioning, ensuring coordination of care and identification of referral needs beyond the scope of physical therapy practice.

SEMESTER X

MANUAL THERAPY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Demonstrate proficiency in manual therapy techniques including mobilization and manipulation.

Apply manual therapy interventions to address joint and soft tissue dysfunctions.

Evaluate the effectiveness of manual therapy techniques in improving range of motion and reducing pain.

Incorporate patient education and self-management strategies into manual therapy interventions

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 advanced 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

Detailed Course Outline:

INTRODUCTION TO MANUAL THERAPY

The Spine and Posture: Structure, Function, Postural Impairments, and Management

Guidelines

Jaw

Functional anatomy and movement

Jaw examination scheme

Jaw tests and mobilizations

Upper cervical spine

Functional anatomy and movement

Notes on evaluation and treatment

Upper cervical tests and mobilizations

Cervical spine

Functional anatomy and movement

Cervical syndromes

Notes on evaluation and treatment

Cervical tests and mobilizations

Thoracic spine and ribs

Functional anatomy and movement

Thoracic syndromes

Notes on evaluation and treatment

Thoracic tests and mobilizations

Lumbar spine

Functional anatomy and movement

Lumbar syndromes

Notes on evaluation and treatment

Lumbar tests and mobilizations

Pelvis

Functional anatomy and movement

Notes on evaluation and treatment

Pelvis tests and mobilizations

Posture and biomechanical influences

Alignment

Stability

Neurologic evaluation of nerve root syndromes

Sensory innervation of the skin

Sensory innervation of deep structures

Motor innervation

Common nerve root syndromes

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

The Spine: Impairments, Diagnoses, and Management Guidelines

Review of the structure and function of the spine
Spinal pathologies and impaired spinal function
Pathology of the intervertebral disk
Pathomechanical relationships of the intervertebral disk and facet joints
Pathology of the zygapophyseal (facet)
Pathology of muscle and soft tissue injuries: strains, tears, and contusions
Pathomechanics of spinal instability
Impaired posture
Etiology of pain
Common faulty postures: characteristics and Impairments

Management of impaired posture

General management guidelines
Tension headache/cervical headache

Management guidelines based on impairments

Principles of management for the spine
Management guidelines—non-weight-bearing bias
Management guidelines—extension bias
Management guidelines—flexion bias
Management guidelines—stabilization
Management guidelines—mobilization
Management guidelines—soft tissue injuries
Management Guidelines—Temporomandibular Joint Dysfunction

The Spine: Exercise Interventions

Basic concepts of spinal management with exercise
Fundamental interventions
Patient education
General exercise guidelines
Kinesthetic awareness
Elements of kinesthetic training—fundamental techniques
Progression to active and habitual control of Posture
Mobility/flexibility
Cervical and upper thoracic
Region—stretching techniques
Mid and lower thoracic and lumbar
Regions—stretching techniques
Muscle performance: stabilization, muscle endurance, and strength training
Stabilization training—fundamental techniques and Progressions

Isometric and dynamic exercises
Cardiopulmonary endurance
Common aerobic exercises and effects on the spine
Functional activities
Early functional training–fundamental techniques
Preparation for functional activities–basic exercise Techniques
Body mechanics and environmental adaptations
Intermediate to advanced exercise techniques for Functional training
Education for prevention

OMT 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

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 Kaltenborn-Evjenth Concept

History

Special features

Overview

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

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

Translatory joint play

The Kaltenborn Treatment Plane

Translatory Joint Play Movements

Determining the direction of restricted gliding

Glide test

Kaltenbom 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

Using translatory grades of movement

Tests of function

Principles of function testing

Assessing quantity of movement

Measuring rotatory movement with a device

Manual grading of rotatory movement (-scale)

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 rotatory movements

Testing rotatory 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

Manual therapy assessment

The Maitland's and Mulligan concept

TECHNIQUES

Maitland and Mulligan Technique 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

SPINAL MOBILIZATIONS

The cervical and upper thoracic spines

NAGS

REVERSE NAGS

SNAGS

SELF SNAGS

Spinal Mobilization with arm Movement

Other mobilization with movement techniques (MWMS) for the Cervical and Upper Thoracic Spines

The Upper cervical spine special techniques

The acute Wry Neck

Headaches

Vertigo, Nausea and other vertebral artery Signs

The Lumbar Spine

SNAGS

SELF SNAGS

The Sacroiliac Joints (S/I) Joints

The thoracic spine

The rib cage

Conclusion

Pilates concept of exercise; Schroth method of exercise

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

Procedures and Protocols to correct spinal Dysfunction with Integrative Manual Therapy

PRACTICAL/ CLINICAL TRAINING:

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.

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:

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, Traudi Baldauf, Kaltenborn, Dennis Morgan, and Eileen Vallowitz, OPTP Minneapolis, Minnesota, USA.

Manual Therapy By: Ola Grimsby, the Ola Grimsby institute San Diego.

Integrative Manual therapy for the upper and lower extremities By: Sharon weiselfish, North Atlantic books Berkeley, California.

Orthopedic manual therapy an evidence-based approach by: Chad Cook

Orthopaedic Manual Therapy Diagnosis Spine and Temporomandibular Joints By: Aad van der

Translatory Spinal Manipulation By: John R. Krauss, Olaf Evjenth, and Doug Creighton John R. Krauss A Lakeview Media L. L.C. Publication

Neuromusculoskeletal Examination and Assessment A Handbook for Therapists

By: Nicola J Petty, Ann P Moore & G D Maitland, Second Edition Churchill Livingstone

Myofascial Manipulation Theory and Clinical Application, Second Edition By: Robert I. Cantu, Alan J. Grodin an Aspen Publication Aspen Publishers, Inc. Gaithersburg, Maryland 2001

Maitland's Vertebral Manipulation Seventh Edition By: Geoffrey D. Maitland

Musculoskeletal manual medicine, diagnosis and treatment by Jiri Dovark, Vaclav Dovark, Werner Schneider etc

Manual therapy, NAGS, SNAGS, MWMS etc by Brian R Mulligan fifth edition

WOMEN'S HEALTH PHYSICAL THERAPY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Identify musculoskeletal and neuromuscular changes during pregnancy and postpartum.

Perform pelvic floor assessment and develop appropriate interventions for pelvic floor dysfunction.

Provide education and support to pregnant and postpartum individuals regarding exercise

and body mechanics.
Collaborate with obstetricians and gynecologists to address musculoskeletal issues related to pregnancy and childbirth.

COURSE DESCRIPTION:

This course intends to provide Introduction to physical therapy practice for evaluation and treatment of pelvic floor dysfunction and an Introduction to physical therapy practice for evaluation and treatment of problems related to pregnancy, osteoporosis, and other disorders specific to women. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

Medical Terminology Regarding gynecology, obstetrics and women's health

Detailed course outline:

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 lymph edema

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

Course Outline: Nutrition in Gynecological Physical Therapy

Course Objectives

Understand the role of nutrition in gynecological health and physical therapy.
Learn to assess and address nutritional needs in women with gynecological conditions.
Develop skills for creating integrated care plans that include both physical therapy and

nutritional interventions.
Foster interdisciplinary collaboration with nutrition professionals to enhance patient outcomes.

Introduction to Gynecological Health and Physical Therapy

Overview of Gynecological Health

Anatomy and physiology of the female reproductive system

Common gynecological conditions (e.g., PCOS, endometriosis, fibroids)

Role of Physical Therapy in Gynecology

Introduction to physical therapy for gynecological health

Common physical therapy interventions

Basics of Nutrition Science

Fundamentals of Nutrition

Macronutrients: carbohydrates, proteins, fats

Micronutrients: vitamins, minerals

Nutrition and Women's Health

Nutritional needs across the lifespan

Impact of nutrition on hormonal health

Nutrition and Reproductive Health

Nutrition and Menstrual Health

Dietary factors influencing menstrual cycles

Managing symptoms of PMS and PMDD through nutrition

Nutrition for Fertility

Nutrients essential for reproductive health

Dietary strategies to support fertility

Nutrition and Common Gynecological Conditions

Polycystic Ovary Syndrome (PCOS)

Nutritional management of PCOS

Role of diet in insulin resistance and weight management

Endometriosis

Anti-inflammatory diets

Nutritional strategies to manage pain and inflammation

Nutrition During Pregnancy and Postpartum

Prenatal Nutrition

Essential nutrients during pregnancy

Managing common pregnancy-related nutritional concerns (e.g., morning sickness, gestational diabetes)

Postpartum Nutrition

Nutritional needs during lactation

Recovery nutrition after childbirth

Integrating Nutrition into Physical Therapy Practice

Developing Nutrition Care Plans

Assessing nutritional status in physical therapy clients

Setting nutritional goals and interventions

Interdisciplinary Collaboration

Working with dietitians and other healthcare providers

Referral processes and collaborative care models

Developing integrated care plans incorporating nutrition and physical therapy

Current Research and Future Directions

Review of Current Research

Latest studies on nutrition and gynecological health

Evidence-based practices in nutrition for gynecological physical therapy

Future Trends and Innovations

Emerging therapies and nutritional strategies

The future of integrative health in gynecology

Recommended text books

Physiotherapy in Obstetrics and Gynecology By: Jill Mantle, Jeanette Haslam, Sue Barton, 2nd edition.

Textbook of Physiotherapy for Obstetric and Gynaecological Conditions (Paperback) By (author) [G.B. Madhur](#)

PEDIATRIC & NEONATAL PHYSICAL THERAPY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Assess developmental milestones and functional abilities in pediatric patients.

Implement family- centered interventions to promote motor development and participation in daily activities.

Adapt treatment techniques to address the unique needs of children with neurological and musculoskeletal disorders.

Monitor growth and development and modify treatment plans accordingly to support optimal outcomes.

Course Description:

This course addresses both the medical and rehabilitation management of the pediatric patient. Foundation lectures on normal development and psychological issues 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.

Medical Terminology regarding pediatrics

Detailed Course Outline:

History and Examination / Pediatric Examination
Assessment and outcome measurement
Theories of Development
Medical Care of Children with Disabilities
Psychological Assessment in Pediatric Rehabilitation
Approaches to working with children
Normal Developmental Milestones
Language Development in Disorders of Communication and Oral Motor Function Adaptive Sports and Recreation
Orthotic and Assistive Devices
Electrodiagnosis in Pediatrics
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
Psychosocial Aspects of Pediatric Rehabilitation
Pediatric and Neonatal Intensive Therapy
Disorders of Respiratory System
Cystic Fibrosis 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
Oncology and palliative care

PEDIATRIC NUTRITION

Learning Objectives

- Understand the fundamental principles of pediatric nutrition and its importance in

physical therapy.

- Assess and identify nutritional needs and deficiencies in pediatric patients.
- Develop and implement nutrition care plans as part of holistic physical therapy treatment.
- Collaborate effectively with dietitians, nutritionists, and other healthcare professionals.
- Apply evidence-based practices in nutrition to improve physical therapy outcomes.

Course outline

Introduction to Pediatric Nutrition

Overview of Pediatric Nutrition

Macronutrients and Micronutrients

Nutrition Assessment and Screening

Dietary intake assessment methods

Growth charts and percentiles

Identifying Nutritional Deficiencies

Common deficiencies in children (e.g., iron, vitamin D)

Signs and symptoms of nutritional deficiencies

Nutrition in Physical Therapy Rehabilitation

Role of nutrition in muscle growth and repair

Impact of nutrition on physical therapy outcomes

Managing weight in children with obesity or underweight issues

Sports Nutrition for Pediatric Athletes

Nutrition for Common Pediatric Conditions

Nutrition for children with chronic illnesses (e.g., cerebral palsy, cystic fibrosis)

Autism spectrum disorders

Down syndrome

Gastrointestinal Disorders

Metabolic and Genetic Disorders (Diabetes mellitus, Phenylketonuria (PKU) etc.)

Recommended Text books:

Physical Therapy for Children By, Suzann K. Campbell, Robert J. Palisano & Darl W. Vander Linden.

Paediatric Rehabilitation Principles and practice (Fourth Edition) By, Michael A Alexander & Dennis J. Matthews.

Additional reading material as assigned.

GERIATRIC PHYSICAL THERAPY 3(2-1)

COURSE LEARNING OUTCOMES

By the end of this course, the students will be able to:

Identify age-related changes in musculoskeletal, neurological, and cardiovascular systems.

Adapt physical therapy interventions to meet the needs of older adults with diverse functional abilities.

Implement fall prevention strategies and promote safe mobility in geriatric populations.

Collaborate with caregivers and interdisciplinary teams to optimize functional independence

and quality of life in older adults.

Course Description:

The course covers normal aging process, physiological and psychological changes and their effects on daily living activities (ADL) and instrumental daily living activities (IADL). Relevant tests and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment instruments as related to patients with geriatric conditions are discussed. The use of evidence-based physical therapy intervention for geriatric conditions is emphasized. Topics will focus on comparing contemporary and traditional interventions and the impact of evolving technology in this area. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

**Medical Terminology regarding geriatric
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

Breathing — the Respiratory System

Beating — the Cardiovascular System

Thinking and Reacting — the Nervous System

Moving — the Musculoskeletal System

Eating & Eliminating — the Gastrointestinal and Urinary Systems

Metabolizing — the Endocrine System

Responding — the Sensory System

Sleeping and Other Physical Changes

Psychological Changes:

The 3 Ds and Suicide in Older Adults

Delirium

Dementia

Depression

Older Adult Abuse and Neglect:

Scope of Older Adult Abuse and Neglect

Clues to Abuse and Interventions

Triage and Assessment:

ABCs of Geriatric Assessment

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

Cerebrovascular accident (C.V.A)

Poly neuropathies etc.

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

Introduction

Defining the problem of falls, risk factors, aging theory concept pertinent to falls in the elderly

Multi faceted approach to the falls problem

Postural control theory, physiology of balance ,

Summary influence of age on postural control, relationship between postural control and falls, A model, examination and evaluation, history, biological assessment, sensory effectors, strength, ROM, endurance, central processing, functional assessment, environmental assessment, psychosocial assessment, intervention

Medications

Nutritional Deficiencies:

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

Gerontology

Introduction

Types of gerontology

Social aspect of aging regarding gerontology

Psychological aspect of aging regarding gerontology

Biological aspect of aging regarding gerontology

GERIATRIC NUTRITION

Learning Objective

- Understand the physiological changes associated with aging and their effects on nutritional needs.
- Identify common nutritional deficiencies and health conditions in the elderly.
- Develop nutrition plans to address the specific needs of older adults.
- Promote healthy aging through dietary strategies and interventions.

Course outline**Introduction to Geriatric Nutrition**

Overview of aging demographics and trends

Importance of nutrition in aging

Physiological Changes with Aging

Changes in the digestive system

Alterations in metabolism

Changes in taste and smell

Impact on nutrient absorption and utilization

Nutritional Requirements of Older Adults

Energy needs

Macronutrient requirements (proteins, fats, carbohydrates)

Micronutrient requirements (vitamins and minerals)

Fluid requirements

Common Nutritional Deficiencies in the Elderly

Vitamin B12, D and calcium

Iron and anemia

Protein-energy malnutrition

Chronic Diseases and Nutrition

Diabetes

Cardiovascular disease

Osteoporosis

Cancer

Cognitive decline (Alzheimer's, dementia)

Nutritional Assessment and Screening

Methods for assessing nutritional status

Screening tools for malnutrition

Identifying risk factors and early intervention

Developing Nutrition Care Plans

Setting nutritional goals

Creating balanced meal plans

Dietary modifications for specific conditions

Recommended Books:

Geriatric Physical Therapy (Hardcover) by [Andrew A. Guccione](#) (Author)

RESEARCH PROJECT 3(0-3)**COURSE DESCRIPTION**

The research project is a capstone course designed to enable students to apply theoretical knowledge and research skills in Doctor of Physical Therapy. Students will undertake a

structured research project addressing a relevant issue in communication sciences and disorders. This hands-on experience fosters critical thinking, scientific inquiry, and evidence-based practice, equipping students for advanced study or clinical application.

1. Learning Objectives

By the end of the course, students will be able to:

- Identify and articulate a researchable problem in the field of DPT
- Develop a research proposal, including a literature review, methodology, and ethical considerations.
- Collect, analyze, and interpret data using appropriate statistical tools.
- Present research findings in written and oral formats suitable for academic and clinical audiences.
- Reflect on the implications of research for clinical practice and future study.

2. Course Content

➤ **Developing a Research Proposal**

- Topic selection and problem statement
- Literature review techniques
- Formulating research questions and hypotheses
- Ethical/Graduate Committee approval and considerations (e.g., consent, confidentiality)

➤ **Research Methodology**

- Study designs (qualitative, quantitative, mixed methods)
- Sampling techniques and sample size determination
- Data collection tools (questionnaires, standardized tests, observational tools)

➤ **Data Analysis**

- Introduction to SPSS/other statistical software
- Descriptive and inferential statistics
- Interpreting results in the context of clinical relevance

➤ **Report Writing and Dissemination**

- Structuring a research report (Abstract, Introduction, Methods, Results, Discussion, Conclusion)
- APA style formatting
- Preparing for oral/poster presentations
- Understanding peer-review and publication processes

3. Assessment Criteria

➤ **Proposal Submission**

- Clarity of research question
- Feasibility and ethical consideration

➤ **Data Collection and Analysis**

- Accuracy in methodology application
- Depth of data analysis

➤ **Final Research Report**

- Quality of writing and structure
- Relevance of findings.

➤ **Thesis Defense**

SUPERVISED CLINICAL PRACTICE VI 4(0-4)

Minimum Performing Standards:

Focus Area: Evaluation, examination and intervention.

It is mandatory for each student to document minimum 16 cases per semester (1 case per week) in clinical log-book duly checked and signed by clinical supervisor on weekly basis and head of institute at completion.

This learning requirement must be performed in Pediatric, gynecology& obstetrics, sports and metabolic disorders (IPD/OPD, surgical & non-surgical) wards and be supervised by a trained Physical Therapist (PT).

Course Learning Outcomes:

By the end of the practice, students will be able to:

- Analyze patient/client data using evidence-based practices to select appropriate examination tests and measures.
- Integrate examination findings to classify patient/client problems, prioritize impairments, and determine specific intervention goals based on body functions and structures, activities, and participation.
- Determine the predicted level of optimal functioning and the time required to achieve it, considering potential barriers such as age, medication, socioeconomic status, and cognitive status.
- Design a patient-centered plan of care with measurable functional goals, short-term and long-term, incorporating patient/client goals, expectations, and preferences.
- Establish criteria for discharge based on patient goals and current functioning, ensuring coordination of care and identification of referral needs beyond the scope of physical therapy practice.

FREQUENTLY ASKED QUESTIONS

What is a Doctor of Physical Therapy (DPT) degree?

How is the DPT program different from other healthcare programs?

What are the prerequisites for enrolling in a DPT program?

What career opportunities are available for DPT graduates?

Can DPTs specialize in specific areas of physical therapy?

What tools or resources are provided for learning?

What are the opportunities for advanced degrees or certifications after the DPT?