



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

## **DOCTOR OF PHYSICAL THERAPY**

### **INTRODUCTION**

Physical therapy is an essential segment of modern health care system. It is a “science of healing and art of caring”. It pertains to the evaluation, assessment and treatment of musculoskeletal, Neurological, Cardio-Vascular and Respiratory systems’ functional disorders including symptoms of pain, edema, physiological, structural and psychosomatic ailments. It also deals with methods of treatment based on movement, manual therapy, physical agents, and therapeutics modalities to relieve the pain and other complications.

Hence, Physical therapy covers basic parameters of healing sciences i.e. preventive, promotive, diagnostic, rehabilitative, and curative.

### **GOALS OF THE PROGRAM:**

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

1. Be primary providers of physical therapy care.
2. Serve as responsible members in the professional community and are willing and able to assume leadership roles in the communities they serve.
3. Identify researchable problems, advocate and participate in research, and incorporate research findings into clinical practice.
4. Understand and place in context the social, economic and cultural issues of practice and effectively advocate for changes in policy
5. Correlate theory with practice and think creatively about, react to, adapt or shape new practice environments.
6. 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:**

1. Demonstrate 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.
2. Understand, correlate and apply theoretical foundations of knowledge to the practice of physical therapy; evaluate and clarify new or evolving theory relevant to physical therapy.
3. Demonstrate the behaviors of the scholarly clinician by developing and utilizing the process of critical thinking and inquiry, particularly focused on the improvement of the practice of physical therapy and the delivery of health care.
4. Engage in reflective practice through sound clinical decision making, critical self-assessment and commitment to lifelong learning.
5. Demonstrate mastery of 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.
6. Prepared to influence the development of human health care regulations and policies that are consistent with the needs of the patient and of the society.
7. Demonstrate leadership, management, and communication skills to effectively participate in physical therapy practice and the health care team.
8. Incorporate and demonstrate positive attitudes and behaviors to all persons.
9. Demonstrate the professional and social skills to adapt to changing health care environments to effectively provide physical therapy care.

**\*SCHEME OF STUDIES FOR 5 YEARS  
DOCTOR OF PHYSICAL THERAPY (DPT) PROGRAM**

SEMESTER/YEAR	Course Code	NAME OF SUBJECT	CREDITS
<b>FIRST</b>	<b>FIRST PROFESSIONAL YEAR</b>		
	RSC-601	ANATOMY -I	4(3-1)
	RSC-602	PHYSIOLOGY-I	3(2-1)
	RSC-603	KINESIOLOGY & BIOMECHANICS-I	3(2-1)
	RSC-604	ENGLISH-I	3(3-0)
	RSC-605	PAKISTAN STUDIES	2(2-0)
	RSC-606	INTRODUCTION TO COMPUTER	3(2-1)
			<b>18</b>
<b>SECOND</b>	RSC-611	ANATOMY -II	4(3-1)
	RSC-612	PHYSIOLOGY-II	3(2-1)
	RSC-613	KINESIOLOGY & BIOMECHANICS -II	3(2-1)
	RSC-614	ENGLISH-II	3(3-0)
	RSC-615	ISLAMIC STUDIES / ETHICS	2(2-0)
	RSC-616	MEDICAL PHYSICS	3(2-1)
			<b>18</b>
<b>THIRD</b>	<b>SECOND PROFESSIONAL YEAR</b>		
	RSC-621	ENGLISH-III	3(3-0)
	RSC-622	ANATOMY -III	3(2-1)
	RSC-623	PHYSIOLOGY-III	3(2-1)
	RSC-624	BIOMECHANICS & ERGONOMICS-I	3(3-0)
	RSC-625	BIOCHEMISTRY & GENETICS-I	2(2-0)
	RSC-626	SOCIOLOGY	2(2-0)
	RSC-627	HEALTH & WELLNESS	2(2-0)
		<b>18</b>	
<b>FOURTH</b>	RSC-631	ANATOMY -IV	3(2-1)
	RSC-632	BIOMECHANICS & ERGONOMICS-II	3(2-1)
	RSC-633	BEHAVIORAL SCIENCES ( <i>Psychiatry &amp; Psychology</i> )	3(3-0)
	RSC-634	BIOCHEMISTRY& GENETICS-II	2(2-0)
	RSC-635	EXERCISE PHYSIOLOGY	3(3-0)
	RSC-636	HUMAN GROWTH, DEVELOPMENT & COMMUNITY BASED REHABILITATION	2(2-0)
			<b>16</b>
<b>FIFTH</b>	<b>THIRD PROFESSIONAL YEAR</b>		
	RSC-641	PATHOLOGY & MICROBIOLOGY-I	2(2-0)
	RSC-642	PHARMACOLOGY-I	3(3-0)
	DPT-641	PHYSICAL AGENTS & ELECTROTHERAPY -I	3(2-1)
	DPT-642	THERAPEUTIC EXERCISES & TECHNIQUES	3(2-1)
	RSC-643	PROSTHETICS & ORTHOTICS	2(2-0)
	DPT-643	PROFESSIONAL PRACTICE (LAWS, ETHICS, ADMINISTRATION)	2(2-0)
	DPT-640	SUPERVISED CLINICAL PRACTICE-I	3(0-3)
		<b>18</b>	
<b>SIXTH</b>	RSC-651	PATHOLOGY & MICROBIOLOGY-II	3(2-1)
	RSC-652	PHARMACOLOGY-II	2(2-0)

	DPT-651	PHYSICAL AGENTS & ELECTROTHERAPY -II	3(2-1)
	DPT-652	MANUAL THERAPY	3(2-1)
	RSC-653	TEACHING METHODOLOGY & COMMUNITY MEDICINE	3(3-0)
	DPT-650	SUPERVISED CLINICAL PRACTICE-II	3(0-3)
			<b>17</b>
<b>SEVENTH</b>	<b>FOURTH PROFESSIONAL YEAR</b>		
	RSC-661	MEDICINE-I	3(3-0)
	RSC-662	SURGERY-I	3(3-0)
	RSC-663	RADIOLOGY & DIAGNOSTIC IMAGING	3(2-1)
	DPT-661	MUSCULOSKELETAL PHYSICAL THERAPY	3(2-1)
	RSC-664	BIOSTATISTICS-I	3(3-0)
	DPT-660	SUPERVISED CLINICAL PRACTICE-III	3(0-3)
			<b>18</b>
<b>EIGHT</b>	RSC-671	MEDICINE-II	3(3-0)
	RSC-672	SURGERY-II	3(3-0)
	DPT-671	NEUROLOGICAL PHYSICAL THERAPY	3(2-1)
	RSC-673	EVIDENCE BASED PRACTICE	3(2-1)
	RSC-674	BIOSTATISTICS-II/ UNIVERSITY OPTIONAL	3(3-0)
	DPT-670	SUPERVISED CLINICAL PRACTICE-IV	3(0-3)
			<b>18</b>
<b>NINTH</b>	<b>FIFTH PROFESSIONAL YEAR</b>		
	DPT-681	CARDIOPULMONARY PHYSICAL THERAPY	3(2-1)
	DPT-682	EMERGENCY PROCEDURES AND PRIMARY CARE	2(2-0)
	DPT-683	CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS	3(3-0)
	RSC-681	SCIENTIFIC INQUIRY & RESEARCH METHODOLOGY	3(2-1)
	DPT-684	GERONTOLOGY AND GERIATRIC PHYSICAL THERAPY	2(2-0)
	DPT-685	INTEGUMENTRY PHYSICAL THERAPY	2(2-0)
	DPT-680	SUPERVISED CLINICAL PRACTICE-V	3(0-3)
			<b>18</b>
<b>TENTH</b>	DPT-691	GYNAECOLOGY & OBSTETRICS PHYSICAL THERAPY	2(2-0)
	DPT-692	PAEDIATRIC PHYSICAL THERAPY	2(2-0)
	DPT-693	SPORTS PHYSICAL THERAPY	2(2-0)
	DPT-690	SUPERVISED CLINICAL PRACTICE-VI	4(0-4)
	DPT-699	RESEARCH PROJECT	6
			<b>16</b>
		<b>TOTAL CREDITS</b>	<b>175</b>

**Note \***

This scheme of curriculum is also applicable to annual system; in which two consecutive semesters will be considered as one professional year

## FIRST SEMESTER

<b>S. No</b>	<b>Course Code</b>	<b>NAME OF SUBJECT</b>	<b>CREDITS</b>
1	RSC-601	ANATOMY -I	4(3-1)
2	RSC-602	PHYSIOLOGY-I	3(2-1)
3	RSC-603	KINESIOLOGY & BIOMECHANICS-I	3(2-1)
4	RSC-604	ENGLISH-I	3(3-0)
5	RSC-605	PAKISTAN STUDIES	2(2-0)
6	RSC-606	INTRODUCTION TO COMPUTER	3(2-1)

## **ANATOMY-I**

**CREDITS 4 (3-1)**

### **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 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 inferior 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**

**CREDITS 3 (2-1)**

#### 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.



## **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***

1. Perform nerve conduction studies and explain their clinical importance
2. Myopathies and neuropathies
3. 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***

1. Clinical significance of cardiac cycle, correlation of ECG and heart sounds to cardiac cycle
2. Clinical significance of cardiac cycle, interpretation of ischemia and arrhythmias
3. Effects of hypertension
4. Clinical significance of heart sounds
5. Effects of ischemia
6. Shock

## **PHYSIOLOGY PRACTICALS**

### **Cardiovascular System**

1. Cardiopulmonary resuscitation (to be coordinated with the department of medicine)
2. Examination of arterial pulse
3. ECG recording and interpretation
4. Arterial blood pressure
5. Effects of exercise and posture on blood pressure
6. 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.

## KINESIOLOGY / BIOMECHANICS-I

CR.H: 3 (2-1)

### 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. It also covers the types of human motions and their planes of motions and its relative axes explain the inter-relationship among kinematic variables, and utilize the knowledge of this inter-relationship to describe and analyze motion. This course also covers the classification of the joints or muscles and their characteristics distinguishing arthrokinematic movements from osteokinematic 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
- Rhythm of movement
- The nervous control 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 kim jonas and karenbaker
  - *The principles of exercise therapy* by: M Dena Gardiner, 4<sup>th</sup> Edition

## ENGLISH I

## (FUNCTIONAL ENGLISH)

CREDIT 3 (3-0)

**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:

1. Functional English
  - 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

## PAKISTAN STUDIES

## (COMPULSORY)

CREDIT HOURS 2 (2-0)

### 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

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

#### 2. Government and Politics in Pakistan

Political and constitutional phases:

- 1947-58
- 1958-71
- 1971-77
- 1977-88
- 1988-99
- 1999 onward

#### 3. Contemporary Pakistan

- Economic institutions and issues
- Society and social structure
- Ethnicity
- Foreign policy of Pakistan and challenges
- Futuristic outlook of Pakistan

### Books Recommended

- Burki, Shahid Javed. *State & Society in Pakistan*, The Macmillan Press Ltd 1980.
- Akbar, S. Zaidi. *Issue in Pakistan's Economy*. Karachi: Oxford University Press, 2000.
- S.M. Burke and Lawrence Ziring. *Pakistan's Foreign policy: An Historical analysis*. Karachi: Oxford University Press, 1993.
- Mehmood, Safdar. *Pakistan Political Roots & Development*. Lahore, 1994.
- Wilcox, Wayne. *The Emergence of Banglades.*, Washington: American Enterprise, Institute of Public Policy Research, 1972.
- Mehmood, Safdar. *Pakistan Kayyun Toota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
- Amin, Tahir. *Ethno - National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.
- Ziring, Lawrence. *Enigma of Political Development*. Kent England: WmDawson & sons Ltd, 1980.
- Zahid, Ansar. *History & Culture of Sindh*. Karachi: Royal Book Company, 1980.
- Afzal, M. Rafique. *Political Parties in Pakistan*, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
- Sayeed, Khalid Bin. *The Political System of Pakistan*. Boston: Houghton Mifflin, 1967.
- Aziz, K.K. *Party, Politics in Pakistan*, Islamabad: National Commission on Historical and Cultural Research, 1976.
- Muhammad Waseem, *Pakistan Under Martial Law*, Lahore: Vanguard, 1987.
- Haq, Noor ul. *Making of Pakistan: The Military Perspective*. Islamabad: National Commission on Historical and Cultural Research, 1993.

### INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGIES

CREDIT

#### HRS 3(2-1)

#### INTRODUCTION TO COMPUTER

##### Course Description:

This is an introductory course on Information and Communication Technologies. Topics include ICT terminologies, hardware and software components, the internet and world wide web, and ICT based applications.

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

: Review Week

Text Books/Reference Books:

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

# SECOND SEMESTER

S.No	Course Code	NAME OF SUBJECT	CREDITS
1	RSC 6011	ANATOMY -II	4(3-1)
2	RSC 6012	PHYSIOLOGY-II	3(2-1)
3	RSC 6013	KINESIOLOGY & BIOMECHANICS -II	3(2-1)
4	RSC 6014	ENGLISH-II	3(3-0)
5	RSC 6015	ISLAMIC STUDIES / ETHICS	2(2-0)
6	RSC 6016	MEDICAL PHYSICS	3(2-1)

## ANATOMY II

**CREDITS 4 (3-1)**

### 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**

**CREDITS 3 (2-1)**

### 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.

### 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***

1. Clinical importance of lung function tests
2. Causes of abnormal ventilation and perfusion
3. Effects on pneumothorax, pleural effusion, and pneumonia
4. Respiratory failure
5. Artificial respiration and uses & effects of O<sub>2</sub> therapy
6. 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***

1. Anemia and its different types
2. Blood indices in various disorders
3. Clotting disorders
4. Blood grouping and cross matching
5. 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

1. Use of the microscope
2. Determination of haemoglobin
3. Determination of erythrocyte sedimentation rate
4. Determining packed cell volume
5. Measuring bleeding and clotting time
6. RBC count
7. Red cell indices
8. WBC count
9. Leukocyte count
10. Prothrombin and thrombin time

#### Respiratory System

1. Clinical examination of chest
2. Pulmonary volume, their capacities and clinical interpretation
3. 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 / BIOMECHANICS-II

CR. H. 3(2-1)

#### 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

### ENGLISH II (FUNCTIONAL ENGLISH)

CREDIT 3(3-0)

**Objectives:** Enable the students to meet their real-life communication needs.

#### **Course Contents**

**Paragraph writing**

Practice in writing a good, unified and coherent paragraph

**Essay writing**

Introduction

**CV and job application**

Translation skills

Urdu to English

**Study skills**

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

**Academic skills**

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

**Presentation skills**

Personality development (emphasis on content, style and pronunciation)

*Note: documentaries to be shown for discussion and review*

**Recommended books:**

**Communication Skills**

a) Grammar

1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19 431350 6.

b) Writing

1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 019 435405 7 Pages 45-53 (note taking).

2. Writing. Upper-Intermediate by Rob Nolasco. Oxford Supplementary Skills. Fourth Impression 1992. ISBN 0 19 435406 5 (particularly good for writing memos, introduction to presentations, descriptive and argumentative writing).

c) Reading

1. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.

2. Reading and Study Skills by John Langan

3. Study Skills by Richard Yorky.

**ISLAMIC STUDIES/ ETHICS (COMPULSORY)**

**CREDIT 2 (2-0)**

**Objectives:**

This course is aimed at:

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

**Detail of Courses**

**Introduction to Quranic Studies**

- 1) Basic Concepts of Quran
- 2) History of Quran
- 3) Uloom-ul -Quran

**Study of Selected Text of Holly Quran**

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

**Study of Selected Text of Holly Quran**

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

**Seerat of Holy Prophet (S.A.W) I**

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

**Seerat of Holy Prophet (S.A.W) II**

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

### **Introduction To Sunnah**

- 1) Basic Concepts of Hadith
- 2) History of Hadith
- 3) Kinds of Hadith
- 4) Uloom –ul-Hadith
- 5) Sunnah & Hadith
- 6) Legal Position of Sunnah

### **Selected Study from Text of Hadith**

#### **Introduction To Islamic Law & Jurisprudence**

- 1) Basic Concepts of Islamic Law & Jurisprudence
- 2) History & Importance of Islamic Law & Jurisprudence
- 3) Sources of Islamic Law & Jurisprudence
- 4) Nature of Differences in Islamic Law
- 5) Islam and Sectarianism

#### **Islamic Culture & Civilization**

- 1) Basic Concepts of Islamic Culture & Civilization
- 2) Historical Development of Islamic Culture & Civilization
- 3) Characteristics of Islamic Culture & Civilization
- 4) Islamic Culture & Civilization and Contemporary Issues

#### **Islam & Science**

- 1) Basic Concepts of Islam & Science
- 2) Contributions of Muslims in the Development of Science
- 3) Quranic & Science

#### **Islamic Economic System**

- 1) Basic Concepts of Islamic Economic System
- 2) Means of Distribution of wealth in Islamic Economics
- 3) Islamic Concept of Riba
- 4) Islamic Ways of Trade & Commerce

#### **Political System of Islam**

- 1) Basic Concepts of Islamic Political System
- 2) Islamic Concept of Sovereignty
- 3) Basic Institutions of Govt. in Islam

#### **Islamic History**

- 1) Period of Khlaft-E-Rashida
- 2) Period of Ummayyads
- 3) Period of Abbasids

#### **Social System of Islam**

- 1) Basic Concepts of Social System of Islam
- 2) Elements of Family
- 3) Ethical Values of Islam

#### **Reference Books:**

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

### **MEDICAL PHYSICS**

**CREDIT HR 3(2-1)**

#### **Course Description:**

This course will cover the basic principal 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 Lachlanhe 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**

1. *Clayton's Electrotherapy and actinotherapy* by: PM Scott
2. *Medical physics for physical therapists* by: AD Moore
3. Preliminary Electricity for Physiotherapists by B. Savage.
4. Basic Electronics by Grob.
5. Principles of Bio-instrumentation by Richard A. Normann.
6. Hand book of Biomedical Instrumentation by R.S. Khanpur.
7. Basic Radiation Protection Technology by Gollnick

## THIRD SEMESTER

S.No	Course Code	Subjects	Credit Hr
1	RSC 6021	ENGLISH-III	3(3-0)
2	RSC 6022	ANATOMY –III	3(2-1)
3	RSC 6023	PHYSIOLOGY -III	3(2-1)
4	RSC 6024	BIOMECHANICS & ERGONOMICS-I	3(3-0)
5	RSC 6025	BIOCHEMISTRY & GENETICS I	2(2-0)
6	RSC 6026	SOCIOLOGY	2(2-0)
7	RSC 6027	HEALTH & WELLNESS	2(2-0)

### **ENGLISH III (Technical Writing and Presentation Skills)**

**CREDIT 3(3-0)**

**Objectives:** Enhance language skills and develop critical thinking

#### **Presentation skills**

##### **Essay writing**

Descriptive, narrative, discursive, argumentative

##### **Academic writing**

How to write a proposal for research paper/term paper

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

##### **Technical Report writing**

##### **Progress report writing**

*Note: Extensive reading is required for vocabulary building*

#### **Recommended books:**

##### Technical Writing and Presentation Skills

- a) Essay Writing and Academic Writing
  1. Writing. Advanced by Ron White. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 435407 3 (particularly suitable for discursive, descriptive, argumentative and report writing).
  2. College Writing Skills by John Langan. Mc=Graw-Hill Higher Education. 2004.
  3. Patterns of College Writing (4<sup>th</sup> edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press.
- b) Presentation Skills
- c) Reading
 

The Mercury Reader. A Custom Publication. Compiled by norther Illinois University. General Editors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).

### **ANATOMY III**

**CREDITS 4(3-1)**

#### **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

### **PHYSIOLOGY III**

**CREDITS 3(2-1)**

#### **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. This course provides the foundation for the further course as exercise physiology, pathology, etc

### **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**

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

#### **Special Senses**

1. Measurement of the field of vision.
2. Measurement of light reflex.
3. Ophthalmoscopy.
4. Colour vision.
5. Hearing tests.
6. Testing taste and smell.

#### **Pregnancy tests**

### **RECOMMENDED BOOKS**

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

## **BIOMECHANICS & ERGONOMICS I**

**CREDIT HR 3(2-1)**

#### **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

#### **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

#### **Recommended text books**

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

### **BIOCHEMISTRY & GENETICS I**

**CREDIT 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

#### **SOCIOLOGY**

**CREDIT 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

#### **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 Professionals, London: Routledge.*
- *Smelter Heil J. 1993. Sociology, New Delhi, Prentice Hall of India:*

### **HEALTH & WELLNESS**

**CREDIT 2(2-0)**

#### **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.

**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



## FOURTH SEMESTER

S.No	Course Code	Subject	Credit Hr
1	RSC 6031	ANATOMY –IV	3(2-1)
2	RSC 6032	BIOMECHANICS & ERGONOMICS-II	3(2-1)
3	RSC 6033	BEHAVIORAL SCIENCES (Psychiatry & Psychology)	3(3-0)
4	RSC 6034	BIOCHEMISTRY& GENETICS II	2(2-0)
5	RSC 6035	EXERCISE PHYSIOLOGY-	3(3-0)
6	RSC 6036	HUMAN GROWTH, DEVELOPMENT & COMMUNITY BASED REHABILITATION	2(2-0)

### ANATOMY IV

**CREDITS 3(2-1)**

#### 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.

**BIOMECHANICS AND ERGONOMICS II**

**CREDIT HR 3(2-1)**

**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

This course will also help to gain an understanding of basic theoretical concepts, principles and techniques of ergonomics as well as an introduction to fundamental ergonomic measurement tools for assessment of physical workload, posture, occupational exposure, and stress

**Range of Motion**

**Active Movements**

- Voluntary movements
- Definition Classification

**Free Exercises**

- Classification, Technique of free exercises Effects and uses

**Assisted Exercises**

- The principles of assistance
- Techniques Effects and uses

**Assisted Resisted Exercises**

**Resisted Exercises**

- The principles of resistance
- techniques of resisted exercises
- Effects and uses of

**Involuntary Movement**

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

**Passive Movement**

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

### **Posture**

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

### **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.

### **APPLICATION PROCESS.**

- Ergonomics of Children and Youth.
- Ergonomics of Aging.
- Ergonomics in Injury Prevention and Disability Management.
- Ergonomics of Play and Leisure.

### **Practical Training / Lab Work**

- 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
  - Joint motion
  - Range of motion
  - Factors affecting ROM
  - End-feel
  - Capsular and non capsular pattern of ROM limitation
  - Procedures
  - Positioning
  - Stabilization
  - Measurements Instruments
  - Alignment
  - Recording
  - Procedures
  - Validity and Reliability
  - Reliability Studies
  - Mathematical methods of evaluation measurement reliability
  - Exercise to evaluate reliability
  - Measurement of upper extremity
  - Measurement of lower extremity
  - Measurement of tempomandibular joint
  - Measurement of the cervical spine
  - Measurement of the thoracic spine
  - Measurement of the lumber joint
  - Average range of motion
  - Joint measurement by body position

### **Recommended text books**

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

### **BEHAVIORAL SCIENCES**

**CREDIT 3(3-0)**

#### **(Psychiatry & Psychology)**

##### **Course Description**

This course is designed to increase awareness of psychosocial issues faced by individuals and their significant reference groups at various points on the continuum of health and disability, including factors that influence values about health promotion, wellness, illness and disability. Personal and professional attitudes and values are discussed as they relate to developing therapeutic relationships. Communication skills are emphasized for effective interaction with clients, health-care professionals and others

##### **Detailed Course Outline:**

- Behavioural Sciences and their importance in health
- Bio-Psycho-Social Model of Healthcare
- Desirable attitudes
- Correlation of brain, mind and Behavioural Sciences
- Roles of a doctor

##### **Understanding Behaviour**

- Sensation, sense organs / special organs
- Perception and factors affecting it
- Attention and concentration
- Memory and its stages, types and methods to improve it
- Types and theories of thinking
- Cognition and levels of cognition
- Problem solving and decision making strategies
- Communication Its types, modes and factors affecting it Non-verbal cues
- Characteristics of a good communicator

##### **Personality and Intelligence**

- Stages and characteristics of psychological growth and development
- Personality and development theories of personality Factors affecting personality development
- Assessment of personality Influence of personality in determining reactions during health, disease, hospitalization, stress, etc
- Intelligence and its types Relevance of IQ and EQ Methods of enhancing EQ and effectively using IQ Factors affecting intelligence and their assessment

##### **Stress Management**

- Definition and classification of stress and stressors
- Relationship of stress and stressors with illness
- Stress and health
- Anxiety
- Coping skills
- Psychological defence mechanisms
- Conflict and frustration
- Adjustment and maladjustment
- Patient anxiety / stress
- Psychological theories of pain perception and patients' experience of pain Treatment adherence and compliance
- Psychological techniques including hypnosis

##### **Doctor – Patient Relationship**

- Concept of boundaries and psychological reactions in doctor – patient relationship (such as transference and counter transference)

##### **Pain, Sleep and Consciousness**

- Concept of pain
- Physiology of pain, psychosocial assessment and management of chronic /intractable atypical facial pain
- Stages of sleep
- Physiology of consciousness
- Attend states of consciousness
- Psychological influence on sleep and consciousness
- Non-pharmacological methods of inducing sleep
- Changes in consciousness

### **Communication Skills**

- Principles of effective communication
- Active listening
- Art of questioning
- Good and bad listener
- Counseling: steps, scope, indication and contraindications
- Dealing with real life crisis and conflict situations in health settings
- A practical method of communication between the doctor and patient about disease, drugs, prognosis etc

### **Interviewing**

- Collecting data on psychosocial factors in Medicine / Surgery / Reproductive Health / Paediatrics and other general health conditions
- Types of interview
- Skills of interviewing

### **Health Psychology**

- Importance of psychological consideration in clinical management of patients
- Psychological therapies
- Key concepts in child's social and cognitive development
- Psychological changes during adolescence and old age and their clinical management
- Impact of illness on a patient's psychological well being including the ability to cope and understand the association between psychological stress and physical well being
- Role of doctor in patient reassurance and allaying anxiety and fear

### **Social and Community Perspective**

- Inequalities of healthcare and the relationship of social class
- Ethnicity, culture and racism, How disease pattern and medical care vary by culture and ethnicity?
- Gender and Healthcare
- Influence of health and illness on behaviour

### **Application of Behavioural Principles in Health and Disease**

- Mentally / emotionally handicapped
- Physically handicapped
- Chronically ill
- Homebound
- Medically compromised

### **Recommended Text Books:**

1. *A Handbook of Behavioural Sciences for Medical and Dental Students* By: Mowadat H Rana, Sohail Ali and Mansoor Mustafa, , University of Health Sciences Lahore
2. *Medicine in Society ; Behavioural Sciences for Medical Students* , By: Christopher Dowrick, , Arnold Publisher
3. *Behavioural Sciences in Clinical Medicine* By: Wolf & Stewart
4. *Developmental Psychology for Healthcare Professions* By: Katherine A Billingham

## **BIOCHEMISTRY AND GENETICS II**

**CREDIT 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.

### **Tissue Biochemistry**

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

### **Metabolism**

#### **Bioenergetics**

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

#### **Metabolism of Carbohydrates**

- Digestion & Absorption of Carbohydrates

- Glycolysis & its Regulation
- Citric Acid Cycle
- Metabolism of Glycogen
- Gluconeogenesis and regulation of blood glucose
- Pentose Phosphate Pathway & its Significance

#### **Metabolism of Lipids**

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

#### **Metabolism of Proteins & Amino Acids**

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

#### **Molecular Biology**

- Transcription in Prokaryotes
- Transcription in Eukaryotes
- Translation: (Genetic Code) Protein Synthesis in Prokaryotes
- Translation: (Genetic Code) Protein Synthesis in Eukaryotes
- Translation Inhibition by Antibiotics
- Regulation of Gene Expression
- Recombinant DNA Technology & Polymerase Chain Reaction

#### **Hormones**

- Classification & Mechanism of Action of Hormones
- Signal Transduction, Second Messengers and Receptors
- Steroid Hormones: Glucocorticoids and Mineralocorticoids
- Insulin & Glucagon

#### **Recommended Text Books:**

- *Harper's Biochemistry* by Robert 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

### **EXERCISE PHYSIOLOGY**

**CREDIT 3 (3-0)**

#### **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
- O<sub>2</sub> and CO<sub>2</sub> 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 Vo<sub>2</sub> Max, Performance, Homeostasis and Strength**

- Principles of training
- Research designs to study training
- Endurance training and VO<sub>2</sub> max
- VO<sub>2</sub> max: cardiac output and arterio-venous oxygen difference
- Detraining and VO<sub>2</sub> 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
- VO<sub>2</sub> 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*

**HUMAN GROWTH, DEVELOPMENT &  
COMMUNITY BASED REHABILITATION****CREDIT 2(2-0)****Course Description:**

This course intends to give the physiotherapy students basic knowledge about various types of disabilities existing in special children. The knowledge ranges from physically handicapped to intellectually disabled children. It also gives information about various existing approaches for the effective rehabilitation and teaching methods

**INTRODUCTION**

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

**EARLY CHILDHOOD**

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

**ADOLESCENCE**

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

**MIDDLE ADULTHOOD**

- Physical and Cognitive Development in Middle Adulthood
- Psychosocial Development in Middle Adulthood

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

#### **HEALTH IN THE COMMUNITY**

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

#### **NORMAL BODY FUNCTION**

- Normal development
- Growth and weight of children

#### **CONDITIONS AND TREATMENTS**

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

#### **MANAGEMENT OF PATIENTS**

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

#### **Recommended books:**

- *Introduction to Special Education* By: Allen and Beacon,(1992), A Simon & Superter Comp.Needham Heights
- *Exceptional Children*, Howard, W.I. (1988); Columbus, Merill.
- *Exceptional Children and Adults*, Patton, J.R. (1991); Boston Scott Foresmen and Co.
- *Exceptional Children in Focus* by: Patton J.R. (1991); New York, Macmillan pub. Co
- *Community based rehabilitation worker manual*, marion loveday, global health publication

# FTH SEMESTER

S.No	Course Code	Subject	Credit Hr
1	RSC 6041	PATHOLOGY & MICROBIOLOGY I	2(2-0)
2	RSC 6042	PHARMACOLOGY I	3(3-0)
3	RSC 6043	PHYSICAL AGENTS & ELECTROTHERAPY -I	3(2-1)
4	RSC 6044	THERAPEUTIC EXERCISES & TECHNIQUES	3(2-1)
5	RSC 6045	PROSTHETICS & ORTHOTICS	2(2-0)
6	RSC 6046	PROFESSIONAL PRACTICE (LAWS , ETHICS, ADMINISTRATION)	2(2-0)
7	RSC 6047	SUPERVISED CLINICAL PRACTICE I	3(0-3)

## PATHOLOGY & MICROBIOLOGY I

**CREDIT 2 (2-0)**

### 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

- 1) Cell injury and death:
  - a. Causes of cell injury
  - b. Necrosis
  - c. Apoptosis
  - d. Subcellular responses
- 2) Cell adaptations:
  - a. Hyperplasia
  - b. Hypertrophy
  - c. Atrophy
  - d. Metaplasia
  - e. Intracellular accumulation
- 3) Inflammation:
  - a. Acute inflammation
    - i. Vascular events
    - ii. Cellular events
    - iii. Chemical mediators
  - b. Chronic inflammation
    - i. General
    - ii. Granulomatous
  - c. Morphologic patterns of acute and chronic inflammation
- 4) Healing and repair:
  - a. Normal controls
  - b. Repair by connective tissue
  - c. Wound healing
- 5) Haemodynamic disorders
  - a. Edema
  - b. Hyperemia / congestion
  - c. Hemorrhage
  - d. Thrombosis
  - e. Embolism

- f. Infarction
- g. Shock
- 6) Diseases of immunity
  - a. General features
  - b. Hypersensitivity reactions
  - c. Immune deficiencies
  - d. Autoimmunity
  - e. Amyloidosis
- 7) Neoplasia:
  - a. Nomenclature
  - b. Molecular basis
  - c. Carcinogenic agents
  - d. Clinical aspects

**MICROBIOLOGY**

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

**PHARMACOLOGY I**

**CREDIT 3(3-0)**

**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 (NASID)
- 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 (3<sup>rd</sup> Edition)By Charles D. Ciccone
- Pharmacology ,Richard A,Harvey ,2<sup>nd</sup> Eddition ,Lippincott's
- Mutlianthore text book of Pharmacology and Therapeutics ,M.Cheema,A vol 1 and Vol 2

## **PHYSICAL AGENTS & ELECTROTHERAPY I**

**CREDIT 3 (2-1)**

### **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, rotenone, novocaine, 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, feedback 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 & Q-titis 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, feedback 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*, 10<sup>th</sup> edition by PM Scott
- *Electrotherapy: Evidence based Practice*, 11<sup>th</sup> 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

**THERAPEUTIC EXERCISE-I CREDIT HR 3(2-1)**

**THERAPEUTIC EXERCISES & TECHNIQUES**

**CREDIT 3(2-1)**

**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 4<sup>th</sup> 5<sup>th</sup> 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

**PROSTHETIC & ORTHOTIC**

**CREDIT 2(2-0)**

**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
- Transtibial Prosthetic Designs
- Transfemoral Prosthetic Designs
- Hip Disarticulations and Transpelvic Prosthetic Designs
- Basic Lower-Limb Prosthetic Training

### **Rehabilitation of Adults with Upper-Limb Amputations**

- Body-Powered Upper-Limb Prosthetic Designs
- Upper-Limb Externally Powered Prosthetic Designs
- Training Patients with Upper-Limb Amputations

### **Beyond the Basics**

- Special Considerations with Children
- Rehabilitation Outcomes
- Adaptive Prostheses for Recreation
- Future Prosthetic Advances and Challenges
- 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 Eldestein & Jan Bruckner

## **PROFESSIONAL PRACTICE IN PHYSICAL THERAPY (LAWS , ETHICS , ADMINISTRATION)**

**CREDIT 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 I**

**CREDITS 3(0-3)**

**HISTORY TAKING**

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
5	Supervised by trained PT	History Taking		

**Course Description:**

During this supervised clinical practice, students are responsible for learning the art of history taking, the first interaction with patient. Students learn the skills under supervision of trained physical therapists. Students become familiar with performance of these skills in all settings (inpatient and outpatient) as well as on all types of patients (surgical, non-surgical, pediatric, geriatric, etc.)

The emphasis is placed on general history taking skills as well as its pertinence to all systems (musculoskeletal, Integumentary, cardiovascular, pulmonary, and neurological.) 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.

**Clinical Competencies:**

Review pertinent medical records and conduct an interview which collects the following data:

- Past and current patient/client history
- Demographics
- General health status
- Chief complaint
- Medications
- Medical/surgical history
- Social history
- Present and pre-morbid functional status/activity
- Social/health habits
- Living environment
- Employment
- Growth and development
- Lab values
- Imaging
- Consultations
- Documentation of the history

# SIXTH SEMESTER

S.No	Course Code	Subject	Credit Hr
1	RSC 6051	PATHOLOGY & MICROBIOLOGY II	3(2-1)
2	RSC 6052	PHARMACOLOGY II	2(2-0)
3	RSC 6053	PHYSICAL AGENTS & ELECTROTHERAPY -II	3(2-1)
4	RSC 6054	MANUAL THERAPY	3(2-1)
5	RSC 6055	TEACHING METHODOLOGY & COMMUNITY MEDICINE	3(3-0)
6	RSC 6056	SUPERVISED CLINICAL PRACTICE II	3(0-3)

## **PATHOLOGY & MICROBIOLOGY II**

**CREDIT 3(2-1)**

### **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 Intraspinial 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**

#### **1) G +ve cocci**

- a. Staphylococci
- b. Streptococci

#### **2) G -ve cocci**

- a. Neisseria

#### **3) G +ve spore forming rods**

- a. Bacillia
- b. Clostridia
- c. G –ve rods (introduction to Enterics)

#### **4) Acid fast bacilli**

- a. Mycobacteria

#### **5) Spirochetes**

- a. Introduction
- b. Treponemes

#### **6) Basic virology**

- a. General characteristics
- b. Viral structure
- c. Nomenclature and classification

#### **7) Mycology**

Introduction to mycology

#### **8) 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 Fibroedema
- 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, 3<sup>rd</sup> edition
- *Basics & advanced Human Pathology*
- *Pathology* by Robbins
- *Introduction to Pathology* by Weight
- *Lecture notes on Pathology* by Thomas and Cotton
- *General Pathology* by Florey *Medical Microbiology and Immunology* By: Levinson and Jawetz, 9th Ed., Mc Graw-Hill.

PHARMACOLOGY II

Credit hr 2(2-0)

**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* (3<sup>rd</sup> Edition) By Charles D. Ciccone
- *Pharmacology*, Richard A, Harvey, 2<sup>nd</sup> Edition, Lippincott's
- *Mutlianthore text book of Pharmacology and Therapeutics*, M. Cheema, A vol 1 and Vol 2

PHYSICAL AGENTS & ELECTROTHERAPY

II

CREDIT 3(2-1)

**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*, 10<sup>th</sup> edition by PM Scott
- *Electrotherapy: Evidence based Practice*, 11<sup>th</sup> 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

## **MANUAL THERAPY**

**CREDIT HR 3(2-1)**

### **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**

##### **OMT Kaltenborn-Evjenth Concept**

- History
- Special features
- Overview

#### **PRINCIPLES**

##### **Spinal movement**

- The mobile segment
- Spinal range of movement
- Joint positioning for evaluation and treatment
- Three-dimensional joint positioning
  - *Resting position*
  - *Actual resting position*
  - *Nonresting positions*
- Joint locking
- Bone and joint movement
- Rotations of a vertebral bone
  - *Standard bone movements*
  - *Combined bone movements*
  - *Coupled movements*
  - *Noncoupled movements*
- Joint roll-gliding associated with bone rotations
  - *Joint roll-gliding*
  - *Abnormal roll-gliding*
- Translation of vertebral bone
- Joint play associated with bone translation

##### **Translatory joint play**

- The Kaltenborn Treatment Plane
- Translatory Joint Play Movements
- Determining the direction of restricted gliding
- Glide test
- Kaltenborn Convex-Concave Rule
- Grades of translatory movement
- Normal grades of translatory movement (Grades I - III)
  - *Palpating resistance to normal movement*
- Pathological grades of translatory movement
- 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 rotatoric movements
  - *Testing rotatoric movement*
  - *Localization tests*
  - *Differentiating articular from extra-articular dysfunction*
  - *Differentiating muscle shortening from muscle spasm*
- Translatory joint play tests
- Resisted movements
- Passive soft tissue movements
- Additional tests

#### **OMT evaluation**

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

#### **Spinal joint mobilization**

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

#### **OMT treatment**

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

#### **Spinal syndromes**

- Notes on spinal syndromes
- Cervical syndromes
- Thoracic syndromes

- Lumbar syndromes
- Neurologic evaluation of nerve root syndromes
- Sensory innervation of the skin
- Sensory innervation of deep structures
- Motor innervation
- Common nerve root syndromes

#### **Manual therapy assessment**

- The Maitland's and Mulligan concept
- Subjective examination
- Physical examination
- Examination of the temporomandibular joint
- Examination of the upper cervical spine
- Examination of the cervicothoracic spine
- Examination of the thoracic spine
- Examination of the lumbar spine

#### **The subjective examination step by step**

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

#### **Physical examination step by step**

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

### **TECHNIQUES**

#### **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

#### **Pelvis**

- Functional anatomy and movement

- Notes on evaluation and treatment
- Pelvis tests and mobilizations

#### **Lumbar spine**

- Functional anatomy and movement
- Notes on evaluation and treatment
- Lumbar tests and mobilizations

#### **Thoracic spine and ribs**

- Functional anatomy and movement
- Notes on evaluation and treatment
- Thoracic tests and mobilizations

#### **Cervical spine**

- Functional anatomy and movement
- Notes on evaluation and treatment
- Cervical tests and mobilizations

#### **Upper cervical spine**

- Functional anatomy and movement
- Notes on evaluation and treatment
- Upper cervical tests and mobilizations

#### **Jaw**

- Functional anatomy and movement
- Jaw examination scheme
- Jaw tests and mobilizations

### **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**

### **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. Kaltenbom in collaboration with Olaf Evjenth, Traudi Baldauf Kaltenbom, Dennis Morgan, and Eileen Vollowitz ,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
- *Translatoric 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, Werneir Schneider etc
- *Manual therapy, NAGS, SNAGS, MWMS etc* by Brian R Mulligan fifth edition

**TEACHING METHODOLOGY & COMMUNITY MEDICINE**

**CREDIT 3 (3-0)**

**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.

**CONTENTS OF THE COURSE:**

- Types of health services, public, private, scientific, traditional health system.
- Organization of public services in health, central, provincial and local levels.
- Burden of disease, concept of health needs for care,
- Levels of health care, primary, secondary and tertiary,
- Planning of health services,
- Organization of health services,
- Implementation and evaluation of health services,
- Management of resources in health services,
- Financial management.
- Health education and social cultural concept in health,
- Ethics in Health Services.
- Theories of learning facilitations
- Cognitive, Psychomotor domain & effective domain
- Bloom taxonomy

**COMMUNITY MEDICINE**

**Course Description:**

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..

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  
 ii) Analytical epidemiology  
 a) Case control  
 b) Cohort studies  
 iii) Experimental Epidemiology randomized control trial  
 Systemic epidemiology  
 i) Vector borne diseases  
 ii) Water borne diseases  
 iii) Air born diseases  
 iv) Contact diseases  
 v) Diseases of major public health importance along with 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 (2<sup>nd</sup> Edition).
- 2- Parks text book of preventive & social medicine –K Park

**SUPERVISED CLINICAL PRACTICE I I**

**CREDITS 3(0-3)**

**SYSTEM REVIEW**

<b>SEMESTER</b>	<b>SUPERVISION</b>	<b>FOCUS</b>	<b>WARDS</b>	<b>COMPETENCIES</b>
6	SUPERVISED BY TRAINED PT	SYSTEMS REVIEW	All rotational wards	AS LISTED BELOW

**Course Description:**

During this supervised clinical practice, students are responsible for learning the skills of systems review and validate the need for physical therapy services. Students learn to objectively review each system under the supervision of trained physical therapists. Students become familiar with

performance of these skills in all settings (inpatient and outpatient) as well as on all types of patients (surgical, non-surgical, pediatric, geriatric, etc.) 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.

**Clinical Competencies:**

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

**General Health Condition (GHC)**

- Fatigue
- Malaise
- Fever/chills/sweats
- Nausea/vomiting
- Dizziness/lightheadedness
- Unexplained weight change
- Numbness/Paresthesia
- Weakness
- Mentation /cognition

**Cardiovascular System (CVS)\***

- Dyspnea
- Orthopnea
- Palpitations
- Pain/sweats
- Syncope
- Peripheral edema
- Cough

**Pulmonary System (PS)\***

- Dyspnea
- Onset of cough
- Change in cough
- Sputum
- Hemoptysis
- Clubbing of nails
- Stridor
- Wheezing

**Gastrointestinal System (GIS)**

- Difficulty with swallowing
- Heartburn, indigestion
- Change in appetite
- Change in bowel function

**Urinary System (US)**

- Frequency
- Urgency
- Incontinence

**Genital Reproductive System (GRS)**

**Male**

- Describe any sexual dysfunction, difficulties, or concerns

**Female**

- Describe any sexual or menstrual dysfunction, difficulties, or problems

**RECOGNITION OF RED AND YELLOW FLAGS**

- Initiate referral when positive signs and symptoms identified in the review of systems are beyond the specific skills or expertise of the physical therapist or beyond the scope of physical therapist practice.
- Consult additional resources, as needed, including other physical therapists, evidence-based literature, other health care professionals, and community resources.
- Screen for physical, sexual, and psychological abuse.

**Cardiovascular and Pulmonary Systems**

- Conduct a systems review for screening of the cardiovascular and pulmonary system (heart rate and rhythm, respiratory rate, blood pressure, edema).
- Read a single lead EKG.

**Integumentary System**

- Conduct a systems review for screening of the integumentary system, the assessment of pliability (texture), presence of scar formation, skin color, and skin integrity.

**Musculoskeletal System**

- Conduct a systems review for screening of musculoskeletal system, the assessment of gross symmetry, gross range of motion, gross strength, height and weight.

**Neurological System**

- Conduct a systems review for screening of the neuromuscular system, a general assessment of gross coordinated movement (eg, balance, gait, locomotion, transfers, and transitions) and motor function (motor control and motor learning).

## SEVENTH SEMESTER

S.No	Course Code	Subject	Credit Hr
1	RSC 6061	MEDICINE I	3(3-0)
2	RSC 6062	SURGERY I	3(3-0)
3	RSC 6063	RADIOLOGY & DIAGNOSTIC IMAGING -	3(2-1)
4	RSC 6064	MUSCULOSKELETAL PHYSICAL THERAPY	3(2-1)
5	RSC 6065	BIOSTATISTICS-I	3(3-0)
6	RSC 6066	SUPERVISED CLINICAL PRACTICE III	3(0-3)

**MEDICINE I****CREDIT 3(3-0)****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 septal 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
- *Bed side techniques*

### **SURGERY I**

**CREDIT HR 3(3-0)**

#### **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 valgum
- DePutry's contracture

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

- *Short practice of surgery* by Bailey and Love's
- *Text Book of Surgery* by Ijaz Ahsan
- *Out line of Fractures*

## **RADIOLOGY & DIAGNOSTIC IMAGING**

**CREDIT 3(2-1)**

### **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, 2<sup>nd</sup> edition.
- *Imaging in rehabilitation*, By: Terry. R. Malone, Charles Hazle & Michael L. Grey. McGraw Hill Publishers.

**MUSCULOSKELETAL PHYSICAL THERAPY**

**CREDIT 3 (2-1)**

**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 Spine and Posture: Structure, Function, Postural Impairments, and Management Guidelines**

*Posture and biomechanical influences*

- Alignment
- Stability

*Impaired posture*

- Etiology of pain
- Common faulty postures: characteristics and Impairments

*Management of impaired posture*

- General management guidelines
- Tension headache/cervical headache

### **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

*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

### **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

### **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

### **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.

### **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

### **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

### **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

**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 4<sup>th</sup> 5<sup>th</sup> edition.
- *Therapeutics Exercises: Techniques for Intervention* By: Willim D.Banddy
- *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. 3<sup>rd</sup> ed. Philadelphia, PA: WB Saunders 1995
- *Orthopaedic Physical Therapy* By: Donatelli & Michael J. Wooden 4<sup>th</sup> Edition.
- *Physiotherapy in Orthopaedics, A problem-solving approach* By: Atkinson, Coutts & Hassenkamp 2<sup>nd</sup> Edition
- *Clinical orthopaedic rehabilitation* By S. Brent. Brotzman & Kevin. E. Wilk, 2<sup>nd</sup> edition, Mosby publishers.
- *Management of Common Musculoskeletal Disorder* by: Hertling, D, and Kessler RM Physical Therapy Principles and Methods. 3<sup>rd</sup> ed. Philadelphia.PA: WB Sunders
- *Orthopedic Physical Assessment*. Magee, D.4<sup>th</sup> ed. Philadelphia PA: WB Sunders 1995
- *Physical Rehabilitations Assessments and Treatment*”. By Susan B,O’Sullivan &Thomas J. Schmitz , 4<sup>th</sup> edition
- *Tidy’s Physiotherapy by Thomas A Skinner & Piercy*

**BIOSTATISTICS I**

**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", 3<sup>rd</sup> Ed., Macmillan Publishing Co., Inc. New York.
- Muhammad, F. 2005. "Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad.

**SUPERVISED CLINICAL PRACTICE I II**

**CREDITS 3(0-3)**

### Musculoskeletal

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
7	Supervised by trained PT	Evaluation, Examination, and Intervention	MSK (IPD/OPD; surgical & non-surgical)	Listed below

#### Course Description:

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to musculoskeletal 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 musculoskeletal system tests and measures including:

A. Accessory movement tests

B. Anthropometrics

(1) Limb length

(2) Limb girth

(3) Body composition

C. Functional strength testing

D. Joint integrity\*

E. Joint mobility\*

F. Ligament laxity tests

G. Muscle length\*

H. Muscle strength\* including manual muscle testing, dynamometry, one repetition max

I. Palpation

J. Range of motion\* including goniometric measurements

- Perform orthotic tests and measures including\*:

A. Components, alignment, fit, and ability to care for orthotic, protective, and supportive devices and equipment.

B. Evaluate the need for orthotic, protective, and supportive devices used during functional activities.

C. Remediation of impairments in body function and structure, activity limitations, and participation restrictions with use of orthotic, protective, and supportive device.

D. Residual limb or adjacent segment, including edema, range of motion, skin integrity and strength.

E. Safety during use of orthotic, protective, and supportive device.

- Perform prosthetic tests and measures including\*:

A. Alignment, fit, and ability to care for prosthetic device.

B. Prosthetic device use during functional activities.

C. Remediation of impairments in body function and structure, activity limitations, and participation restrictions, with use of prosthetic device.

D. Evaluation of residual limb or adjacent segment, including edema, range of motion, skin integrity, and strength.

E. Safety during use of the prosthetic device.

- Perform tests and measures for assistive and adaptive devices including\*:

A. Assistive or adaptive devices and equipment use during functional activities.

B. Components, alignment, fit, and ability to care for the assistive or adaptive devices and equipment.

C. Remediation of impairments in body function and structure, activity limitations, and participation restrictions with use of assistive or adaptive devices and equipment.

D. Safety during use of assistive or adaptive equipment.

### **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

- Design a Plan of Care

1. Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.

2. Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.\*

3. Identify patient/client goals and expectations.\*

4. Identify indications for consultation with other professionals.\*

5. Make referral to resources needed by the patient/client (assumes knowledge of referral sources).\*

6. Select and prioritize the essential interventions that are safe and meet the specified functional goals and outcomes in the plan of care\* (ie, (a) identify precautions and contraindications, (b) provide evidence for patient-centered interventions that are identified and selected, (c) define the specificity of the intervention (time, intensity, duration, and frequency), and (d) set realistic priorities that consider relative time duration in conjunction with family, caregivers, and other health care professionals).

7. Establish criteria for discharge based on patient goals and current functioning and disability.\*

- Coordination of Care
  1. Identify who needs to collaborate in the plan of care.
  2. Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral.\*
  3. Refer and discuss coordination of care with other health care professionals.\*
  4. Articulate a specific rationale for a referral.
  5. Advocate for patient/client access to services.
- Progression of Care
  1. Identify outcome measures of progress relative to when to progress the patient further.\*
  2. Measure patient/client response to intervention.\*
  3. Monitor patient/client response to intervention.
  4. Modify elements of the plan of care and goals in response to changing patient/client status, as needed.\*
  5. Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
  6. Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan
  1. Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
  2. Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.\*
  3. Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
  4. Include patient/client and family/caregiver as a partner in discharge.\*
  5. Discontinue care when services are no longer indicated.
  6. When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
  7. Determine the need for equipment and initiate requests to obtain.

**Interventions:**

- Safety, Emergency Care, CPR and First Aid
  - Standard Precautions
  - Body Mechanics and Positioning
  - Categories of Interventions
    - Safety, Cardiopulmonary Resuscitation Emergency Care, First Aid
      - Ensure patient safety and safe application of patient/client care.\*
      - Perform first aid.\*
      - Perform emergency procedures.\*
      - Perform Cardiopulmonary Resuscitation (CPR).\*
      - Precautions
1. Demonstrate appropriate sequencing of events related to universal precautions.\*
  2. Use Universal Precautions.
  3. Determine equipment to be used and assemble all sterile and non-sterile materials.\*
  4. Use transmission-based precautions.
  5. Demonstrate aseptic techniques.\*
  6. Apply sterile procedures.\*
  7. Properly discard soiled items.\*
- Body Mechanics and Positioning
    1. Apply proper body mechanics (utilize, teach, reinforce, and observe).\*
    2. Properly position, drape, and stabilize a patient/client when providing physical therapy.\*
  - Interventions
    1. Coordination, communication, and documentation may include:
      - A. Addressing required functions:
        - (1) Establish and maintain an ongoing collaborative process of decision-making with patients/clients, families, or caregivers prior to initiating care and throughout the provision of services.\*
        - (2) Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
        - (3) Follow advance directives.
      - B. Admission and discharge planning.
      - C. Case management.
      - D. Collaboration and coordination with agencies, including:
        - (1) Home care agencies
        - (2) Equipment suppliers
        - (3) Schools
        - (4) Transportation agencies
        - (5) Payer groups



- E. Communication across settings, including:
  - (1) Case conferences
  - (2) Documentation
  - (3) Education plans
- F. Cost-effective resource utilization.
- G. Data collection, analysis, and reporting of:
  - (1) Outcome data
  - (2) Peer review findings
  - (3) Record reviews
- H. Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:
  - (1) Elements of examination, evaluation, diagnosis, prognosis, and Intervention
  - (2) Changes in body structure and function, activities and participation.
  - (3) Changes in interventions
  - (4) Outcomes of intervention
- I. Interdisciplinary teamwork:
  - (1) Patient/client family meetings
  - (2) Patient care rounds
  - (3) Case conferences
- J. Referrals to other professionals or resources.\*
- K. Patient/client-related instruction may include:
  - A. Instruction, education, and training of patients/clients and caregivers regarding:
    - (1) Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)\*
    - (2) Enhancement of performance
    - (3) Plan of care:
      - a. Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.
      - b. Preferred interventions, alternative interventions, and alternative modes of delivery
      - c. Expected outcomes
    - (4) Health, wellness, and fitness programs (management of risk factors)
    - (5) Transitions across settings

Therapeutic exercise may include performing:

- A. Body mechanics and postural stabilization:
  - (1) Body mechanics training\*
  - (2) Postural control training\*
  - (3) Postural stabilization activities\*
  - (4) Posture awareness training\*
- B. Flexibility exercises:
  - (1) Muscle lengthening\*
  - (2) Range of motion\*
  - (3) Stretching\*
- C. Gait and locomotion training\*:
  - (1) Developmental activities training\*
  - (2) Gait training\*
  - (3) Device training\*
  - (4) Perceptual training\*
  - (5) Basic wheelchair training\*
- D. Strength, power, and endurance training for head, neck, limb, and trunk\*:
  - (1) Active assistive, active, and resistive exercises (including concentric, dynamic/isotonic, eccentric, isokinetic, isometric, and plyometric exercises)
  - (2) Aquatic programs\*
  - (3) Task-specific performance training
- E. Strength, power, and endurance training for pelvic floor:
  - (1) Active (Kegel)
- F. Strength, power, and endurance training for ventilatory muscles:
  - (1) Active and resistive
- G. Manual therapy techniques may include:
  - A. Passive range of motion
  - B. Massage:
    - (1) Connective tissue massage
    - (2) Therapeutic massage

C. Manual traction\*

D. Mobilization/manipulation:

(1) Soft tissue\* (thrust and nonthrust\*)

(2) Spinal and peripheral joints\* (thrust and nonthrust\*)

- Functional training in self-care and home management may include\*:
- Functional training in work (job/school/play), community, and leisure integration or reintegration may include\*:
  - Activities of daily living (ADL) training:
    - (1) Bed mobility and transfer training\*
    - (2) Age appropriate functional skills
  - Barrier accommodations or modifications\*
  - Device and equipment use and training:
    - (1) Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
    - (2) Orthotic, protective, or supportive device or equipment training during self-care and home management\*
    - (3) Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
  - Functional training programs\*:
    - (1) Simulated environments and tasks\*
    - (2) Task adaptation
  - Injury prevention or reduction:
    - (1) Safety awareness training during self-care and home management\*
    - (2) Injury prevention education during self-care and home management
    - (3) Injury prevention or reduction with use of devices and equipment
- Prescription, application, and, as appropriate, fabrication of devices and equipment may include\*:
  - Adaptive devices\*:
    - (1) Hospital beds
    - (2) Raised toilet seats
    - (3) Seating systems – prefabricated
      - Assistive devices\*:
        - (1) Canes
        - (2) Crutches
        - (3) Long-handled reachers
        - (4) Static and dynamic splints – prefabricated
        - (5) Walkers
        - (6) Wheelchairs
          - Orthotic devices\*:
            - (1) Prefabricated braces
            - (2) Prefabricated shoe inserts
            - (3) Prefabricated splints
              - Prosthetic devices (lower-extremity)\*
              - Protective devices\*:
                - (1) Braces
                - (2) Cushions
                - (3) Helmets
                - (4) Protective taping
    - Supportive devices\*:
      - (1) Prefabricated compression garments
      - (2) Corsets
      - (3) Elastic wraps
      - (4) Neck collars
      - (5) Slings
      - (6) Supplemental oxygen - apply and adjust
      - (7) Supportive taping
  - Electrotherapeutic modalities may include:
    - A. Biofeedback\*
    - B. Electrotherapeutic delivery of medications (eg, iontophoresis)\*
    - C. Electrical stimulation\*:
      - (1) Electrical muscle stimulation (EMS)\*
      - (2) Functional electrical stimulation (FES)
      - (3) High voltage pulsed current (HVPC)
      - (4) Neuromuscular electrical stimulation (NMES)
      - (5) Transcutaneous electrical nerve stimulation (TENS)
  - Physical agents and mechanical modalities may include: *Physical agents*:
    - A. Cryotherapy\*:
      - (1) Cold packs

- (2) Ice massage
- (3) Vapocoolant spray
- B. Hydrotherapy\*:
  - (1) Contrast bath
  - (2) Pools
  - (3) Whirlpool tanks\*
- C. Sound agents\*:
  - (1) Phonophoresis\*
  - (2) Ultrasound\*
- D. Thermotherapy\*:
  - (1) Dry heat
  - (2) Hot packs\*
  - (3) Paraffin baths\*

*Mechanical modalities:*

- A. Compression therapies (prefabricated)\*
  - (1) Compression garments
    - Skill Category Description of Minimum Skills
  - (2) Vasopneumatic compression devices\*
  - (3) Taping
  - (4) Compression bandaging (excluding lymphedema)
- B. Gravity-assisted compression devices:
  - (1) Standing frame\*
  - (2) Tilt table\*
- C. Mechanical motion devices\*:
  - (1) Continuous passive motion (CPM)\*
- D. Traction devices\*:
  - (1) Intermittent
  - (2) Positional
  - (3) Sustained

## EIGHT SEMESTER

S.No	Course Code	Subject	Credit Hr
1	RSC 6071	MEDICINE II	3(3-0)
2	RSC 6072	SURGERY II	3(3-0)
3	RSC 6073	NEUROLOGICAL PHYSICAL THERAPY	3(2-1)
4	RSC 6074	EVIDENCE BASED PRACTICE	3(2-1)
5	RSC 6075	BIOSTATISTICS-II/ UNIVERSITY OPTIONAL	3(3-0)
6	RSC 6076	SUPERVISED CLINICAL PRACTICE IV	3(0-3)

### **MEDICINE II**

**CREDIT 3(3-0)**

#### **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 Comma

#### **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
- *Bed side techniques*

#### **SURGERY II**

**CREDIT 3(3-0)**

#### **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 David Hamblen, Hamish Simpsons
- *Outline of orthopedics* by David Hamblen, Hamish Simpsons
- *Apley's systems of orthopedics and fractures* by Louis Solomon 9<sup>th</sup> ed , publisher holder Arnold
-

**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

**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

**Case Histories****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.

**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

**EVIDENCE BASED PRACTICE**

**CREDIT 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*, 8<sup>th</sup> Edition By, M.Neil.Browne& Stuart M Keeley
- *Additional reading material as assigned.*

**BIOSATISTICS II**

**CREDIT HRS: 3 (3-0)**

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", 3<sup>rd</sup> Ed., Macmillan Publishing Co., Inc. New York. Muhammad, F. 2005.
- "Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad

**SUPERVISED CLINICAL PRACTICE I V**

**CREDITS 3(0-3)**

Neurological

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
8	Supervised by trained PT	Evaluation, Examination, and Intervention	Neurological (IPD/OPD; surgical & non-surgical)	Listed below

**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
- Design a Plan of Care
  1. Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.
  2. Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.\*
  3. Identify patient/client goals and expectations.\*
  4. Identify indications for consultation with other professionals.\*
  5. Make referral to resources needed by the patient/client (assumes knowledge of referral sources).\*
  6. Select and prioritize the essential interventions that are safe and meet the specified functional goals and outcomes in the plan of care\* (ie, (a) identify precautions and contraindications, (b) provide evidence for patient-centered interventions that are identified and selected, (c) define the specificity of the intervention (time, intensity, duration, and frequency), and (d) set realistic priorities that consider relative time duration in conjunction with family, caregivers, and other health care professionals).
  7. Establish criteria for discharge based on patient goals and current functioning and disability.\*
- Coordination of Care
  1. Identify who needs to collaborate in the plan of care.
  2. Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral.\*
  3. Refer and discuss coordination of care with other health care professionals.\*
  4. Articulate a specific rationale for a referral.
  5. Advocate for patient/client access to services.
- Progression of Care
  1. Identify outcome measures of progress relative to when to progress the patient further.\*
  2. Measure patient/client response to intervention.\*
  3. Monitor patient/client response to intervention.
  4. Modify elements of the plan of care and goals in response to changing patient/client status, as needed.\*
  5. Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
  6. Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan
  1. Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
  2. Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.\*
  3. Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
  4. Include patient/client and family/caregiver as a partner in discharge.\*
  5. Discontinue care when services are no longer indicated.
  6. When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
  7. Determine the need for equipment and initiate requests to obtain.

### **Interventions:**

- Safety, Emergency Care, CPR and First Aid
- Standard Precautions
- Body Mechanics and

- Positioning
  - Categories of Interventions
    - Safety, Cardiopulmonary Resuscitation Emergency Care, First Aid
      - Ensure patient safety and safe application of patient/client care.\*
      - Perform first aid.\*
      - Perform emergency procedures.\*
      - Perform Cardiopulmonary Resuscitation (CPR).\*
      - Precautions
1. Demonstrate appropriate sequencing of events related to universal precautions.\*
  2. Use Universal Precautions.
  3. Determine equipment to be used and assemble all sterile and non-sterile materials.\*
  4. Use transmission-based precautions.
  5. Demonstrate aseptic techniques.\*
  6. Apply sterile procedures.\*
  7. Properly discard soiled items.\*
- Body Mechanics and Positioning
    1. Apply proper body mechanics (utilize, teach, reinforce, and observe).\*
    2. Properly position, drape, and stabilize a patient/client when providing physical therapy.\*
  - Interventions
    1. Coordination, communication, and documentation may include:
      - A. Addressing required functions:
        - (1) Establish and maintain an ongoing collaborative process of decision-making with patients/clients, families, or caregivers prior to initiating care and throughout the provision of services.\*
        - (2) Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
        - (3) Follow advance directives.
      - B. Admission and discharge planning.
      - C. Case management.
      - D. Collaboration and coordination with agencies, including:
        - (1) Home care agencies
        - (2) Equipment suppliers
        - (3) Schools
        - (4) Transportation agencies
        - (5) Payer groups
      - E. Communication across settings, including:
        - (1) Case conferences
        - (2) Documentation
        - (3) Education plans
      - F. Cost-effective resource utilization.
      - G. Data collection, analysis, and reporting of:
        - (1) Outcome data
        - (2) Peer review findings
        - (3) Record reviews
      - H. Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:
        - (1) Elements of examination, evaluation, diagnosis, prognosis, and Intervention
        - (2) Changes in body structure and function, activities and participation.
        - (3) Changes in interventions
        - (4) Outcomes of intervention
      - I. Interdisciplinary teamwork:
        - (1) Patient/client family meetings
        - (2) Patient care rounds
        - (3) Case conferences
      - J. Referrals to other professionals or resources.\*
      - K. Patient/client-related instruction may include:
        - A. Instruction, education, and training of patients/clients and caregivers regarding:
          - (1) Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)\*
          - (2) Enhancement of performance
          - (3) Plan of care:
            - a. Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.

- b. Preferred interventions, alternative interventions, and alternative modes of delivery
- c. Expected outcomes
- (4) Health, wellness, and fitness programs (management of risk factors)
- (5) Transitions across settings

- Therapeutic exercise may include performing:

- Balance\*, coordination\*, and agility training:
  - (1) Developmental activities training\*
  - (2) Motor function (motor control and motor learning) training or retraining
  - (3) Neuromuscular education or reeducation\*
  - (4) Perceptual training
  - (5) Posture awareness training\*
  - (6) Sensory training or retraining
  - (7) Standardized, programmatic approaches
  - (8) Task-specific performance training
- Neuromotor development training:
  - (1) Developmental activities training\*
  - (2) Motor training
  - (3) Movement pattern training
  - (4) Neuromuscular education or reeducation\*
- Functional training in self-care and home management may include\*:
- Functional training in work (job/school/play), community, and leisure integration or reintegration may include\*:
  - Activities of daily living (ADL) training:
    - (1) Bed mobility and transfer training\*
    - (2) Age appropriate functional skills
  - Barrier accommodations or modifications\*
  - Device and equipment use and training:
    - (1) Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
    - (2) Orthotic, protective, or supportive device or equipment training during self-care and home management\*
    - (3) Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
- Functional training programs\*:
  - (1) Simulated environments and tasks\*
  - (2) Task adaptation
- Injury prevention or reduction:
  - (1) Safety awareness training during self-care and home management\*
  - (2) Injury prevention education during self-care and home management
  - (3) Injury prevention or reduction with use of devices and equipment
- Prescription, application, and, as appropriate, fabrication of devices and equipment may include\*:
  - Adaptive devices\*:
    - (1) Hospital beds
    - (2) Raised toilet seats
    - (3) Seating systems – prefabricated
      - Assistive devices\*:
        - (1) Canes
        - (2) Crutches
        - (3) Long-handled reachers
        - (4) Static and dynamic splints – prefabricated
        - (5) Walkers
        - (6) Wheelchairs
          - Orthotic devices\*:
            - (1) Prefabricated braces
            - (2) Prefabricated shoe inserts
            - (3) Prefabricated splints
              - Prosthetic devices (lower-extremity)\*
              - Protective devices\*:
                - (1) Braces
                - (2) Cushions
                - (3) Helmets
                - (4) Protective taping
  - Supportive devices\*:
    - (1) Prefabricated compression garments
    - (2) Corsets

- (3) Elastic wraps
- (4) Neck collars
- (5) Slings
- (6) Supplemental oxygen - apply and adjust
- (7) Supportive taping
- Electrotherapeutic modalities may include:
  - A. Biofeedback\*
  - B. Electrotherapeutic delivery of medications (eg, iontophoresis)\*
  - C. Electrical stimulation\*:
    - (1) Electrical muscle stimulation (EMS)\*
    - (2) Functional electrical stimulation (FES)
    - (3) High voltage pulsed current (HVPC)
    - (4) Neuromuscular electrical stimulation (NMES)
    - (5) Transcutaneous electrical nerve stimulation (TENS)
- Physical agents and mechanical modalities may include: *Physical agents*:
  - A. Cryotherapy\*:
    - (1) Cold packs
    - (2) Ice massage
    - (3) Vapocoolant spray
  - B. Hydrotherapy\*:
    - (1) Contrast bath
    - (2) Pools
    - (3) Whirlpool tanks\*
  - C. Sound agents\*:
    - (1) Phonophoresis\*
    - (2) Ultrasound\*
  - D. Thermotherapy\*:
    - (1) Dry heat
    - (2) Hot packs\*
    - (3) Paraffin baths\*
- Mechanical modalities*:
  - A. Compression therapies (prefabricated)\*
    - (1) Compression garments
      - Skill Category Description of Minimum Skills
    - (2) Vasopneumatic compression devices\*
    - (3) Taping
    - (4) Compression bandaging (excluding lymphedema)
  - B. Gravity-assisted compression devices:
    - (1) Standing frame\*
    - (2) Tilt table\*
  - C. Mechanical motion devices\*:
    - (1) Continuous passive motion (CPM)\*
  - D. Traction devices\*:
    - (1) Intermittent
    - (2) Positional
    - (3) Sustained



## NINTH SEMESTER

RSC 6081	CARDIOPULMONARY PHYSICAL THERAPY	3(2-1)
RSC 6082	EMERGENCY PROCEDURES AND PRIMARY CARE	2(2-0)
RSC 6083	CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS	3(3-0)
RSC 6084	SCIENTIFIC INQUIRY & RESEARCH METHODOLOGY	3(2-1)
RSC 6085	GERONTOLOGY AND GERIATRIC PHYSICAL THERAPY	2(2-0)
RSC 6086	INTEGUMENTRY PHYSICAL THERAPY	2(2-0)
RSC 6087	SUPERVISED CLINICAL PRACTICE V	3(0-3)

### CARDIOPULMONARY PHYSICAL THERAPY

CREDIT 3(2-1)

#### 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

#### **Recommended Text Book:**

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

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

**CREDIT 2(2-0)**

### **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 modules1
- 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, 1<sup>st</sup> edition, 2010, FA Davis Company
- *Acute care hand book for Physical Therapists* by: Jaime C paz, Michelle P West, 2<sup>nd</sup> edition, 2002, Butterworth Heinemann

#### **CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS**

**CREDIT 3(3-0)**

#### **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

### **SCIENTIFIC INQUIRY & RESEARCH METHODOLOGY**

**CREDIT 3(2-1)**

#### **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, co relational statistic & 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)* 3<sup>rd</sup> Edition By Elizabeth Domholdt

**GERONTOLOGY & GERIATRIC PHYSICAL THERAPY**

**CREDIT 2(2-0)**

**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

#### **Recommended Books:**

- Geriatric Physical Therapy (Hardcover) by [Andrew A. Guccione](#) (Author)
- Fundamentals of Geriatric Medicine

## **INTEGUMENTARY PHYSICAL THERAPY**

**CREDITHR 2(2-0)**

### **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

#### **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-

**SUPERVISED CLINICAL PRACTICE V**

**CREDITS 3(0-3)**

### Cardiovascular and Pulmonary

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
9	Supervised by trained PT	Evaluation, Examination, and Intervention	Cardiovascular and pulmonary (IPD/OPD; surgical & non-surgical)	Listed below

#### **Course Description:**

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to cardiovascular and pulmonary 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 cardiovascular/pulmonary tests and measures including:
  - A. Heart rate
  - B. Respiratory rate, pattern and quality\*
  - C. Blood pressure
  - D. Aerobic capacity test\* (functional or standardized) such as the 6-minute walk test
  - E. Pulse Oximetry
  - F. Breath sounds – normal/abnormal
  - G. Response to exercise (RPE)
  - H. Signs and symptoms of hypoxia
  - I. Peripheral circulation (deep vein thrombosis, pulse, venous stasis, lymphedema)\*

#### **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
- Design a Plan of Care
  1. Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.
  2. Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.\*
  3. Identify patient/client goals and expectations.\*
  4. Identify indications for consultation with other professionals.\*
  5. Make referral to resources needed by the patient/client (assumes knowledge of referral sources).\*
  6. Select and prioritize the essential interventions that are safe and meet the specified functional goals and outcomes in the plan of care\* (ie, (a) identify precautions and contraindications, (b) provide evidence for patient-centered interventions that are identified and selected, (c) define the specificity of the intervention (time, intensity, duration, and frequency), and (d) set realistic priorities that consider relative time duration in conjunction with family, caregivers, and other health care professionals).
  7. Establish criteria for discharge based on patient goals and current functioning and disability.\*
- Coordination of Care
  1. Identify who needs to collaborate in the plan of care.
  2. Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral.\*
  3. Refer and discuss coordination of care with other health care professionals.\*
  4. Articulate a specific rationale for a referral.
  5. Advocate for patient/client access to services.
- Progression of Care
  1. Identify outcome measures of progress relative to when to progress the patient further.\*
  2. Measure patient/client response to intervention.\*
  3. Monitor patient/client response to intervention.
  4. Modify elements of the plan of care and goals in response to changing patient/client status, as needed.\*
  5. Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
  6. Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan
  1. Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
  2. Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.\*
  3. Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
  4. Include patient/client and family/caregiver as a partner in discharge.\*
  5. Discontinue care when services are no longer indicated.
  6. When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
  7. Determine the need for equipment and initiate requests to obtain.

**Interventions:**

- Safety, Emergency Care, CPR and First Aid
- Standard Precautions
- Body Mechanics and
- Positioning
- Categories of Interventions
  - Safety, Cardiopulmonary Resuscitation Emergency Care, First Aid

- Ensure patient safety and safe application of patient/client care.\*
  - Perform first aid.\*
  - Perform emergency procedures.\*
  - Perform Cardiopulmonary Resuscitation (CPR).\*
  - Precautions
1. Demonstrate appropriate sequencing of events related to universal precautions.\*
  2. Use Universal Precautions.
  3. Determine equipment to be used and assemble all sterile and non-sterile materials.\*
  4. Use transmission-based precautions.
  5. Demonstrate aseptic techniques.\*
  6. Apply sterile procedures.\*
  7. Properly discard soiled items.\*
- Body Mechanics and Positioning
    1. Apply proper body mechanics (utilize, teach, reinforce, and observe).\*
    2. Properly position, drape, and stabilize a patient/client when providing physical therapy.\*
  - Interventions
    1. Coordination, communication, and documentation may include:
      - A. Addressing required functions:
        - (1) Establish and maintain an ongoing collaborative process of decision-making with patients/clients, families, or caregivers prior to initiating care and throughout the provision of services.\*
        - (2) Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
        - (3) Follow advance directives.
      - B. Admission and discharge planning.
      - C. Case management.
      - D. Collaboration and coordination with agencies, including:
        - (1) Home care agencies
        - (2) Equipment suppliers
        - (3) Schools
        - (4) Transportation agencies
        - (5) Payer groups
      - E. Communication across settings, including:
        - (1) Case conferences
        - (2) Documentation
        - (3) Education plans
      - F. Cost-effective resource utilization.
      - G. Data collection, analysis, and reporting of:
        - (1) Outcome data
        - (2) Peer review findings
        - (3) Record reviews
      - H. Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:
        - (1) Elements of examination, evaluation, diagnosis, prognosis, and Intervention
        - (2) Changes in body structure and function, activities and participation.
        - (3) Changes in interventions
        - (4) Outcomes of intervention
      - I. Interdisciplinary teamwork:
        - (1) Patient/client family meetings
        - (2) Patient care rounds
        - (3) Case conferences
      - J. Referrals to other professionals or resources.\*
      - K. Patient/client-related instruction may include:
        - A. Instruction, education, and training of patients/clients and caregivers regarding:
          - (1) Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)\*
          - (2) Enhancement of performance
          - (3) Plan of care:
            - a. Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.
            - b. Preferred interventions, alternative interventions, and alternative modes of delivery
            - c. Expected outcomes
          - (4) Health, wellness, and fitness programs (management of risk factors)

(5) Transitions across settings

• Therapeutic exercise may include performing:

A. Aerobic capacity/endurance conditioning or reconditioning\*:

- (1) Gait and locomotor training\*
- (2) Increased workload over time (modify workload progression)
- (3) Movement efficiency and energy conservation training
- (4) Walking and wheelchair propulsion programs
- (5) Cardiovascular conditioning programs

B. Relaxation:

- (1) Breathing strategies\*
- (2) Movement strategies
- (3) Relaxation techniques

C. Airway clearance techniques may include\*:

A. Breathing strategies\*:

- (1) Active cycle of breathing or forced expiratory techniques\*
- (2) Assisted cough/huff techniques\*
- (3) Paced breathing\*
- (4) Pursed lip breathing
- (5) Techniques to maximize ventilation (eg, maximum inspiratory hold, breath stacking, manual hyperinflation)

B. Manual/mechanical techniques\*:

- (1) Assistive devices

C. Positioning\*:

- (1) Positioning to alter work of breathing
- (2) Positioning to maximize ventilation and perfusion

○ Functional training in self-care and home management may include\*:

○ Functional training in work (job/school/play), community, and leisure integration or reintegration may include\*:

○ Activities of daily living (ADL) training:

- (1) Bed mobility and transfer training\*
- (2) Age appropriate functional skills

○ Barrier accommodations or modifications\*

○ Device and equipment use and training:

- (1) Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
- (2) Orthotic, protective, or supportive device or equipment training during self-care and home management\*
- (3) Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*

○ Functional training programs\*:

- (1) Simulated environments and tasks\*
- (2) Task adaptation

○ Injury prevention or reduction:

- (1) Safety awareness training during self-care and home management\*
- (2) Injury prevention education during self-care and home management
- (3) Injury prevention or reduction with use of devices and equipment

• Prescription, application, and, as appropriate, fabrication of devices and equipment may include\*:

○ Adaptive devices\*:

- (1) Hospital beds
- (2) Raised toilet seats
- (3) Seating systems – prefabricated

○ Assistive devices\*:

- (1) Canes
- (2) Crutches
- (3) Long-handled reachers
- (4) Static and dynamic splints – prefabricated
- (5) Walkers
- (6) Wheelchairs

○ Orthotic devices\*:

- (1) Prefabricated braces
- (2) Prefabricated shoe inserts
- (3) Prefabricated splints

○ Prosthetic devices (lower-extremity)\*

○ Protective devices\*:

- (1) Braces
- (2) Cushions
- (3) Helmets
- (4) Protective taping

- Supportive devices\*:
  - (1) Prefabricated compression garments
  - (2) Corsets
  - (3) Elastic wraps
  - (4) Neck collars
  - (5) Slings
  - (6) Supplemental oxygen - apply and adjust
  - (7) Supportive taping
- Electrotherapeutic modalities may include:
  - A. Biofeedback\*
  - B. Electrotherapeutic delivery of medications (eg, iontophoresis)\*
  - C. Electrical stimulation\*:
    - (1) Electrical muscle stimulation (EMS)\*
    - (2) Functional electrical stimulation (FES)
    - (3) High voltage pulsed current (HVPC)
    - (4) Neuromuscular electrical stimulation (NMES)
    - (5) Transcutaneous electrical nerve stimulation (TENS)
- Physical agents and mechanical modalities may include: *Physical agents*:
  - A. Cryotherapy\*:
    - (1) Cold packs
    - (2) Ice massage
    - (3) Vapocoolant spray
  - B. Hydrotherapy\*:
    - (1) Contrast bath
    - (2) Pools
    - (3) Whirlpool tanks\*
  - C. Sound agents\*:
    - (1) Phonophoresis\*
    - (2) Ultrasound\*
  - D. Thermotherapy\*:
    - (1) Dry heat
    - (2) Hot packs\*
    - (3) Paraffin baths\*

*Mechanical modalities:*

- A. Compression therapies (prefabricated)\*
  - (1) Compression garments
    - Skill Category Description of Minimum Skills
  - (2) Vasopneumatic compression devices\*
  - (3) Taping
  - (4) Compression bandaging (excluding lymphedema)
- B. Gravity-assisted compression devices:
  - (1) Standing frame\*
  - (2) Tilt table\*
- C. Mechanical motion devices\*:
  - (1) Continuous passive motion (CPM)\*
- D. Traction devices\*:
  - (1) Intermittent
  - (2) Positional
  - (3) Sustained



# TENTH SEMESTER

S.No	Course Code	Subject	Credit Hr
1	RSC 6091	GYNAECOLOGY & OBSTETRICS PHYSICAL THERAPY	2(2-0)
2	RSC 6092	PAEDIATRIC PHYSICAL THERAPY	2(2-0)
3	RSC 6093	SPORTS PHYSICAL THERAPY	2(2-0)
4	RSC 6094	SUPERVISED CLINICAL PRACTICE VI	4(0-4)
5	RSC 6095	RESEARCH PROJECT	6

## GYNECOLOGY & OBSTETRICS PHYSICAL THERAPY

CREDIT 2(2-0)

### 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 odema

#### **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
- 

#### 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 PHYSICAL THERAPY**

**CREDIT HR 2(2-0)**

### **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

#### **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.*

## **SPORTS PHYSICAL THERAPY:**

**CREDIT HR 2(2-0)**

### **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**

**Recommended Books:**

- *Sports Rehabilitation and Injury Prevention* by: Paul Comfort & Earle Abrahamson, 1<sup>st</sup> 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, 1<sup>st</sup> edition, 2010, Churchill Livingstone.

**SUPERVISED CLINICAL PRACTICE VI**

**CREDITS 4(0-4)**

**INTEGUMENTARY**

<b>SEMESTER</b>	<b>SUPERVISION</b>	<b>FOCUS</b>	<b>WARDS</b>	<b>COMPETENCIES</b>
10	Supervised by trained PT	Evaluation, Examination, and Intervention	Integumentary, gynecology& obstetrics, sports and metabolic disorders (IPD/OPD; surgical & non-surgical)	Listed below

**Course Description:**

During this supervised clinical practice, students are responsible for successful execution of examination, evaluation, and interventions relating to Integumentary, gynecology and obstetrics, sports and metabolic disorders. Students 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, geriatric, obstetrics & gynecology, sports etc.) 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 integumentary integrity tests and measures including\*:
  - A. Activities, positioning, and postures that produce or relieve trauma to the skin.
  - B. Assistive, adaptive, orthotic, protective, supportive, or prosthetic devices and equipment that may produce or relieve trauma to the skin.
  - C. Skin characteristics, including blistering, continuity of skin color, dermatitis, hair growth, mobility, nail growth, sensation, temperature, texture and turgor.
  - D. Activities, positioning, and postures that aggravate the wound or scar or that produce or relieve trauma.
  - E. Signs of infection.
  - F. Wound characteristics: bleeding, depth, drainage, location, odor, size, and color.
  - G. Wound scar tissue characteristics including banding, pliability, sensation, and texture.

### **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

**Plan of Care:**

- Goal setting
- Coordination of Care
- Progression of care
- Discharge
- Design a Plan of Care
  1. Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.
  2. Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.\*
  3. Identify patient/client goals and expectations.\*
  4. Identify indications for consultation with other professionals.\*
  5. Make referral to resources needed by the patient/client (assumes knowledge of referral sources).\*
  6. Select and prioritize the essential interventions that are safe and meet the specified functional goals and outcomes in the plan of care\* (ie, (a) identify precautions and contraindications, (b) provide evidence for patient-centered interventions that are identified and selected, (c) define the specificity of the intervention (time, intensity, duration, and frequency), and (d) set realistic priorities that consider relative time duration in conjunction with family, caregivers, and other health care professionals).
  7. Establish criteria for discharge based on patient goals and current functioning and disability.\*
- Coordination of Care
  1. Identify who needs to collaborate in the plan of care.
  2. Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral.\*
  3. Refer and discuss coordination of care with other health care professionals.\*
  4. Articulate a specific rationale for a referral.
  5. Advocate for patient/client access to services.
- Progression of Care
  1. Identify outcome measures of progress relative to when to progress the patient further.\*
  2. Measure patient/client response to intervention.\*
  3. Monitor patient/client response to intervention.
  4. Modify elements of the plan of care and goals in response to changing patient/client status, as needed.\*
  5. Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
  6. Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan
  1. Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
  2. Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.\*
  3. Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
  4. Include patient/client and family/caregiver as a partner in discharge.\*
  5. Discontinue care when services are no longer indicated.
  6. When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
  7. Determine the need for equipment and initiate requests to obtain.

**Interventions:**

- Safety, Emergency Care, CPR and First Aid
- Standard Precautions
- Body Mechanics and
- Positioning
- Categories of Interventions
  - Safety, Cardiopulmonary Resuscitation Emergency Care, First Aid
    - Ensure patient safety and safe application of patient/client care.\*
    - Perform first aid.\*
    - Perform emergency procedures.\*
    - Perform Cardiopulmonary Resuscitation (CPR).\*
    - Precautions
- 1. Demonstrate appropriate sequencing of events related to universal precautions.\*
- 2. Use Universal Precautions.
- 3. Determine equipment to be used and assemble all sterile and non-sterile materials.\*
- 4. Use transmission-based precautions.
- 5. Demonstrate aseptic techniques.\*
- 6. Apply sterile procedures.\*
- 7. Properly discard soiled items.\*
- Body Mechanics and Positioning
  1. Apply proper body mechanics (utilize, teach, reinforce, and observe).\*

2. Properly position, drape, and stabilize a patient/client when providing physical therapy.\*

- Interventions

1. Coordination, communication, and documentation may include:

A. Addressing required functions:

(1) Establish and maintain an ongoing collaborative process of decision-making with patients/clients, families, or caregivers prior to initiating care and throughout the provision of services.\*

(2) Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).

(3) Follow advance directives.

B. Admission and discharge planning.

C. Case management.

D. Collaboration and coordination with agencies, including:

(1) Home care agencies

(2) Equipment suppliers

(3) Schools

(4) Transportation agencies

(5) Payer groups

E. Communication across settings, including:

(1) Case conferences

(2) Documentation

(3) Education plans

F. Cost-effective resource utilization.

G. Data collection, analysis, and reporting of:

(1) Outcome data

(2) Peer review findings

(3) Record reviews

H. Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:

(1) Elements of examination, evaluation, diagnosis, prognosis, and Intervention

(2) Changes in body structure and function, activities and participation.

(3) Changes in interventions

(4) Outcomes of intervention

I. Interdisciplinary teamwork:

(1) Patient/client family meetings

(2) Patient care rounds

(3) Case conferences

J. Referrals to other professionals or resources.\*

K. Patient/client-related instruction may include:

A. Instruction, education, and training of patients/clients and caregivers regarding:

(1) Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)\*

(2) Enhancement of performance

(3) Plan of care:

a. Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.

b. Preferred interventions, alternative interventions, and alternative modes of delivery

c. Expected outcomes

(4) Health, wellness, and fitness programs (management of risk factors)

(5) Transitions across settings

Therapeutic exercise may include performing:

- Integumentary repair and protection techniques may include\*:

A. Debridement\*—nonselective:

(1) Enzymatic debridement

(2) Wet dressings

(3) Wet-to-dry dressings

(4) Wet-to-moist dressings

B. Dressings\*:

(1) Hydrogels

(2) Wound coverings

C. Topical agents\*:

- (1) Cleansers
- (2) Creams
- (3) Moisturizers
- (4) Ointments
- (5) Sealants

- Functional training in self-care and home management may include\*:
  - Functional training in work (job/school/play), community, and leisure integration or reintegration may include\*:
    - Activities of daily living (ADL) training:
      - (1) Bed mobility and transfer training\*
      - (2) Age appropriate functional skills
    - Barrier accommodations or modifications\*
    - Device and equipment use and training:
      - (1) Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
      - (2) Orthotic, protective, or supportive device or equipment training during self-care and home management\*
      - (3) Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
  - Functional training programs\*:
    - (1) Simulated environments and tasks\*
    - (2) Task adaptation
  - Injury prevention or reduction:
    - (1) Safety awareness training during self-care and home management\*
    - (2) Injury prevention education during self-care and home management
    - (3) Injury prevention or reduction with use of devices and equipment
  - Prescription, application, and, as appropriate, fabrication of devices and equipment may include\*:
    - Adaptive devices\*:
      - (1) Hospital beds
      - (2) Raised toilet seats
      - (3) Seating systems – prefabricated
        - Assistive devices\*:
          - (1) Canes
          - (2) Crutches
          - (3) Long-handled reachers
          - (4) Static and dynamic splints – prefabricated
          - (5) Walkers
          - (6) Wheelchairs
            - Orthotic devices\*:
              - (1) Prefabricated braces
              - (2) Prefabricated shoe inserts
              - (3) Prefabricated splints
                - Prosthetic devices (lower-extremity)\*
                - Protective devices\*:
                  - (1) Braces
                  - (2) Cushions
                  - (3) Helmets
                  - (4) Protective taping
- Supportive devices\*:
  - (1) Prefabricated compression garments
  - (2) Corsets
  - (3) Elastic wraps
  - (4) Neck collars
  - (5) Slings
  - (6) Supplemental oxygen - apply and adjust
  - (7) Supportive taping
- Electrotherapeutic modalities may include:
  - A. Biofeedback\*
  - B. Electrotherapeutic delivery of medications (eg, iontophoresis)\*
  - C. Electrical stimulation\*:
    - (1) Electrical muscle stimulation (EMS)\*
    - (2) Functional electrical stimulation (FES)
    - (3) High voltage pulsed current (HVPC)
    - (4) Neuromuscular electrical stimulation (NMES)
    - (5) Transcutaneous electrical nerve stimulation (TENS)

- Physical agents and mechanical modalities may include: *Physical agents*:

- A. Cryotherapy\*:

- (1) Cold packs
    - (2) Ice massage
    - (3) Vapocoolant spray

- B. Hydrotherapy\*:

- (1) Contrast bath
    - (2) Pools
    - (3) Whirlpool tanks\*

- C. Sound agents\*:

- (1) Phonophoresis\*
    - (2) Ultrasound\*

- D. Thermotherapy\*:

- (1) Dry heat
    - (2) Hot packs\*
    - (3) Paraffin baths\*

- Mechanical modalities*:

- A. Compression therapies (prefabricated)\*

- (1) Compression garments
      - Skill Category Description of Minimum Skills
    - (2) Vasopneumatic compression devices\*
    - (3) Taping
    - (4) Compression bandaging (excluding lymphedema)

- B. Gravity-assisted compression devices:

- (1) Standing frame\*
    - (2) Tilt table\*

- C. Mechanical motion devices\*:

- (1) Continuous passive motion (CPM)\*

- D. Traction devices\*:

- (1) Intermittent
    - (2) Positional
    - (3) Sustained