

**CURRICULUM**  
**OF**  
**DOCTOR OF PHYSICAL THERAPY**

**(Revised 2016)**



**HIGHER EDUCATION COMMISSION**  
**ISLAMABAD**

## **CURRICULUM DIVISION, HEC**

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## CONTENTS

1.	Introduction.....	6
2.	Scheme of Study.....	17
3.	Details of Course .....	20
4.	Annexures A– F .....	212

## PREFACE

The curriculum, with varying definitions, is a plan of the teaching-learning process that students of an academic programme are required to undergo. It includes objectives and learning outcomes, course contents, scheme of studies, teaching methodologies and methods of assessment of learning. Knowledge in all academic disciplines is expanding and even new disciplines are also emerging, it is imperative that curriculum are developed and revised regularly.

University Grants Commission (UGC) was designated as the competent authority to develop, review and revise curricula beyond Class-XII vide Section 3, Sub-Section 2 (ii), Act of Parliament No. X of 1976 titled “**Supervision of Curricula and Textbooks and Maintenance of Standard of Education**”. With the repeal of UGC Act, the same function was assigned to the Higher Education Commission (HEC) under its Ordinance of 2002, Section 10, Sub-Section 1 (v).

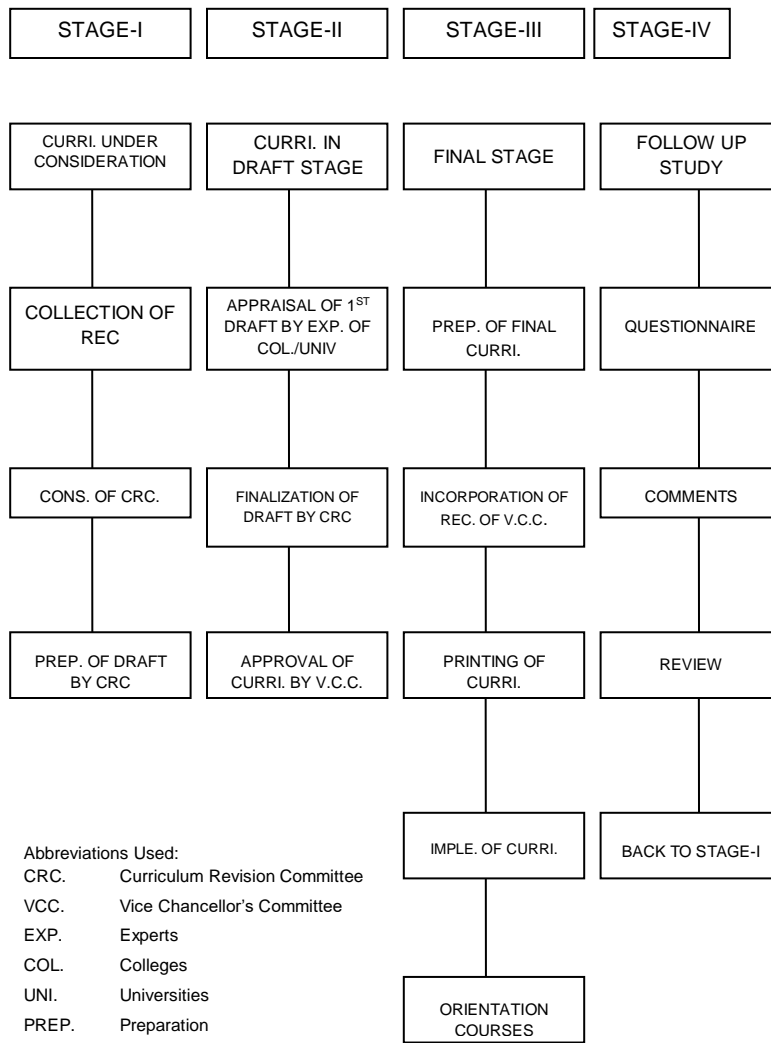
In compliance with the provisions, the Curriculum Division of HEC undertakes the revision of curricula after every three years through respective National Curriculum Revision Committees (NCRCs) which consist of eminent professors and researchers of relevant fields from public and private sector universities, R&D organizations, councils, industry and civil society nominated by their organizations.

In order to impart education at par with quality international standards, HEC NCRCs have developed unified templates as guidelines for the development and revision of curricula in the disciplines of Basic Sciences, Applied Sciences, Social Sciences, Agriculture and Engineering in 2007 and 2009.

It is hoped that this curriculum document, prepared by the respective NCRC's, would serve the purpose of meeting our national, social and economic needs, and it would also provide the level of competency specified in Pakistan Qualification Framework to make it compatible with international educational standards. The curriculum is also placed on the website of HEC ([www.hec.gov.pk](http://www.hec.gov.pk)).

**(Fida Hussain)**  
**Director General (Academics)**

## CURRICULUM DEVELOPMENT PROCESS



## INTRODUCTION

The meeting of National Curriculum Revision Committee to review and revise the Curriculum for Doctor of Physical Therapy at degree level was held at HEC. List of participants of meeting is as under:-

Sr	Name	
1.	<b>Dr. Asghar Khan, PT</b> Director, PT, DPT (USA), Riphah College of Rehabilitation, Riphah International University, Sector I-14, Islamabad.	Convener
2.	<b>Dr. Saleha Saleem Bukhari, PT</b> Principal/Head School of Physiotherapy, KEMU, Lahore	Member
3.	<b>Dr. Saeed Akhtar, PT</b> Assistant Professor/HOD, Institute of Physical Medicine and Rehabilitation Dow University of Health Sciences, OJHA campus, Karachi	Member
4.	<b>Dr. Zahid Mehmood Bhatti, PT</b> Assistant Professor, Lahore College of Physical Therapy, LMDC, Lahore	Member
5.	<b>Dr. Khalid Aziz, PT</b> Assistant Professor, Baqai Medical University, Karachi	Member
6.	<b>Dr. Haider Darain, PT</b> Director/Principal Khyber Medical University, Institute of Physical Medicine and Rehabilitation, Peshawar	Member
7.	<b>Dr. Muhammad Khan, PT</b> Assistant Professor/HOD City Campus Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences, Karachi	Member
8.	<b>Dr. Sumaira Imran Farooqui, PT</b> Principal/Associate Professor Ziauddin College of Physical Therapy, Ziauddin University Karachi	Member

9.	<b>Dr. Syed Hassan Abbas, PT</b> Principal, Liaquat National School of Physiotherapy, Liaquat National Hospital, Karachi.	Member
10.	<b>Dr. Shahid Ahmad Heera, PT</b> Head of School, Department of Physical Therapy The University of Faisalabad	Member
11.	<b>Dr. Muhammad Asif, PT</b> Principal/ Associate Professor Isra Institute of Rehabilitation Sciences, Isra University Karachi Campus	Member
12.	<b>Dr. Ahsan Javed, PT</b> Assistant Professor/ HOD School of Physiotherapy, University of South Asia, Lahore.	Member
13.	<b>Dr. Muhammad Naveed Babar, PT</b> Principal/Associate Professor Isra Institute of Rehabilitation Sciences, Isra University Islamabad Campus	Member
14.	<b>Dr. Shaukat Ali, PT</b> Assistant Professor/Incharge Physical Therapy ShifaTameer-e-Millat University, Islamabad	Member
15.	<b>Dr. Fariha Shah, PT</b> Assistant Professor/ Head Physiotherapy Department FMH Institute of Allied Health Sciences, Lahore	Member
16.	<b>Dr. Akhtar Rasul, PT</b> Assistant Professor/Incharge Department of Physiotherapy, Sargodha Medical College, University of Sargodha, Sargodha	Member
17.	<b>Dr. Ashfaq Ahmad, PT</b> Director Academics, Faculty of Allied Health Sciences, HOD, Associate Professor, University Institute of Physical Therapy, UOL, Lahore	Member
18.	<b>Dr. Muhammad Junaid Ejaz Gondal, PT</b> Course Coordinator of Physiotherapy, KEMU, Lahore	Member
19.	<b>Dr. Syed Shakil-ur-Rehman, PT</b> Associate Professor/Principal Department of Rehabilitation Sciences, Riphah International University, Al-Mizan Campus, Rawalpindi	Member

20.	<b>Dr. Furqan Ahmed Siddiqi, PT</b> Associate Professor, Foundation University Institute of Rehabilitation Sciences, Foundation University Islamabad	Member
21.	<b>Dr. Awais Bin Inam, PT</b> Deputy Director, College of Physical Therapy Govt. College University Faisalabad	Member
22.	<b>Dr. Asif Gulzar Shaikh, PT</b> Deputy Director, Institute of Physiotherapy and Rehabilitation Sciences, Liaquat University of Medial and Health Sciences, Jamshoro Sindh	Member
23.	<b>Dr. Syed Murtaza, PT</b> Deputy Director, Department of Physiotherapy, Peoples University of Medical and Health Sciences for women, Nawabshah	Member
24.	<b>Dr. Hassan Anjum Shahid, PT</b> Assistant Professor/HOD Imperial College of Business Studies, Lahore	Member
25.	<b>Dr. Noreen Zia, PT</b> Assistant Professor, FMH Institute of Allied Health Sciences, Lahore	Member
26.	<b>Dr. Ali Shahzad, PT</b> Assistant Professor, Lahore College of Physical Therapy, LMDC, Lahore	Member
27.	<b>Dr. Sumaiyah Obaid, PT</b> Assistant Professor, Department of Physical Therapy and Rehabilitation Sciences, University of Faisalabad, Faisalabad	Member
28.	<b>Dr. Hafiz Muhammad Asim, PT</b> Associate Professor/ Program Coordinator t-DPT, University of Health Sciences, Lahore	Secretary



## PROCEEDINGS OF NCRC

### A. MINUTES OF THE FIRST MEETING OF NCRC SEPTEMBER 2015

**Title:** Preliminary meeting of NCRC to Review the DPT Curriculum

**Venue:** Higher Education Commission, Regional Centre, Lahore

**Dated:** 16<sup>th</sup> -18<sup>th</sup> September 2015

**Day-1 (16<sup>th</sup> September, 2015)**

The meeting started at 9:15 am with Recitation from Holy Quran by Dr. Naveed Babar. Mr. Riazul Haq, Assistant Director Curriculum Revision HEC welcomed the forum, gave introductory speech in which he informed that the curriculum of multiple academic discipline are being revised on 3yearly basis. The Assistant Director highlighted that NCRC cannot make any changes in the compulsory subjects like English, Islamiat and Pakistan studies.

The house with consensus selected **Dr. Asghar khan as Convener & Dr. Hafiz Muhammad Asim as Secretary of the committee.**

The convener appointed Dr. Shahid Ahmad Heera for recording of minutes.

The Convener informed that the first exercise on curriculum development of Doctor of Physical Therapy was conducted in 2011; he encouraged house to review the existing curriculum and give suggestions for improvement accordingly. Following are the suggestions made by the members:

- It was suggested by the house that 60% marks in intermediate (pre-medical) should be the basic eligibility criteria for admission in DPT program.
- Emphasis on integration in curriculum was emphasized by many members.
- Modular system of education was recommended as being done in other major health care disciplines.
- The need for redistribution of subjects was suggested with revision and reduction in content of English by one of the members.
- Practical description of Cardiopulmonary Physical Therapy was recommended to be included in the revised curriculum.
- Dr Muhammad Naveed Babar presented report of a qualitative study conducted on DPT curriculum in Isra University, Islamabad campus, the recommendations included that objectives based

course outline should be designed and course content related to Medicine, Surgery and Manual Therapy need modification.

- Suggestions were made regarding the revision in contents of Radiology and Physical Agents and Electrotherapy.
- Need to avoid overlapping of contents and development of a mechanism of student's feedback for evaluation of content of each course in all Physical therapy institutions was emphasized.
- It is proposed that institution should focus to upgrade their implementation of curriculum to be problem/outcome based.
- The house was informed by one of the members that FSBPT declared the existing curriculum at par with international standards according to Course Work Tool-5.
- Dr. Hafiz Muhammad Asim presented complete document of Revised curriculum of all subjects based on division of Learning Outcomes & Table of Specifications of UHS.
- After detailed discussions, the Scheme of Studies & credit hours for each semester was revised with consensus in the house (the copy of revised scheme of studies is attached herewith), meeting ended at 4:00 pm.

#### **Day-2 (17<sup>th</sup> September, 2015)**

- Meeting started with recitation from the Holy Quran by Dr. Asghar Khan. Madam Ghayur Fatima (Director Curriculum division HEC Islamabad) was briefed about the activities of Day-1 and gave her expert opinion and guidelines for further progression of process.
  - The Technical session started with review of Course Contents of all subjects in sequential, suggested changes were simultaneously incorporated and got approved by the house.
  - **Subject specialist sub-Committees** were constituted for those subjects that needed major revision and the committee members were asked to submit their recommendations by the end of the day. Following are the committees
1. Recommended/Reference Books Review Committee: Dr. Shakeel ur Rehman, Dr. Junaid Ijaz Gondal, Dr. Shaukat Ali & Dr. Hassan Anjum Shahid.
  2. Exercise Physiology Review Committee: Dr. Sumaira, Dr Ashfaq Ahmad, Dr Ahsan Javed & Dr Akhtar Rasool.
  3. Biomechanics & Ergonomics Review Committee: Dr Akhtar Rasool, Dr Khalid, Dr Ali Shahzad & Dr Awais Bin Inam.
  4. Electrotherapy Modalities Committee: Dr Naveed Babar & Dr Sumaira.
  5. Ethics, Scientific Inquiry, Cultural Competence and Educational Techniques: Dr M. Asif Sheikh.
  6. Burns: Dr Sumaira Farooqui.

- Curriculum contents were thoroughly discussed and it was decided that contents will be finalized after review in final next day's session. The meeting ended at 4:15 pm.

**Day-3 (18<sup>th</sup> September, 2015)**

- Meeting started with Recitation from the Holy Quran by Dr. Hafiz Muhammad Asim.
- The Convener & Secretary provided the line of action for working groups selected that comprises of 2 persons each per Semester for final review of the contents.

<b>SEMESTER</b>	<b>MEMBERS</b>
<b>FIRST</b>	Dr Junaid Ijaz Gondal & Dr Ahsan Javed
<b>SECOND</b>	Dr Saeed Akhtar & Dr Ashfaq Ahmad
<b>THIRD</b>	Dr Muhammad Khan, Dr Asif Gulzar & Dr Khalid Aziz
<b>FOURTH</b>	Dr Shaukat Ali & Dr Naveed Babar
<b>FIFTH</b>	Dr Hassan Abbas & Dr Sumaira Farooqi
<b>SIXTH</b>	Dr Shakeel Ur Rehman & Dr Saleha Saleem Bokhari
<b>SEVENTH</b>	Dr Fariha Shah, Dr Furqan Ahmad & Dr Noreen Zia
<b>EIGHTH</b>	Dr Zahid Bhatti & Dr Hassan Anjum
<b>NINTH</b>	Dr Muhammad Asif & Dr Sumaiyah Obaid
<b>TENTH</b>	Dr Akhtar Rasool & Dr Awais Bin Inam

- The proposed revised curriculum was approved after detailed discussion in the house and submitted for further processing.
- Ms. Ghayyur Fatima thanked the house for their contribution for the development and improvement of the profession.
- Convener and the Secretary also thanked the house for their contributions.

## **B. MINUTES OF THE FINAL MEETING OF NCRC MARCH 2016**

**Title:** final Meeting of NCRC to Review the DPT Curriculum

**Venue:** Higher Education Commission, Regional Centre, Peshawar

**Dated:** 02'- 04' March 2016

### **Day-1 (02 March, 2016)**

- The meeting started at 9:00 am with Recitation from holy Quran by Dr. Hafiz Asim<sub>PT</sub>.
- Mr. Riaz-ul-Haq, Assistant Director Curriculum HEC welcomed the members of the committee. , Assistant Director Curriculum HEC explained that the purpose of the meeting is to finalize the revision of the National Curriculum of DPT. He further highlighted that NCRC cannot make any changes in the Compulsory subjects like Introduction to computer, Statistics, English, Islamiat and Pakistan studies that are already incorporated in all graduate programs across Pakistan.
- Dr. Asghar Khan <sub>PT</sub> chaired the meeting as Convener & Dr. Hafiz Muhammad Asim<sub>PT</sub> as Secretary of the committee.
- Chair emphasized that the universities should be encouraged to implement the revised curriculum with full commitment.
- The Convener informed that the first meeting for the revision of curriculum of Doctor of Physical Therapy developed in 2011 was conducted in September 2015; he encouraged house to review the existing curriculum and give suggestions for improvement accordingly.
- It was agreed after discussion that the semester wise scheme of study will remain same as finalized in the last meeting.
- The secretary NCRC requested the house to present the revised curriculum with list of books by the groups allotted semester wise in the last meeting and the house review.
- On day one, three curricula were presented and changes incorporated.
- Below is the list of members presented semester wise revised curriculum on day one:

<b>SEMESTER</b>	<b>MEMBERS</b>
FIRST	Dr. AhsanJaved, <sub>PT</sub>
SECOND	Dr. SaeedAkhtar <sub>PT</sub> Dr.Ashfaq Ahmad <sub>PT</sub>
THIRD	Dr. Muhammad Khan <sub>PT</sub> , Dr. AsifGulzar <sub>PT</sub> Dr. Khalid Aziz <sub>PT</sub>

- The house ended the session with the vote of thanks to the chair.

**Day-2(03 March, 2016)**

- The meeting started at 9:00 am with Recitation from holy Quran by Dr.HaiderDarain<sub>PT</sub>.
- Revised curriculum was continued to be presented.
- The content of sociology and Molecular Biology and Genetics was updated according to the recommendations of the house.
- Suggestions and minor alterations were recommended in the rest of curricula that were incorporated accordingly.
- Following members presented the revised curriculum on Day-2:

<b>FOURTH</b>	Dr. Shaukat Ali <sub>PT</sub>
<b>FIFTH</b>	Dr. Hassan Abbas <sub>PT</sub> Dr.Sumaira I Farooqui <sub>PT</sub>
<b>SIX</b>	Dr.Shakeel-ur-Rehman <sub>PT</sub> Dr.SalehaSaleemBokhari <sub>PT</sub>
<b>SEVENTH</b>	Dr.Furqan Ahmad <sub>PT</sub>
<b>EIGHTH</b>	Dr. Mohammad Ashfaq <sub>PT</sub>
<b>NINETH</b>	Dr .Asif Sheikh <sub>PT</sub> Dr. SumaiyahObaid <sub>PT</sub>
<b>TENTH</b>	Dr. AkhtarRasool <sub>PT</sub> DrAwais Bin Inam <sub>PT</sub>

**Day-3 (04 March, 2016)**

- Revised formatted curriculum was re-reviewed thoroughly, discussed in detail and approved by the house.
- Recommendations were made after a detail discussion for the improvement of the DPT program.
- Meeting ended with the vote of thank to higher education commission for its commitment for the betterment of profession by providing the forum.

**RECOMMENDATIONS**

The following are the recommendations of the committee for HEC to be implemented;

1. The Committee members strongly recommended that entry level education after F.Sc./ HSSC or equivalent (Pre Medical with minimum 60% marks) will be the basic entry level requirement for the admission in Doctor of Physical Therapy (DPT).
2. House recommended that only those graduates will be eligible to use the nomenclature of Physiotherapist or Physical Therapist who have completed their B.Sc. Physical Therapy or Doctor of Physical Therapy. The Title Doctor will be used only by those who have done DPT or those who have done t-DPT or PP-DPT after B.Sc. Physical Therapy.

3. Minimum requirements for launching of DPT degree program is recommended to be:
  - a) Minimum 200 bedded hospital with well-equipped physical therapy department.
  - b) Faculty to student ratio of 1:12
  - c) Head of the program must be Physical Therapist
  - d) Total intake will be maximum 100 students in a year.
4. The Committee members suggested that the advanced degrees after Doctor of Physical Therapy (DPT) should be MS/ M.Phil and PhD in Physical Therapy.
5. Committee has suggested that HEC should facilitate to formulate an accreditation council comprising of members from the Physical therapy academic Institutions to standardize the DPT program in all public and private sector universities of Pakistan; only after which an associate program may be started.
6. Certificate courses of 3-6 months duration are recommended to be started in sub specialties of physical therapy after DPT.
7. House recommended one year paid House job/internship for DPT graduate in minimum 200 bedded general hospitals.

## **RATIONALE**

Physical therapy is an essential segment of modern health care system. It is a —science of healing and art of caringll. It pertains to the clinical examination, evaluation, assessment, diagnosis and treatment of musculoskeletal, Neurological, Cardio-Vascular and Respiratory systems' functional disorders including symptoms of pain, edema, physiological, structural and psychosomatic ailments. It 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 PROGRAMME:**

**THE PURPOSE OF THE DOCTOR OF PHYSICAL THERAPY PROGRAMME (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 PROGRAMME:**

**GRADUATES OF THE DOCTOR OF PHYSICAL THERAPY PROGRAMME 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. 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.
2. 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.

3. Engage in reflective practice through sound clinical decision making, critical self-assessment and commitment to lifelong learning.
4. 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.
5. 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.
6. Demonstrate leadership, management, and communication skills to effectively participate in physical therapy practice and the health care team.
7. Incorporate and demonstrate positive attitudes and behaviours to all persons.
8. Demonstrate the professional and social skills to adapt to changing health care environments to effectively provide physical therapy care.



**SCHEME OF STUDIES  
DOCTOR OF PHYSICAL THERAPY (DPT)**

<b>FIRST PROFESSIONAL YEAR</b>	
<b>FIRST SEMESTER</b>	
ANATOMY –I	4(3-1)
PHYSIOLOGY-I	3(2-1)
KINESIOLOGY-I	3(2-1)
ENGLISH-I (FUNCTIONAL ENGLISH)	3(3-0)
PAKISTAN STUDIES	2(2-0)
INTRODUCTION TO COMPUTER	3(2-1)
<b>Credit Hours</b>	<b>18</b>
<b>SECOND SEMESTER</b>	
ANATOMY –II	4(3-1)
PHYSIOLOGY-II	3(2-1)
KINESIOLOGY-II	3(2-1)
ENGLISH-II (COMMUNICATION SKILLS)	3(3-0)
ISLAMIC STUDIES / ETHICS	2(2-0)
SOCIOLOGY	2(2-0)
<b>Credit Hours</b>	<b>17</b>
<b>SECOND PROFESSIONAL YEAR</b>	
<b>THIRD SEMESTER</b>	
ENGLISH-III (Technical Writing & Presentation Skills)	3(3-0)
MEDICAL PHYSICS	3(2-1)
ANATOMY –III	3(2-1)
PHYSIOLOGY-III	3(2-1)
BIOMECHANICS & ERGONOMICS-I	3(3-0)
BIOCHEMISTRY I	2(2-0)
<b>Credit Hours</b>	<b>17</b>
<b>FOURTH SEMESTER</b>	
ANATOMY-IV (Neuro Anatomy)	3(2-1)
BIOMECHANICS & ERGONOMICS-II	3(2-1)
HEALTH & WELNESS	2(2-0)
BIOCHEMISTRY II	3(2-1)

EXERCISE PHYSIOLOGY	3(2-1)
MOLECULAR BIOLOGY & GENETICS	2(2-0)
<b>Credit Hours</b>	<b>16</b>
<b>THIRD PROFESSIONAL YEAR</b>	
<b>FIFTH SEMESTER</b>	
PATHOLOGY & MICROBIOLOGY I	2(2-0)
PHARMACOLOGY & THERAPEUTICS I	2(2-0)
PHYSICAL AGENTS & ELECTROTHERAPY I	3(2-1)
THERAPEUTIC EXERCISES & TECHNIQUES	3(2-1)
BIostatISTICS I	3(3-0)
BEHAVIORAL SCIENCES (PSYCHOLOGY & ETHICS)	2(2-0)
SUPERVISED CLINICAL PRACTICE I	3(0-3)
<b>Credit Hours</b>	<b>18</b>
<b>SIXTH SEMESTER</b>	
PATHOLOGY & MICROBIOLOGY II	3(2-1)
PHARMACOLOGY & THERAPEUTICS II	2(2-0)
PHYSICAL AGENTS & ELECTROTHERAPY –II	3(2-1)
BIostatISTICS II (university optional)	3(3-0)
COMMUNITY MEDICINE & REHABILITATION	3(3-0)
SUPERVISED CLINICAL PRACTICE II	3(0-3)
<b>Credit Hours</b>	<b>17</b>
<b>FOURTH PROFESSIONAL YEAR</b>	
<b>SEVENTH SEMESTER</b>	
MEDICINE I	3(3-0)
SURGERY I	3(3-0)
RADIOLOGY & DIAGNOSTIC IMAGING	3(2-1)
MUSCULOSKELETAL PHYSICAL THERAPY	3(2-1)
EVIDENCE BASED PRACTICE	3(2-1)
SUPERVISED CLINICAL PRACTICE III	3(0-3)
<b>Credit Hours</b>	<b>18</b>
<b>EIGHTH SEMESTER</b>	
MEDICINE II	3(3-0)
SURGERY II	3(3-0)

NEUROLOGICAL PHYSICAL THERAPY	3(2-1)
SCIENTIFIC INQUIRY & RESEARCH METHODOLOGY	3(2-1)
EMERGENCY PROCEDURES & PRIMARY CARE IN PHYSICAL THERAPY	3(2-1)
SUPERVISED CLINICAL PRACTICE IV	3(0-3)
<b>Credit Hours</b>	<b>18</b>
<b>FIFTH PROFESSIONAL YEAR</b>	
<b>NINTH SEMESTER</b>	
CARDIOPULMONARY PHYSICAL THERAPY	3(2-1)
PROSTHETICS & ORTHOTICS	2(2-0)
CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS	3(3-0)
MANUAL THERAPY	3(2-1)
PROFESSIONAL PRACTICE (LAWS , ETHICS &ADMINISTRATION)	2(2-0)
INTEGUMENTRY PHYSICAL THERAPY	2(2-0)
SUPERVISED CLINICAL PRACTICE V	3(0-3)
<b>Credit Hours</b>	<b>18</b>
<b>TENTH SEMESTER</b>	
OBSTETRICS & GYNAECOLOGICAL PHYSICAL THERAPY	2(2-0)
PAEDIATRIC PHYSICAL THERAPY	2(2-0)
GERONTOLOGY & GERIATRIC PHYSICAL THERAPY	2(2-0)
SPORTS PHYSICAL THERAPY	2(2-0)
SUPERVISED CLINICAL PRACTICE VI	4(0-4)
RESEARCH PROJECT	6
<b>Credit Hours</b>	<b>18</b>
<b>TOTAL CREDIT HOURS</b>	<b>174</b>
<b>Total theory/Lectures for Ten Semesters</b>	<b>130</b>
<b>Total Practical Hours for Ten Semesters</b>	<b>44</b>

**Note \***

- *This scheme of curriculum is also applicable to annual system; in which two consecutive semesters will be considered as one professional year.*
- *Credit hours distribution is as following:*

**Theory:** one credit hour shall be equal to one hour of teaching per week throughout the semester.

**Practical / lab:** one credit hour shall be equal to two hours of lab work per week throughout the semester.

**Clinical:** one credit hour shall be equal to three hours of clinical work per week throughout the semester.

**Research:** One credit hour shall be equal to three hours of research work per week throughout the semester.

### **FIRST SEMESTER**

1. ANATOMY -I
2. PHYSIOLOGY-I
3. KINESIOLOGY-I
4. ENGLISH-I (FUNCTIONAL ENGLISH)
5. PAKISTAN STUDIES
6. INTRODUCTION TO COMPUTER

### **DETAILS OF COURSES**

#### **ANATOMY- I**

**CREDIT HOURS 4(3-1)**

#### **COURSE DESCRIPTION**

The focus of this course is an in-depth study and analysis of the general and regional organization of the human body. Emphasis is placed upon structure and function of human movement. A comprehensive study of human anatomy histology, embryology, 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, projected materials and radiographs are utilized to identify anatomical landmarks and configurations of the upper limb

#### **LEARNING OBJECTIVES**

- Define basic technical terminology and language associated with anatomy
- Describe the structure, composition and functions of the organs in the human body
- Comprehend the concepts (& associated principles) for each general type of anatomical structures
- Demonstrate skills in the surface markings of clinically important structures, on normal living bodies and the correlation of structure with function
- Describe concepts of embryology and histology
- Identify histological slides of the human body
- Describe the interdependency and interactions of the structural and functional components of upper limb

### **COURSE CONTENTS**

## **GENERAL ANATOMY AND FUNCTIONAL 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
- Classification
- 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
- Raphes
- Ligaments
- Condyle
- Epicondyle
- Ridge
- Tuberosity

- Tubercle
- Foramen
- Canal
- Groove
- Process
- Spur

### **THE JOINTS**

- Introduction
- Functional classification
- 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 nerve
- Typical spinal nerve
- Microscopic picture of nerve
- Introduction of autonomic nervous system
- Anatomy of neuromuscular junction

### **GENERAL HISTOLOGY**

- Cell
- Epithelium
- Connective tissue
- Bone
- Muscle tissue
- Nerve tissues

- Blood vessels
- Skin and appendages
- Lymphatic organs

#### **GENERAL EMBRYOLOGY**

- Male and female reproductive organs
- Cell division and Gametogenesis
- Fertilization, cleavage, blastocyte 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

#### **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

#### **DEMONSTRATION**

- Shoulder joint, attached muscles and articulating surfaces
- Elbow joint
- Wrist joint
- Radioulnar joint
- MCP and IP joints
- Acromioclavicular joint
- Sternoclavicular joint
- Brachial plexus
- Blood supply of brain
- Structure of bones

#### **LAB WORK**

During study of this course, emphasis should be given on applied aspects, practical histology, radiological anatomy, surface anatomy and cross-sectional anatomy of the region covered in the respective semester /year

#### **Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements. The practical note book shall contain a record of the surface landmarks and cross-sectional views of parts which student would have observed

#### **RECOMMENDED BOOKS**

1. Gray's Anatomy by Prof. Susan Standing 41<sup>st</sup> Ed., Elsevier.
2. Clinical Anatomy for Medical Students by Richard S. Snell.
3. Clinically Oriented Anatomy by Keith Moore.
4. General Anatomy by Prof.
5. Ghulam Ahmad, latest Ed.
6. Clinical Anatomy by R. J. Last, Latest Ed.
7. Cunningham's Manual of Practical Anatomy by G. J. Romanes, 15th Ed., Vol-I, II and III.
8. The Developing Human. Clinically Oriented Embryology by Keith L. Moore, 6th Ed.
9. Wheater's Functional Histology by Young and Heath, Latest Ed.
10. Medical Histology by Prof. Laiq Hussain.
11. Neuroanatomy by Richard S. Snell 7<sup>th</sup> edition.
12. Jancquera textbook of histology



13. Colour atlas of histology by defiero
14. Langman`s embryology
15. Clinically oriented developmental anatomy by k.l.moore

## **PHYSIOLOGY- I**

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

### **COURSE DESCRIPTION**

The course is designed to study the function of the human body at the cellular, tissue and systems levels. The course will help students in understanding the complexities of the cells, tissues, and major organs and systems of the human body, concentrating on basic mechanisms underlying human life processes and important diseases affecting normal human function

### **LEARNING OBJECTIVES**

- Define the terminology related to the structure and function of the human body systems
- Compare and contrast the structural and functional characteristics of the various human body cells
- Describe basic chemical concepts and principles as they apply to the structure and functioning of the blood and neuromuscular system
- Analyze the interrelationships of body organ systems, homeostasis, and the complementarity of structure and functioning of the blood and neuromuscular system
- Demonstrate advance techniques to investigate the body and interpret data to be used for diagnosis and treatment
- Define the principles behind medical instrumentation and their usage

### **COURSE CONTENTS**

#### **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
- 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

### **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

### **LAB WORK**

- Use of the microscope
- Determination of haemoglobin
- Determination of erythrocyte sedimentation rate
- Determining packed cell volume
- Measuring bleeding and clotting time
- RBC count
- Red cell indices
- WBC count
- Leukocyte count
- Prothrombin and thrombin time.
- Blood indices in various disorders
- Clotting disorders
- Blood grouping and cross matching

### **Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements

### **RECOMMENDED BOOKS**

1. Textbook of Physiology by Guyton and Hall, 12<sup>th</sup> Ed.
2. Review of Medical Physiology by William F. Ganong, 23<sup>rd</sup> Ed.
3. Physiology by Berne and Levy, 6<sup>th</sup> Ed.
4. Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D.Richards 4<sup>th</sup> Ed.
5. Physiological Basis of Medical Practice by John B. West and Taylor, 12<sup>th</sup> Ed.

### **KINESIOLOGY- I**

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

#### **COURSE DESCRIPTION**

Course covers the principles of mechanics and anatomy in relation to human movement facilitating students to apply kinesiological evaluation and treatment of muscular imbalance or derangement in their clinical practice. It consists of evaluation of muscular function and group movements of muscle in relation to force of gravity and manual resistance. By becoming familiar with the knowledge of basic mechanical and physiological mechanisms, students will be more confident and competent in using them in use of exercises to promote physical rehabilitation

#### **LEARNING OBJECTIVES**

- Define the mechanical principles and their application on the human body
- Describe concept of movement and how it occurs in body
- Demonstrate fundamental position, their effects and uses
- Explore fundamental skills to differentiate between a good and bad posture and to use technique for re-education
- Develop critical thinking ability in students on how and why to select which technique in a specific case, suitable for its rehabilitation
- Describe muscular anatomy, its function against gravity and manual resistance

#### **COURSE CONTENTS**

##### **INTRODUCTION TO KINESIOLOGY**

- Definition of Physical Therapy and Rehabilitation
- Definition of kinesiology

##### **MECHANICS**

- Mechanical Principles and Mechanics of Position
- Force - force system – Description of units
- Gravity: Center of gravity and line of gravity
- Level of gravity

- Equilibrium
- Fixation and Stabilization
- Mechanics of movement
- Axes / Planes
- Speed
- Velocity
- Acceleration
- Momentum
- Inertia
- Friction
- Lever - types – application in human body
- Pulley - types – application in human body
- Angle of pull

#### **INTRODUCTION TO MOVEMENT**

- Types of movement and posture
- Patterns of movement
- Timing in movement
- Rhythm of movement
- The nervous control of movement

#### **STARTING POSITIONS**

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

#### **POSTURE**

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

#### **MUSCLE STRENGTH AND MUSCLE ACTION**

- Types of Muscles contraction

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

#### **LAB WORK**

- Fundamentals of muscle testing
- Methods of muscle recording
- Basic muscle grading system
- Evaluation of posture
- Regional upper limb muscle testing
- Practical demonstrations of muscles work and its ranges
- Practical demonstrations of various fundamental positions and posture analysis.

#### **Note**

The students are expected to make a practical note book. The practical note book is a collection of evidence that learning has taken place and also a reflective record of student's achievements

#### **RECOMMENDED BOOKS**

1. Practical exercise therapy by Margaret Hollis 3<sup>rd</sup> Ed. illustrated, reprint, Blackwell Scientific
2. Brunnstrom's Clinical Kinesiology 6<sup>th</sup> Ed. By. Peggy A Houglum, Dolores B Bertoti
3. Clinical kinesiology and anatomy 5<sup>th</sup> Ed. by Lynn S Lippert
4. Joint structure and function: a comprehensive analysis 5<sup>th</sup> Ed. by: Pamela. K. Levangie and Cynthia. C. Norkin.
5. Muscle function testing by: Cunningham and Daniel. 2nd, illustrated
6. Human movement explain by kimjonas and karenbaker
7. The principles of exercise therapy by: M. Dena Gardiner, 4<sup>th</sup> Edition.

#### **ENGLISH- I**

#### **FUNCTIONAL ENGLISH**

**CREDIT HOURS 3(3-0)**

#### **COURSE 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**

#### **Functional English 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

**Writing**

1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
2. Reading/Comprehension
3. Reading. Upper Intermediate. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
4. Speaking.

**PAKISTAN STUDIES (COMPULSORY)****CREDIT HOURS 2(2-0)****COURSE 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 CONTENTS****HISTORICAL PERSPECTIVE**

- Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-e-Azam Muhammad Ali Jinnah
- Factors leading to Muslim separatism

**PEOPLE AND LAND**

- Indus Civilization • Muslim advent
- Location and geo-physical features

**GOVERNMENT AND POLITICS IN PAKISTAN**

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

**CONTEMPORARY PAKISTAN**

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

### **RECOMMENDED BOOKS**

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

### **INTRODUCTION TO COMPUTERS CREDIT HOURS: 3(2-1)**

#### **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

#### **COURSE CONTENTS**

- 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

#### **RECOMMENDED BOOKS**

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

#### **SECOND SEMESTER**

1. **ANATOMY-II**
2. **PHYSIOLOGY-II**
3. **KINESIOLOGY-II**
4. **ENGLISH-II (COMUNICATION SKILLS)**
5. **ISLAMIC STUDIES/ETHICS**
6. **SOCIOLOGY**

#### **ANATOMY- II**

**CREDIT HOURS 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 manikins/smart board systems supplemented with the study of charts, models, prosected materials and radiographs are utilized to identify

anatomical landmarks and configurations of the lower limb, abdomen and pelvis

### **LEARNING OBJECTIVES**

- Describe gross anatomy of neuro-musculoskeletal and circulatory system of lower limb, abdominal wall and pelvis.
- Demonstrate anatomical landmarks and configuration of the lower limb, abdominal wall and pelvis through dissection/identification of structures in the manicans / smart board systems supplemented with the study of charts, models, prosected materials, and radiographs.
- Describe major stages of embryological development of the lower limb with development of the neurological and vascular supplies to the lower limb.

### **COURSE CONTENTS**

#### **LOWER LIMB OSTEOLOGY**

- Detailed description of all bones of lower limb and pelvis along with their markings

#### **MYOLOGY**

- Muscles of gluteal region
- Muscles around hip joint
- Muscles of thigh
- 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

### **EMBRYOLOGY**

- Introduction to developing human
- Gametogenesis, Spermatogenesis, Oogenesis
- Fertilization and phases of fertilization
- Germ layers
- Development of limbs, Muscular system and Nervous system

### **LAB WORK**

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.

### **Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements

### **RECOMMENDED BOOKS**

1. Gray's Anatomy by Prof. Susan Standing 41<sup>st</sup> Ed., Elsevier.
2. Clinical Anatomy for Medical Students by Richard S. Snell.
3. Clinically Oriented Anatomy by Keith Moore.
4. General Anatomy by Prof. Ghulam Ahmad, latest Ed.
5. Clinical Anatomy by R. J. Last, Latest Ed.
6. Cunningham's Manual of Practical Anatomy by G. J. Romanes, 15th Ed., Vol-I, II and III.
7. The Developing Human. Clinically Oriented Embryology by Keith L. Moore, 6th Ed.
8. Wheater's Functional Histology by Young and Heath, Latest Ed.

9. Medical Histology by Prof. Laiq Hussain.
10. Neuroanatomy by Richard S. Snell 7<sup>th</sup> edition.
11. Jancquera textbook of histology
12. Colour atlas of histology by defiero
13. Langman`s embryology
14. Clinically oriented *developmental anatomy by k.l.moore*

## **PHYSIOLOGY- II**

**CREDIT HOURS 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. These topics are addressed by a consideration of the cardiovascular, gastrointestinal, and endocrinological systems. The integrative nature of physiological responses in normal function and disease is stressed throughout the course

### **LEARNING OBJECTIVES**

- Describe functions of gastrointestinal tract, endocrinology and cardiovascular system
- Describe physiology at the molecular, metabolic/cellular, tissue and systems levels
- Differentiate the physiological responses in normal function and disease stages

### **COURSE CONTENTS**

#### **GASTROINTESTINAL TRACT**

- General function of gastrointestinal tract
- Enteric nervous system
- Control of gastrointestinal mobility and secretions
- 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
- Dysphagia
- Physiological basis of acid peptic disease

## **CARDIOVASCULAR SYSTEM**

- Heart and circulation
- Function of cardiac muscle
- Cardiac pacemaker and cardiac muscle contraction
- Cardiac cycle
- ECG: recording and interpretation
- Common arrhythmias
- 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

## **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 and control of blood sugar
- The endocrine functions of the kidney and Physiology of growth.

## **LAB WORK**

- Clinical significance of cardiac cycle, correlation of ECG and heart sounds
- Examination of arterial pulses
- Arterial blood pressure
- Effects of exercise and posture on blood pressure

- Cardiopulmonary resuscitation (to be coordinated with the department of medicine)

**Note**

The students are expected to make a sketch book. The sketch book is a collection of evidence that learning has taken place. It is a reflective record of achievements

**RECOMMENDED BOOKS**

1. Textbook of Physiology by Guyton and Hall, 12<sup>th</sup> Ed.
2. Review of Medical Physiology by William F. Ganong, 23<sup>rd</sup> Ed.
3. Physiology by Berne and Levy, 6<sup>th</sup> Ed.
4. Human Physiology: The Basis of Medicine by Gillian Pocock, Christopher D.Richards 4<sup>th</sup> Ed.
5. Physiological Basis of Medical Practice by John B. West and Taylor, 12<sup>th</sup> Ed.

**KINESIOLOGY-II**

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

**COURSE DESCRIPTION**

The course covers the types of human motions in relation to axes and planes. It further explores the inter-relationship among kinematic variables and motion analysis

**LEARNING OBJECTIVES**

- Describe the ROM and types of movements & exercises.
- Differentiate among agonists, antagonists, and synergists integrating the knowledge learned with human motion occurring during daily activities.
- Demonstrate relaxation techniques, derived positions and effective use of walking aids.
- Demonstrate coordinated and incoordinated movements

**COURSE CONTENTS**

**TYPES OF MOVEMENT & EXERCISES**

- Voluntary & involuntary movements
- Active and Passive movements
- Classification & techniques of free exercises
- The principles, techniques and effects of assisted exercises
- The principles, techniques and effects of assisted resisted exercises
- The principles, types, techniques and effects of resisted exercises
- Variation of the power of the muscles in different parts of their range

- Progressive Resistance Exercise
- Reflex movement
- The reflex arc
- The stretch reflex
- The righting reflexes
- The postural reflexes
- Effects and uses of reflex movement

#### **PASSIVE MOVEMENT**

- The principles, types, techniques and effects of passive exercises
- Definition of Passive manual mobilization and manipulations
- Controlled sustained stretching, Principles and Effects and uses

#### **RELAXATION**

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

#### **DERIVED POSITIONS**

- Purpose of derived positions
- Positions derived from standing by: alteration of arms, 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 Quadra pod
- Frames

### **LAB WORK**

- Demonstrations of the techniques of active, passive movements
- Demonstrations of relaxation procedures
- Demonstrations of various derived positions
- PRE program
- Manual muscle testing - Regional Lower limb muscle testing

### **Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements

### **RECOMMENDED BOOKS**

1. Practical exercise therapy by Margaret Hollis 3<sup>rd</sup> Ed. illustrated, reprint, Blackwell Scientific
2. Brunnstrom's Clinical Kinesiology 6<sup>th</sup> Ed. By. Peggy A Hougum, Dolores B Bertoti
3. Clinical kinesiology and anatomy 5<sup>th</sup> Ed. by Lynn S Lippert
4. Joint structure and function: a comprehensive analysis 5<sup>th</sup> Ed. by: Pamela. K. Levangie and Cynthia. C. Norkin.
5. Muscle function testing by: Cunningham and Daniel. 2nd, illustrated
6. Human movement explain by kimjonas and karenbaker
7. *The principles of exercise therapy by: M. Dena Gardiner, 4<sup>th</sup> Edition.*



## **ENGLISH II (COMMUNICATION SKILLS)CREDIT HOURS 3(3-0)**

### **COURSE 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**

##### **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.

##### **Writing**

1. Writing. Intermediate by Marie-ChristineBoutin, Suzanne Brinand and Francoise 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).

### **Reading**

1. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 019 453403 0.
2. Reading and Study Skills by John Langan
3. Study Skills by RiachardYorky.

## **ISLAMIC STUDIES / ETHICS**

**CREDIT HOURS 2(2-0)**

### **COURSE OBJECTIVES**

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

### **COURSE CONTENTS**

#### **INTRODUCTION TO QURANIC STUDIES**

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

#### **STUDY OF SELECTED TEXT OF HOLLY QURAN**

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

#### **STUDY OF SELECTED TEXT OF HOLLY QURAN**

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

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

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

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

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

#### **INTRODUCTION TO SUNNAH**

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

#### **SELECTED STUDY FROM TEXT OF HADITH**

##### **INTRODUCTION TO ISLAMIC LAW & JURISPRUDENCE**

- Basic Concepts of Islamic Law & Jurisprudence
- History & Importance of Islamic Law & Jurisprudence
- Sources of Islamic Law & Jurisprudence
- Nature of Differences in Islamic Law
- Islam and Sectarianism.

##### **ISLAMIC CULTURE & CIVILIZATION**

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

##### **ISLAM & SCIENCE**

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

##### **ISLAMIC ECONOMIC SYSTEM**

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

##### **POLITICAL SYSTEM OF ISLAM**

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

#### **ISLAMIC HISTORY**

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

#### **SOCIAL SYSTEM OF ISLAM**

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

#### **RECOMMENDED BOOKS**

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 YousafIslahi,"
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)

#### **SOCIOLOGY**

**CREDIT HOURS: 2(2-0)**

#### **COURSE DESCRIPTION**

The course focuses at providing basic concepts and models of health sciences. The psycho-socio and cultural assessment of health seeking behavioral patterns and the role of therapeutic management group will be examined. The indigenous healing system and contemporary medical system will be studied. It makes them realize the importance of the relationship of the physical therapist and the patient

#### **LEARNING OBJECTIVES**

- Comprehend basic knowledge and concepts of sociology
- Describe relationship among impact of group, culture and environment on the behavior and health of patients

- Describe social aspects of health & illness and emphasize importance of the relationship of the physical therapist with patient, along critical perspectives of contemporary issues in health

## **COURSE CONTENTS**

### **INTRODUCTION**

- Medical Sociology, and the field of medical sociology
- Contribution of sociology to medicine.

### **HEALTH AND DISEASE**

- Social definition of illness
- Health and disease as deviant behavior
- Social cultural causes of disease

### **SOCIOLOGICAL PERSPECTIVES ON HEALTH & ILLNESS**

- Functionalist Approach
- Conflict Approach
- Interactionist Approach
- Labeling Approach

### **ILLNESS BEHAVIOR AND PERCEPTIONS OF ILLNESS**

- Illness Behavior
- Cultural Influences on Illness Behavior
- Sociological and Demographic Influences
- Lay Beliefs About Health and Illness
- Self medication
- Sick Role

### **SOCIAL DETERMINANTS OF HEALTH**

- The Social Gradient
- Stress
- Early Life
- Life Expectancy
- Social support networks
- Education and literacy
- Employment/Working conditions
- Social environments
- Addiction
- Food
- Transport

### **PATIENT AND PHYSICAL THERAPIST**

- Physical Therapist s view of disease and the patient

- Patient's perspective of illness
- Patient Physical Therapist relationship
- Patient-nurses relation

#### **SOCIOLOGY OF MEDICAL CARE**

- Hospitals
- Origin and development.
- Hospitals as social organization: problems of Quackery.
- Interpersonal relationship in medical settings.
- Mental illness in sociological perspective.
- Complementary & alternative Medicine (CAM)

#### **RECOMMENDED BOOKS**

1. Sociology for Physiotherapists(2006) by Bid Dibyendunarayan Jaypee publisher
2. A.P Dixit (2005) Global Hiv/Aids Trends, Vista International Publications house New Delhi;
3. Diarmuid O Donovan (2008) The State of Health Atlas University of California Press;
4. G.C. Satpalhy (2003) Prevention of Hiv/Aids & Drug abuse, isha Books, New Delhi.
5. Global Health Challenges for Human Security (ed.) Lincoln Chen et el. Global Equity. UK 2003.
6. Jai P Narain (2004) Aids in Asia the challenge a head , Sage Publications New Delhi;
7. Julia A Ericksen (2008) Taking charge of Breast Cancer University of California Press;
8. Meena Sharma (2006) Aids, Awareness Through Community Participation Kalpaz Publications Delhi;
9. P Dixit (2005) Global HIV/AIDS Trends, Vista International Publishing House Delhi 110053;
10. Rose Weitz (2004) The Sociology of health, Illness & health care a critical approach Thomson wads worth.
11. Rubina Sehgal(2004)The Trouble Times; Sustainable Development in the age of extreme. Islamabad.

#### **THIRD SEMESTER**

1. **ENGLISH-III (Technical Writing and Presentation Skills)**
2. **MEDICAL PHYSICS**
3. **ANATOMY-III**
4. **PHYSIOLOGY-III**
5. **BIOMECHANICS & ERGONOMICS-I**
6. **BIOCHEMISTRY-I**

#### **ENGLISH-III**

## **(TECHNICAL WRITING AND PRESENTATION SKILLS)**

**CREDIT HOURS 3(3-0)**

### **LEARNING OBJECTIVES**

Enhance language skills and develop critical thinking

### **COURSE CONTENTS**

#### **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 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.

#### **Presentation Skills**

#### **Reading**

1. The Mercury Reader. A Custom Publication. Compiled by Northern 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)

**MEDICAL PHYSICS CREDIT HOURS: 3(2-1)**

### **COURSE DESCRIPTION**

This course will cover the basic principle of physics which are applicable in medical equipment used in Physical therapy. It also covers the fundamentals of currents, sound waves, electromegnetic radiations and their effects & application in physical therapy

### **LEARNING OBJECTIVES**

- Describe basic principles of physics used in electromedical equipment
- Define laws of physics various aspect of physical phenomena and their interaction with human body
- Descibe basic concepts of electricity, its laws, magnetism, electro mechanics and related theories
- Explain fundamentals of low, medium and high frequency currents, heat, electromagnetic radiations and sound waves.
- Demonstrate safety skills in biomedical instruments and radiation protection

### **COURSE CONTENTS**

#### **ELECTRICITY AND MAGNETISM**

- Structure of an atom
- Electron Theory, Conductors & Insulators
- Conduction& Convection

#### **STATIC ELECTRICITY**

- Charging by conduction and Induction
- Electrostatic Fields
- Capacitors, types of capacitors
- 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 units
- Resistance and types
- Chemical effects of a Current
- Types of Current
- Cell and Batteries
- Simple Voltage 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**

- Magnetic effect of an electric current
- Moving coil volt meter and Ammeter
- Measurement of high frequency and alternate current withmeters
- Electromagnetic induction
- Faradays law
- Mutual and self-Induction
- Eddy currents
- Transformers
- Construction and types
- Static and auto Transformer

### **ELECTRO MECHANICS**

- Current for treatment
- Rectification
- Rectification of A.C
- Half wave and full wave Rectification
- Valve rectification circuits and metal rectifier
- Surging of current
- Vibrations and Multivibrators circuit

### **CLASSIFICATION OF CURRENTS (OVERVIEW)**

#### **LOW FREQUENCY CURRENT**

- Sinusoidal current
- Faradic current
- Galvanic current (constant and interrupted)
- Diadynamic current TENS
- Super imposed current and their graphical representation.

#### **MEDIUM FREQUENCY CURRENT**

- Interferential current
- Russian current.

#### **HIGH FREQUENCY CURRENT**

- 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 temperature 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
- 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
- Internal and external hazards
- Main principle to control external hazard
- Distance and shielding

### **LAB WORK**

- Specify resistance by using the potential divider
- Verify the joules law of electrical methods
- Calibrate a thermo couple and an unknown temperature
- Find the acceleration due to gravity by simple pendulum
- Verify the law of reflection of light
- Verify the law of refraction of light
- Verify the refraction index of glass using rectangular slab

### **RECOMMENDED BOOKS**

1. Clayton's Electrotherapy and actinotherapy by: P. M Scott.
2. Medical physics for physical therapists by: A. D 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

### **ANATOMY-III**

**CREDIT HOURS: 4(3-1)**

#### **COURSE DESCRIPTION**

The focus of this course is an in-depth and comprehensive study of human anatomy with emphasis on the head and neck, face and skull. Identify anatomical structures within the thorax with emphasis on structures of thoracic wall and thoracic cavity. Dissection and identification of structures in the manikins/smart board system supplemented with the study of charts, models, prosected materials and radiographs are utilized to identify anatomical landmarks and configurations of the head and neck, face, skull and thorax.

#### **LEARNING OBJECTIVES**

- Describe and illustrate human anatomy related to head and neck, face, skull and thoracic cavity
- Identify joints, muscles, nerves, veins, arteries and other anatomical structures of head and neck, face and skull
- Identify anatomical structures of the thoracic wall and thoracic cavity

#### **COURSE CONTENTS**

##### **THE HEAD AND 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)
- Joints 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
- Muscles of eye

#### **THE SKULL**

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

#### **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

### **LAB WORK**

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

#### **Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements

### **RECOMMENDED BOOKS**

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

### **PHYSIOLOGY-III**

**CREDIT HOURS: 3(2-1)**

#### **COURSE DESCRIPTION**

The course is designed to study the function of the human body with emphasis on function of human respiratory system, nervous system, reproductive system, body fluids and renal system. These topics are addressed by a consideration of clinical and applied physiology in relation to clinical modules and practice

#### **LEARNING OBJECTIVES**

- Describe major functions of the respiratory system
- Explain major functions of central and peripheral nervous
- Discuss major functions of male and female reproductive
- Describe major functions body fluids and renal system and relate this to clinical practice

#### **COURSE CONTENTS**

## **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

## **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

## **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 estrogen, 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

#### **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

#### **LAB WORK**

##### **RESPIRATORY SYSTEM**

- Stethography
- Breath sounds
- Respiratory rate
- Lung function tests

##### **NERVOUS SYSTEM**

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

**Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements

**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, 12thEd.

**BIOMECHANICS AND ERGONOMICS – ICREDIT HOURS: 3(3-0)****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

**LEARNING OBJECTIVES**

- Define concepts and terminology within the area of biomechanics
- Describe statics, kinematics and kinetics in human movement
- Analyze and describe the motion of a body or system using qualitative and quantitative approaches
- Demonstrate an understanding of how changes of movement patterns and techniques will influence the load on human tissues of the musculoskeletal system during movement
- Apply knowledge of the underlying musculoskeletal principles and concepts of biomechanics including the core areas of human movements in upper and lower extremity
- Understand and apply knowledge, tools and techniques used in Ergonomics

**COURSE CONTENTS****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

#### **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

#### **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

#### **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.

## **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

### **RECOMMENDED BOOKS**

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

## **BIOCHEMISTRY-I**

**CREDIT HOURS: 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 introduction to the biomolecules i.e. amino acid, proteins carbohydrates, fats, enzymes and nucleic acids. The nutritional biochemistry concludes the course

### **LEARNING OBJECTIVES**

- Describe cell and body fluids in the context of chemistry and human biochemistry
- Discuss the properties, classification and functions of biomolecules with emphasis on amino acid, peptides, proteins, enzymes, carbohydrates, lipids and nucleic acid
- Explain importance of nutritional biochemistry with emphasis on minerals, trace elements, vitamins and balance diet

### **COURSE CONTENTS**

#### **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.

## **RECOMMENDED BOOKS**

1. Harper's Biochemistry by Robbert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, Latest Ed.
2. Lippincott's Illustrated Review of Biochemistry by Pamela C. Champe and Richard A. Harvey, Latest Ed.
3. Practical Clinical Biochemistry by Varley.

4. Textbook of Biochemistry by Devlin, 5<sup>th</sup> Ed.
5. Textbook of Medical Biochemistry Vol-I and II by M.A. Hashmi. Biochemistry by Stryer, Lubert, Latest Ed.

#### **FOURTH SEMESTER**

1. **ANATOMY-IV (Neuro Anatomy)**
2. **BIOMECHANICS & ERGONOMICS-II**
3. **HEALTH & WELNESS**
4. **BIOCHEMISTRY-II**
5. **EXERCISE PHYSIOLOGY**
6. **MOLECULAR BIOLOGY & GENETICS**

#### **ANATOMY - IV (Neuro Anatomy)      CREDIT HOURS 3 (2-1)**

##### **COURSE DESCRIPTION**

The purpose of the course is to provide the students an in-depth study and analysis of the regional and systemic organization of the body. Course will emphasis on structure and function of human movement. Course will cover human anatomy with emphasis on the nervous, skeletal, muscle, and circulatory systems. Course will lay down the foundation of General Anatomy, the understanding of Neuroanatomy (regional Anatomy) to be supplemented through dissection and identification of structures in the manikins/smart boards, charts, models, prosected materials and radiographs

##### **LEARNING OBJECTIVES**

- Describe regional organization of human brain & neural pathways
- Classify the nervous system
- Explain structure and function of spinal cord

##### **COURSE CONTENTS**

###### **NEURO ANATOMY**

- Central Nervous System: Disposition, Parts and Functions
- Brain stem (Pons, Medulla, and Mid Brain)
- Cerebrum
- Cerebellum
- Thalamus
- Basal ganglia
- Lymbic system
- 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

#### **LAB WORK**

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

#### **Note**

The students are expected to make a practical note book. The book is a collection of evidence that learning has taken place. It is a reflective record of their achievements

#### **RECOMMENDED BOOKS**

- Gray's Anatomy by Prof. Susan Standring 41<sup>th</sup> Ed., Elsevier.
- Clinical Neuroanatomy 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, 15<sup>th</sup> Ed., Vol-I, II and III.

**BIOMECHANICS AND ERGONOMICS-II**

**CREDIT HOURS 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. 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

#### **LEARNING OBJECTIVES**

- Describe biomechanical structure and function of human connective, muscular, nervous and skeletal tissues
- Explain mechanical, neural and muscular events in normal and pathological motion
- Explain mechanical and ergonomic principles are applied in understanding the human movement
- Discuss basic concepts, principles and theories of ergonomics

#### **COURSE CONTENTS**

##### **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, nature and effectiveness of muscle action in the trunk
- Biomechanical contribution to common injuries of the spine

##### **APPLIED BIOMECHANICS**

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

##### **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

##### **HUMAN MOVEMENT IN FLUID MEDIUM**

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

## **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

## **LAB WORK**

### **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
- Measurement of upper extremity & lower extremity
- Measurement of temporomandibular, cervical , thoracic & lumber spine
- Joint measurement by body position
- Biomechanical assessment of Upper extremity
- Biomechanical assessment of Lower Extremity
- Biomechanical assessment of Gait
- Reflective case assignment related to biomechanics of various regions of the body



- Measurement of angles of joints
- Biomechanical study of deformities

#### **RECOMMENDED BOOKS**

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

#### **HEALTH & WELLNESS**

**CREDIT HOURS 2(2-0)**

#### **COURSE DESCRIPTION**

This course will facilitate discussion on the theories of health and wellness, including motivational theory, locus of control, public health initiative, psycho-social, spiritual and cultural. The course will cover health risks, screening, and assessment considering epidemiological principles. This will also cover risk reduction strategies for primary and secondary prevention, including programs for special populations

#### **LEARNING OBJECTIVES**

- Define Health, wellness and fitness
- Describe healthy people and role of PT in Health and wellness
- Explain the key concepts of physical and mental fitness
- Explain health and wellness issues in child, adolescence and old age
- Discuss Women health issues

#### **COURSE CONTENTS**

##### **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

#### **SCREENING FOR HEALTH, FITNESS, AND WELLNESS**

- Distinguishing Screening, Evaluation & Examination
- 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
- Pre-partum 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

### **MARKETING HEALTH AND WELLNESS**

- Definition of Marketing
- Marketing Strategies for health and wellness Centres

### **RECOMMENDED BOOKS**

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

### **BIOCHEMISTRY-II**

**CREDIT HOURS: 3(2-1)**

#### **COURSE DESCRIPTION**

This course will provide the knowledge and skills in fundamental organic chemistry and introductory biochemistry that are essential for further studies. It will also cover the 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 course also covers the section of nutritional biochemistry

#### **LEARNING OBJECTIVES**

- Explain biochemical description of different human tissues
- Describe respiration at cellular and molecular level
- Explain metabolism of carbohydrates, protein and lipids

#### **COURSE CONTENTS**

##### **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

### **LAB WORK**

#### **Section 1**

##### **Techniques of Instruments in Clinical Biochemistry with examples.**

1. Visible Spectrophotometry
2. Flame photometry
3. UV & IR spectrophotometry
4. Atomic Absorption spectrophotometry
5. pH Metry
6. Chromatography and determination of Amino Acids in Urine by pape chromatography

#### **Section 2**

##### **Clinical quantatives analysis in Biochemistry**

1. Sample Collection Blood, Faces and body fluids

2. Serum Glucose Estimation
3. Glucose tolerance Test (GTT)
4. Serum Cholesterol estimation (Total, HDL and HDL cholesterol)
5. Serum Bilirubin Estimation (Total, Direct and Indirect bilirubins)
6. Serum Amylase Estimation
7. Serum AST Estimation
8. Serum ALT Estimation
9. Serum ALP Estimation
10. Serum Creatine Kinase(CK) Estimation
11. Serum Ascorbic acid Estimation
12. Serum LDH Estimation
13. Serum Proteins Estimation (Total, Albumin & Globulin)
14. Serum Total lipids Estimation
15. Serum calcium Estimation (total, ionized & unionized)
16. Serum Uric acid Estimation
17. Serum Magnesium Estimation
18. Serum Urea Estimation
19. Serum Creatinine Estimation

#### **RECOMMENDED BOOKS**

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

#### **EXERCISE PHYSIOLOGY**

**CREDIT HOURS: 3(2-1)**

#### **COURSE DESCRIPTION**

This course aims to develop a critical appreciation of exercise and applied physiology. The course will also enable the readers to understand injury prevention, rehabilitation and performance enhancement strategies.

#### **LEARNING OBJECTIVES**

- Define homeostasis, types of systems involved in maintaining Human internal environment
- Discuss the responses, including hormonal, circulatory, respiratory and thermal to exercise
- Define principles of cardiopulmonary training

- Discuss the effects of exercise on VO<sub>2</sub> max and lactic acid
- Describe training of Female athlete, children and old population.

## **COURSE CONTENTS**

### **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**

- 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**

- 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**

- 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.

### **LAB WORK**

- Predicting VO<sub>2</sub> max using the Harvard step test
- Ratings of perceived exertion and intensity of exercise
- Time limit test
- Predicting VO<sub>2</sub> max using Astrand Rhyming Momogram
- Determining maximal oxygen uptake using treadmill



- The effects of endurance and strength exercise on CV response
- Blood lactate sampling at rest and during exercise
- Determining onset of blood lactate accumulation and lactate threshold
- Assessing muscular efficiency
- The stretch reflex
- Stoop test

#### **RECOMMENDED BOOKS**

1. Exercise Physiology- Theory and Application to Fitness and Performance by: Scott K. Powers, Edward T. Howley.
2. Exercise physiology, A thematic Approach By: Tudor Hale, University College Chichester, UK.
3. Additional study material as assigned by the tutor.

### **MOLECULAR BIOLOGY & GENETICS CREDIT HOURS 2(2-0)**

#### **COURSE DISCRIPTION**

This course covers the brief overview of the cellular & molecular biology, membrane physiology, introduction to molecular medicine and gene therapy, nuclear transplantation, gene therapy for neurological disorders, gene therapy for musculoskeletal disorders and the concept of molecular medicine in physical therapy.

This course has been designed to address a more in depth study of biology of inheritance and inheritance patterns. This course focuses on classical Mendelian genetics, the DNA molecule and molecular genetics, and population genetics. The course also covers Human genome and Molecular Pathology.

#### **COURSE CONTENTS**

##### **BRIEF REVIEW OF CELLULAR & MOLECULAR BIOLOGY**

- Structure and Functions of Cell, Nucliec Acid, Chromosomes & Proteins

##### **INTRODUCTION TO MOLECULAR MEDICINE AND GENE THERAPY**

- Introduction
- Genetic Manifestations of Molecular Medicine
- Gene Therapy and Patterns of Gene Expression
- Gene Therapy and Molecular Medicine
- Gene Therapy: Current Basic Science Issues
- Human Gene Therapy: Current Status and Basic Science

##### **GENE THERAPY FOR NEUROLOGICAL DISORDERS:**

- Introduction
- Sorting Out the Complexity of the Nervous System
- What Goes Wrong in Neurological Disorders

- Neurotrophic Factors and Gene Therapy
- Neural Transplants and Stem Cells
- Clinical Neurodegenerative Conditions
- Clinical Trials Testing Genetically Modified Cells and Neurotrophic Factors for Neurodegeneration:
- Stem Cell Therapy in Spinal Cord Injuries
- Future Considerations and Issues

## **GENE THERAPY FOR MUSCULOSKELETAL DISORDERS**

- Bone
  - Introduction:
  - Regulatory Factors in Bone Development and Regeneration:
  - Cells for Gene Therapy Strategies Directed Towards Bone Regeneration
  - In Vivo & Ex Vivo Gene Therapy Strategies for Bone
  - Clinical Trials for Bone Replacement
- Ligament and Tendon:
  - Introduction
  - Ligament and Tendon Growth Factors
  - Cells for Gene Therapy Strategies Directed Towards Ligament Regeneration
  - In Vivo & Ex Vivo Gene Therapy Strategies to Intact Ligament and Tendon
  - Gene Therapy Strategies for Lacerated Tendon Repair, promote Osseo-Integration of Tendon Grafts
  - Clinical Trials for Ligament and Tendon Replacement:
- Cartilage:
  - Introduction
  - Growth Factors and Cytokines for Cartilage Repair and Regeneration
  - Cells for Gene Therapy Strategies Directed Towards Cartilage Regeneration
  - Gene Delivery Strategies for Cartilage Repair and Regeneration
  - Dose Dependency Detected with Cartilage Gene Therapies
  - Therapeutic Effects by Transfected Cells on Distal Joints
  - Transfected Xenogenic Cells for Cartilage Repair
  - Cartilage Tissue Engineering and Gene Therapy
- Intervertebral Disc
  - Introduction
  - The Biology of Intervertebral Disc Degeneration
  - Application of Gene Therapy in Intervertebral Disc
  - In Vivo & Ex Vivo Gene Therapy Strategies to

- Intervertebral Disc
  - Clinical Trials for Intervertebral Disc
- Muscles
  - Introduction
  - The Molecular Basis of Myopathies
  - In Vivo & Ex Vivo Gene Therapy Strategies in Myopathies
  - Clinical Trials in Myopathies
  - Gene Therapy: Ethical Issues at the Policy Level

**A brief introduction to following topics**

- The chemistry of dna
- Dna replication and recombination
- Transcription, translation and protein synthesis
- Cell-based dna cloning
- Nucleic acid hybridization assays:
- Pcr, dna sequencing and in vitro mutagenesis:
- Organization of the human genome:
- Human gene expression:
- Instability of the human genome:
- Mutation and dna repair:
- Physical and transcript mapping:

**RECOMMENDED BOOKS**

1. Molecular Medicine: Genomics to Personalized Healthcare, 3<sup>rd</sup> Edition by R. Trent. (Published in 2005 by Academic Press).
2. Principles of Molecular Medicine, 2<sup>nd</sup> Edition by Marschall S. Runge and Cam Patterson. (Published in 2006 by Humana Press).
3. Molecular Neuropharmacology: A Foundation for Clinical Neuroscience, 2<sup>nd</sup> Edition by Eric J. Nestler, Steven E. Hyman and Robert C. Malenka. (Published in 2008 by McGraw-Hill Professional).
4. Molecular Medicine: An Introductory Text, 3<sup>rd</sup> Edition by R. J. Trent. (Published in 2005 by Academic Press).
5. Molecular Biology of the Cell, 5<sup>th</sup> Edition by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter. (Published in 2007 by Garland Science).
6. Human Molecular Genetics, 3<sup>rd</sup> Edition by Tom Strachan and Andrew Read. (Published in 2003 by Garland Science/Taylor & Francis Group).
7. Molecular Medicine for Clinicians, 1<sup>st</sup> Edition by Barry Mendelow, Michele Ramsay, Nanthakumar Chettyan and Wendy Stevens. (Published in 2008 by University Press).
8. Molecular Markers, Natural History and Evolution, 2<sup>nd</sup> Edition by John C. Avise. (Published in 2004 by Sinauer Associates).

9. "Molecular Pathology: The Molecular Basis of Human Disease, 1<sup>st</sup>Edition by William B. Coleman, and Gregory J. Tsongalis.(Published in 2009 by Academic Press).
10. Additional Study Material as assigned By the tutor.
11. Genetics: A Conceptual Approach, 3<sup>rd</sup>Edition by Benjamin Pierce (Published in 2007 by W. H. Freeman).
12. Human Molecular Genetics, 3<sup>rd</sup>Edition by Tom Strachan and Andrew P Read(Published in 2003 by Garland Science/Taylor & Francis Group).
13. Genetics-From Genes to Genomes, 3<sup>rd</sup>Edition by Hartwell, Hood, Goldberg, Reynolds, Silver andVeres(Published in 2006 by McGraw-Hill).
14. Additional Study Material, as assigned By the tutor.

#### **FIFTH SEMESTER**

1. **PATHOLOGY & MICROBIOLOGY-I**
2. **PHARMACOLOGY & THERAPEUTIC-I**
3. **PHYSICAL AGENTS & ELECTROTHERAPY-I**
4. **THERAPEUTIC EXERCISES & TECHNIQUES**
5. **BIostatISTICS-I**
6. **BEHAVIORAL SCIENCES (PSYCHOLOGY & ETHICS)**
7. **SUPERVISED CLINICAL PRACTICE-I**

#### **PATHOLOGY & MICROBIOLOGY-I**

**CREDIT HOURS 2(2-0)**

#### **COURSE DESCRIPTION**

The course will develop an understanding among students about the pathology of underlying clinical disease states and involving the major organ systems. Epidemiological issues will be presented and discussed. Students will use problem-solving skills and information about pathology and Microbiology to decide when referred to another health care provider or alternative intervention is indicated

#### **COURSE OBJECTIVES**

- Discuss concepts of general pathology
- Discuss recognize signs and symptoms that are considered red flag for serious disease
- Discuss and disseminate pertinent information and findings, and ascertain the appropriate steps to follow during physical therapy management

#### **COURSE CONTENTS**

##### **GENERAL PATHOLOGY WHICH INCLUDES**

##### **CELL INJURY AND DEATH**

- Causes of cell injury
- Pathogenesis of necrosis and apoptosis

- Sub cellular responses

#### **CELL ADAPTATIONS**

- Relevant examples: Hyperplasia, Hypertrophy, Atrophy, Metaplasia and intracellular accumulation

#### **INFLAMMATION**

- Acute inflammation
- Vascular events and cellular events
- Chemical mediators

#### **CHRONIC INFLAMMATION**

- General and granulomatous inflammation
- Morphologic patterns of acute and chronic inflammation

#### **HEALING & REPAIR**

- Normal controls of healing and repair.
- Repair by connective tissue
- Wound healing

#### **HAEMODYNAMIC DISORDERS**

- Edema and its types
- Hyperemia /congestion, Hemorrhage, Thrombosis, Embolism, Infarction, Shock.

#### **DISEASES OF IMMUNITY**

- General features of immunity
- Hypersensitivity reactions
- Immune deficiencies.
- Autoimmunity
- Amyloidosis

#### **NEOPLASIA**

- Nomenclature of neoplasia
- Molecular basis of neoplasia
- Carcinogenic agents of neoplasia
- Clinical aspects of neoplasia

#### **MICROBIOLOGY**

##### **THE BACTERIA**

- Bacterial cell structure, its forms and function
- Identification and classification of bacteria
- Gram stain

##### **METHODS OF STUDYING MICRO-ORGANISM**

- Culturing, inoculation and identification

- Types of medicine
- Physical states of media

#### **MICROBIAL GROWTH**

- Stages in the normal growth curve
- Microbial genetics
- Prokaryotic transcriptions and translations.
- Conjugations
- Mutation and its causes.
- Mechanism of drug resistances and its pathogenesis.
- Gateway to infection.
- Resident flora and its mechanism of invasions
- Classic stages of clinical infection
- Sterilization and disinfection.

#### **RECOMMENDED BOOKS**

1. Goodman CC & Fuller KS. Pathology: implication for the Physical Therapist. 4th ed. Elsevier:USA;2015
2. Kumar V, Abbas AK, & Aster JC. Robbins basic pathology. 9th ed. Elsevier: Philadelphia; 2013.
3. Levinson W. review of medical microbiology & immunology. 14th ed. McGraw-Hill: Canada; 2016
4. Thomson AD & Cotton RE. Lecture notes on pathology. 3rd ed. FA Davis; 1983

### **PHARMACOLOGY & THERAPEUTICS- ICREDIT HOURS      2(2-0)**

#### **COURSE DESCRIPTION**

This course deals with pharmacodynamics, pharmacokinetics, clinical/therapeutic uses and toxicology of drugs. Emphasis is given on how a drug works to anticipate when giving a drug to a patient are of paramount importance include administering drugs, calculating medication dosages based on given setting, assessing drug effects, intervening to make a drug more tolerable, and providing teaching about drugs and the drug regimen.

#### **LEARNING OBJECTIVES**

- Discuss prescription and/or over-the-counter medications used in the management of a variety of patient conditions encountered during physical therapy management.

#### **COURSE CONTENTS**

##### **GENERAL PRINCIPLES OF PHARMACOLOGY**

- Various principal of pharmacology
- Introduction to pharmacokinematics

- Various drug dosage forms and pharmacological doses
- Various routes of drug administration and their advantages/disadvantages
- Factors modifying drug absorption and distribution
- Major mechanisms responsible for drug metabolism
- Factors modifying drug metabolism
- Basic principles of drug excretion
- Factors modifying drug excretion
- Various mechanisms by which drugs exert their effects
- Various types of pharmacological graphs
- Identification of the therapeutic index and therapeutic window on a given dose response curve

#### **DRUG USED TO TREAT PAIN AND INFLAMMATION**

- Therapeutic uses of opioid analgesics.
- Classification of non-steroidal anti-inflammatory drugs on the basis of mechanism of action.
- Pharmacological management of rheumatoid and osteoarthritis.
- Patient control analgesia

#### **PHARMACOLOGY OF CENTRAL NERVOUS SYSTEM**

- Classification of the drugs, which modulate the central Nervous System according to their general principles, selectivity, specificity and mode of action.
- Pharmacokinetics, clinical uses, contraindications, adverse effects and toxicity of drugs acting on above receptor system
- Sedative, hypnotic and anxiety agents
- Drugs used to treat affective disorders depression and manic depression
- Antipsychotic and antiepileptic drugs
- Pharmacologic management of Parkinson disease
- General and local anesthetics

#### **DRUGS AFFECTING SKELETAL MUSCLE**

- Skeletal Muscle Relaxants

#### **AUTONOMIC AND CARDIOVASCULAR PHARMACOLOGY**

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

#### **RECOMMENDED BOOKS**

1. Ciccone CD. Pharmacology in rehabilitation. 5th ed. United states: Cardiopulmonary Perspectives in Rehabilitation; 2015.
2. Whalen K, Finkel R & Panavelli TA, editors. Lippincott illustrated reviews: pharmacology. 6th ed. Philadelphia: Wolters Kluwer; 2015
3. Cheema M. multi author textbook of pharmacology and therapeutics. Lahore: National Medical Publication; 2015: 1.
4. Cheema M. multi author textbook of pharmacology and therapeutics. Lahore: National Medical Publication; 2015: 2

### **PHYSICAL AGENTS & ELECTROTHERAPY-ICREDIT HOURS 3(2-1)**

#### **COURSE DESCRIPTION**

This course deals with the Physical principle associated with Electrotherapy and methods used in the field of Physical Therapy.

#### **LEARNING OBJECTIVES**

- Discuss in detail the information about the physiological and therapeutic uses, risks, preventions and knowledge of indications and contraindications on the type of electric current to be used in different disorders
- Demonstrate fundamental skills that will be used to train in electrotherapy modalities according to the need of patient

#### **COURSE CONTENTS**

##### **INTRODUCTION & GENERAL CONSIDERATION OF ELECTROTHERAPY**

- Electrotherapy.
- Types of currents and its parameters.
- Identification of the safety rules for using electrical currents.
- Background with respect to RMP, nerve impulse, electrical charges of nerve and tissues.
- Healing process.
- Application of the energy to the body for therapy.
- List of the risks, preventions and knowledge of indications and contraindications.

##### **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

#### **TRANSCUTANEOUS ELECTRICAL NERVE STIMULATOR (TENS)**

- TENS
- Characteristics of TENS
- Modes, pain theories, pain modulation and technique of application of TENS
- Therapeutic uses, contraindications and dangers of TENS
- Clinical method of application and dosage

#### **FARADIC AND FARADIC TYPE CURRENT**

- Faradic and Faradic type current.
- Explain true Faradic current
- Therapeutic effects, mode of applications, contraindications and dangers of Faradic current?
- Clinical method of application and dosages of Faradic current

#### **SINUSOIDAL CURRENT**

- Detailed description of sinusoidal current
- Treatment
- Methods of application

#### **GALVANIC DIRECT CURRENT AND INTERRUPTED DIRECT CURRENT (DC & IDC)**

- Galvanic Current & IDC.
- Production and transmission of galvanic & IDC.
- Effects, uses, contraindications and dangers of DC & IDC.
- Dosages and clinical methods of application of DC & IDC

#### **MODIFIED GALVANIC CURRENT**

- Modified galvanic currents
- Physical and Therapeutic effects
- Uses
- Treatment techniques & methods of application
- Electrical stimulation of nerve & muscle
- 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 and Lower motor neurons and Muscular disease

#### **DIDYNAMIC CURRENT**

- Didynamic current
- Explain characteristics, derivatives and effects of Didynamic current
- Explain the technique of application, therapeutic uses, contraindications and dangers
  - Example: Sprain ankle, Sciatica. Facial neuralgia. Trigeminal neuralgia & Otitis media
- Clinical method of application and dosage

#### **MEDICAL IONIZATION**

- Describe Theory & proof of ionization
- Discuss Effects of various ions; iodine, salicylate, albutin, copper, zinc histamine, carbachol, renitinenovocaine, lithium
- Describe Techniques of medical ionization with vasodilator drugs
- Discuss Techniques for special areas.

#### **ELECTRO-DIAGNOSTICS**

- What are the use of electrical changes in evaluation and diagnosis?
- What are Faradic & I. D. C test
- What is Accomodity test
- Explain the physiological changes in Peripheral nerve.
- Give an assessment of nerve and muscle potential.
- What do you about Electromyography? Explain briefly.
- Give an assessment by observing the results of stimulating nerve and muscle.
- Explain muscle contraction.
- Give SDCT (Strength Duration Curve Test).
- Explain Evoked potentials.

#### **MEDIUM FREQUENCY CURRENT**

- Define Russian current,
- Explain the technique of application, contraindications and dangers of Russian current.
- Explain clinical method of application and dosage
- Define IFC,
- What are the characteristics, effects, technique of application and therapeutic uses
- Explain the contraindications, dangers and clinical method of application of IFC.

### **SUPER IMPOSED CURRENT**

- Give Introduction
- Definition
- Describe Effects & uses, Technique, Methods, Dangers and Precautions

### **HIGH VOLTAGE CURRENT (HVC)**

- Define HVC, Explain the characteristics, effects and uses of HVC.
- Explain the technique of application of HVC.
- What are the contraindications and dangers of HVC
- What is the clinical method of application and dosage of HVC

### **HIGH FREQUENCY CURRENTS**

- Introductions of high frequency currents
- Describe Productions of high frequency currents
- Describe Uses, indication, contraindications & methods of applications of high frequency currents

### **LAB WORK**

- Location of motor points
- Faradic & I.D.C test
- Strength duration curve, determination of Rheobase and Chronaxie
- Accommodate test
- Electromyography
- Definition, method, value, uses of E.M.G, Electromyography & temperature, feedback techniques
- Practical application of TENS in physical therapy treatment
- 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**

1. Savage B. Practical electrotherapy for physiotherapists. UK: Faber; 1960.

2. Scott PM. Clayton's electrotherapy and actinotherapy. 7th ed. USA: Williams & Wilkins: 1980.
3. Watson T. Electrotherapy: evidence-based practice. 12th ed. Edinburgh: Churchill Livingstone; 2008
4. Cameron MH. Physical agents in rehabilitation: from research to practice. 4th ed. St. Louis: Elsevier; 2013.
5. Singh J. Textbook of electrotherapy. 2nd ed. India: Jaypee; 2012

### **THERAPEUTIC EXERCISES & TECHNIQUES CREDIT HOURS(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

#### **LEARNING OBJECTIVES**

- Defines & Explain types of physical therapy techniques and exercises
- Demonstrate best practices associated with injury and its rehabilitation
- Discuss strategies to improve movement and function, relieve pain and extend mobility potential.

#### **COURSE CONTENTS**

##### **THERAPEUTIC EXERCISE: FOUNDATIONAL CONCEPTS**

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

##### **APPLIED SCIENCE OF EXERCISE AND TECHNIQUES**

- Define Range of motion, Types of ROM exercises, its Indications and goals.

- Discuss Limitations of ROM exercises with Precautions and contraindications.
- Describe Principles and procedures for applying ROM Techniques: Self-assisted ROM, continuous passive motion and ROM through functional patterns.

#### **STRETCHING FOR IMPAIRED MOBILITY**

- Define terms related to mobility and stretching
- Discuss Properties of soft tissue—response to immobilization and stretch
- Discuss determinants, types, and effects of stretching interventions
- Describe Procedural guidelines for application of stretching interventions
- Explain Precautions during stretching
- Discuss Adjuncts to stretching interventions
- Explain Manual stretching techniques in anatomical planes of motion.

#### **PERIPHERAL JOINT MOBILIZATION**

- Define terms: mobilization/manipulation, self-mobilization (auto-mobilization), mobilization with movement, physiological movements, accessory movements, thrust, manipulation under anesthesia, muscle energy
- Discuss Basic concepts of joint motion: arthro kinematics
- Discuss Indications and Limitations of joint mobilization techniques with its contraindications and precautions
- Discuss Procedures for applying passive joint mobilization techniques
- Discuss Mobilization with movement: principles of application
- Discuss 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.

#### **RESISTANCE EXERCISE FOR IMPAIRED MUSCLE PERFORMANCE**

- Define Muscle performance
- Discuss types of resistance exercise with its guiding principles
- What are Determinants of an resistance exercise program
- Discuss General Principles of Resistance Training with Precautions For and Contraindications to resistance exercise
- Define Manual resistance exercise with its guidelines
- What are Physiological changes that occur with training
- Discuss Skeletal muscle function and its adaptation to resistance exercise

- Discuss special considerations, techniques with general background for upper extremity and lower extremity
- Describe Proprioceptive neuromuscular facilitation, its principles, procedures and basic and specific Techniques
- Discuss Diagonal patterns of PNF with reference to upper and lower extremity.
- Discuss Mechanical resistance exercise and its use in rehabilitation, conditioning programs with special considerations for children and older adults
- Discuss Selected resistance training regimens
- Discuss Equipment for resistance training

#### **PRINCIPLES OF AEROBIC EXERCISE**

- Discuss Application of principles of an aerobic conditioning program for the patient with coronary disease for both inpatients and multiple phases of outpatient
- Discuss special considerations and adaptive changes
- Discuss Applications of aerobic training for the de-conditioned individual and the patient with chronic illness in different Age group.

#### **AQUATIC EXERCISE**

- Define aquatic exercises with its Background and principles,
- identify Goals, indications, Precautions and contraindications to aquatic exercise
- Discuss Properties of water, Aquatic temperature and therapeutic exercise
- What are the Special equipment for aquatic exercise
- Discuss Exercise interventions using an aquatic environment such as stretching exercises, Strengthening Exercises and Aerobic Conditioning.

#### **LAB WORK**

- Hands on skills of the following techniques:
- Range of Motion,
- Stretching
- Resisted exercise
- Peripheral joint mobilization.
- Aerobic exercises
- Balance training
- Hydrotherapy
- Reflective clinical case studies

- Supervised and independent applications 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 performs/observes during course of study

**RECOMMENDED BOOKS**

1. Kisner C & Colby LA. Therapeutic exercise: foundations & techniques. 6<sup>th</sup> ed. Philadelphia: FA Davis; 2012.
2. Bandy WD & Sanders B. Therapeutic Exercise for physical therapist assistants: techniques for intervention. 3<sup>rd</sup> ed. Wolters Kluwer; 2012.
3. Sullivan PE and Markos PD. Clinical decision making in therapeutic exercise. Appleton & Lange; 1994.
4. Connolly BH & Montgomery P. Therapeutic exercise in developmental disabilities. 3<sup>rd</sup> ed. Slack; 2004.

**BIostatistics-I**

**CREDIT HOURS 3(3-0)**

**COURSE DESCRIPTION**

It involves selection of appropriate statistical techniques to address questions of medical relevance; select and apply appropriate statistical techniques for managing common types of medical data; use various software packages for statistical analysis and data management; interpret the results of statistical analyses and critically evaluate the use of statistics in the medical literature; communicate effectively with statisticians and the wider medical community, in writing and orally through presentation of results of statistical analyses; explore current and anticipated developments in medical statistics.

**LEARNING OBJECTIVES**

- Discuss necessary concepts of statistics to enable them to realize a research project in the field of Physiotherapy
- Explain Fundamentals of reading and understanding research methods, design, and statistics.

**COURSE CONTENTS**

- At the end of the course the student should be able to understand:

### **STATISTICS**

- Define 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**

- Explain 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**

- Describe 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**

- Define Discrete And Continuous Distributions: Binomial, Poisson And Normal Distribution. Exercises.

### **SAMPLING AND SAMPLING DISTRIBUTIONS**

- Describe 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**



1. Walpole RE. Students study guide: introduction to statistics. 3rd ed. 1982.
2. Muhammad F. Statistical methods and data analysis. Faisalabad: KitabMarkaz; 2000
3. R. L Ott, Micheal T longnecker. An introduction to statistical methods and data analysis, 7th ed. Brooks/Cole, Cengage Learning 2015

**BEHAVIOURAL SCIENCES (PSYCHOLOGY & ETHICS)  
CREDIT HOURS 2(2-0)**

**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. 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.

**COURSE OBJECTIVES**

- Explain psychological and ethical factors that influence values about health promotion, wellness, illness and disability
- Demonstrate Skills to effective physical therapist-client relationship for better health care outcomes.

**COURSE CONTENTS**

**INTRODUCTION OF BEHAVIORAL SCIENCES**

- Define Behavioral Sciences
- Discuss its importance in health
- Discuss Bio-Psycho-Social Model of Healthcare

**BEHAVIOR OF INDIVIDUAL**

- Nature/nurture debate
- Behaviorism and learning theories
- Behavioral modifications

**COGNITION**

- cognition
- cognitive development throughout lifespan

**SCIENCE OF RELATIONSHIP**

- Define and discuss communication skills, its types, modes, barriers and factors affecting
- Discuss Counseling: steps, scope, indication and contraindications in health setting

- Discuss conflict management: Dealing with real life crisis and conflict situations in health settings
- Discuss interviewing and its psychosocial factors in health care.
- Define clinician-patient / client relationship
- Discuss Concept of boundaries and psychological reactions in clinician – patient relationship such as transference and counter transference.
- Discuss Problem solving and decision making strategies in health care

### **STRESS MANAGEMENT**

- Define and classify of stress
- Discuss effects of stress on health and coping strategies
- Discuss Relationship of stress and stressors with illness
- Define Anxiety
- Discuss Psychological defense mechanisms, Adjustment and maladjustment

### **APPLICATION OF BEHAVIORAL PRINCIPLES IN HEALTH AND DISEASE**

- Importance of psychological consideration in physical therapy management of
  - Mentally, emotionally and physically compromised patients
  - Terminally ill and home bound patients

### **ETHICS**

- Define ethics, medical ethics, and values, value system, virtues, mores, moral rules and morality
- Discuss ethical theories
- Discuss principle based approach for physical therapist in ethics such as;
  - Non-maleficence, beneficence, autonomy, fidelity, veracity, paternalism, and Justice.
- Discuss code of ethics for physical therapist
- Discuss ethical dimension of the physical therapist patient relationship, confidentiality, information sharing, and informed consent and ethical dilemmas

### **RECOMMENDED BOOKS**

1. Rana MH, Ali S & Mustafa M. A handbook of behavioral sciences for medical and dental students. 2nd ed. Lahore : university of health sciences; 2013.
2. Dowrick C. Medicine in society: behavioral sciences for medical students. CRC Press; 2001

3. Billingham KA, Feldman HS & Lopez MA. Developmental psychology for health care profession. Michigan: westviewpress ;1982.
4. Purtilo RB & Doherty RF. Ethical dimensions: in the health professions. 6th ed. St. Louis: Elsevier; 2016
5. Veatch RM. Medical ethics. 2nd ed. USA: Jones & Bartlett. 1997

**SUPERVISED CLINICAL PRACTICE-I CREDIT HOURS 3(0-3)**

**HISTORY TAKING**

<b>SEMESTER</b>	<b>SUPERVISION</b>	<b>FOCU</b>	<b>WARDS</b>	<b>COMPETENCIES</b>
5	Supervised by Trained PT	History Taking	All wards	As listed below

**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.

**Note**

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

**SIXTH SEMESTER**

1. **PATHOLOGY & MICROBIOLOGY-II**
2. **PHARMACOLOGY & THERAPEUTICS-II**
3. **PHYSICAL AGENTS & ELECTROTHERAPY-II**
4. **BIostatISTICS II (University Optional)**
5. **COMMUNITY BASED MEDICINE & REHABILITATION**
6. **SUPERVISED CLINICAL PRACTICE - II**

**PATHOLOGY & MICROBIOLOGY-II**

**CREDIT 3(2-1)**

**COURSE DESCRIPTION**

This course will cover the basic concepts, terminology, etiology, and characteristics of pathological processes. The course includes the diseases of the Integumentary System, Cardiovascular System, the Lymphatic System, the Respiratory System, the Nervous System, and Pathology of the musculoskeletal System, Pathology of Aging and medical microbiology. Also help the student to provide with a working knowledge of clinical pathology lab importance in Physical Therapy

**COURSE OBJECTIVES**

- Describe consequences of pathologic processes on the structure and function of the human body.
- Discuss selected disorders/diseases common to acute care in the physical therapy.
- Explain normal structure and function, in relation to disease processes in the physical therapy.

**COURSE CONTENTS**

**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.

##### **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 Tumours
- Primary Malignant Bone Tumours
- Multiple Myeloma
- Primary Soft Tissue Tumours
- Metastatic Tumours.

### **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 Tumours
- Specific Primary Brain Tumours
- Primary Intraspinal Tumours
- Metastatic Tumours
- Paraneoplastic Syndromes

- Leptomeningeal Carcinomatosis
- Pediatric Tumours.

#### **DEGENERATIVE DISEASES OF THE CENTRAL NERVOUS SYSTEM**

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

#### **STROKE**

- Stroke
- Vascular Disorders of the Spinal Cord.

#### **MEDICAL MICROBIOLOGY**

##### **G +VE COCCI**

- Staphylococci
- Streptococci.

##### **G -VE COCCI**

- Neisseria.

##### **G +VE SPORE FORMING RODS**

- Bacillies
- Clostridia
- G –ve rods (introduction to Enterics)

##### **ACID FAST BACILLI**

- Mycobacteria.

##### **SPIROCHETES**

- Introduction
- Treponemes.

##### **BASIC VIROLOGY**

- General characteristics
- Viral structure
- Nomenclature and classification.

##### **MYCOLOGY**

- Introduction to mycology.

##### **PARASITOLOGY**

- Introduction to protozoan.

### **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 tumour
- Examination of urine.

### **RECOMMENDED BOOKS**

1. *Pathology: implications for the Physical therapist* by: Catherine Cavallaro Goodman, 4<sup>th</sup> edition
2. *Basics & advanced Human Pathology* by Robbins 9<sup>th</sup> edition
3. *Lecture notes on Pathology* by Thomas and Cotton Published by Blackwell Scientific Publications, Oxford
4. *General Pathology* by Lord Howard Florey 4<sup>th</sup> edition by Lloyd-Luke (Medical Books) Ltd
5. *Medical Microbiology and Immunology* By: Levinson and Jawetz, 9<sup>th</sup> Ed., Mc Graw-Hill.

## **PHARMACOLOGY & THERAPEUTICS-IICREDIT HOURS 2(2-0)**

### **COURSE DESCRIPTION**

This course is designed to acquaint the students with the study of properties, effects, and therapeutic value of the primary agents in major drug categories. The topics include pharmacology of the respiratory system, gastrointestinal system, treatments of infectious diseases, and the drugs used in iontophoresis and phonophoresis

### **LEARNING OBJECTIVES**

- Describe theoretical background of pharmacological treatment in physical therapy.
- Explain pharmacological background for clinical treatment of patient referred to physical therapy.
- Define basic principles and drugs for respiratory system, gastrointestinal system and disorders in endocrine system.



- Discuss basic principles and drugs of anti-microbial, antiviral drugs, immunosuppressive drugs and drugs used in iontophoresis and phonophoresis

## **COURSE CONTENTS**

### **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 BOOK**

1. Pharmacology in Rehabilitation (5<sup>rd</sup> Edition-2015 ) By Charles D. Ciccone.
2. Pharmacology, Richard A, Harvey, 3rd Edition, Lippincott's.
3. A Textbook of Clinical Pharmacology and Therapeutics, 5<sup>th</sup> Edition by James Ritter 2012

### **PHYSICAL AGENTS & ELECTROTHERAPY-IICREDIT HOURS 3(2-1)**

#### **COURSE DESCRIPTION**

This course covers the basic principle of electrotherapy modalities used in physical therapy, including thermal, mechanical, physical agents and electromagnetic tools. Also help to understand the Indication, Contraindication and Methods of application in physical therapy.

#### **LEARNING OBJECTIVES**

- Explain physiological basis of different modalities
- Discuss selection of appropriate modalities in different condition
- Demonstrate the application of thermal, mechanical & electromagnetic tools in different conditions

## **COURSE CONTENTS**

### **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 Vapour Lamp: Air cooled mercury vapour 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.

### **HELIO THERAPY**

- 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.

#### **BIOFEED BACK**

- Introduction
- Indications
- Contra-Indications
- Types of Biofeedback
- Advantages
- Disadvantages

#### **SHOCKWAVE THERAPY**

- Physiology
- Indications
- Method of Application
- Contra-Indications

#### **WAX THERAPY**

- Characteristics of Paraffin Wax
- Care of Apparatus
- Physiological Effects
- Indications
- Contra-Indications
- Advantages
- Disadvantages
- Method of Application

### **MEGNATIC THERAPY**

- Indications
- Contra-Indications
- Method of Application

### **LAB WORK**

- The practical training will be practiced in physiotherapy treatment ward under the supervision of qualified physiotherapists.
- Practical application of Interferential therapy
- 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
- Supervised application of Wax therapy
- Practical application of Infra-red Rays
- Practical application of Mechanical traction
- Supervised application of Hot packs, Electric Heating pads
- Paraffin Wax bath application
- Practical application of SWD
- Practical application of LASER
- Supervised application of Shock wave therapy
- Practical application of Magnetic therapy
- 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**

1. Clayton's Electrotherapy and Actinotherapy, 10<sup>th</sup> edition by PM Scott.
2. Electrotherapy: Evidence based Practice, 11<sup>th</sup> edition by Shelia Kitchen.
3. Michelle H Cameron's Physical Agent in Rehabilitation: From research to Practice.
4. Electrotherapy and Electrodiagnosis by S. Lient.
5. Applications of Shortwave Diathermy by P. M. Scott.

6. Practical Electrotherapy by Savage.
7. Textbook of Electrotherapy & Practical application by Jagmohan Singh 2<sup>nd</sup> Edition

## **BIostatistics-II (UNIVERSITY OPTIONAL) CREDIT HOURS 3(3-0)**

### **COURSE DESCRIPTION**

The course is designed to provide the students with the necessary concepts of statistics to enable them to realize a research project in the field of Physiotherapy. It involves selection of appropriate statistical techniques to address questions of medical relevance; select and apply appropriate statistical techniques for managing common types of medical data; use various software packages for statistical analysis and data management; interpret the results of statistical analyses and critically evaluate the use of statistics in the medical literature; communicate effectively with statisticians and the wider medical community, in writing and orally through presentation of results of statistical analyses; explore current and anticipated developments in medical statistics. It is designed to teach entry-level physical therapy students the fundamentals of reading and understanding research methods, design, and statistics.

### **LEARNING OBJECTIVES**

- The course aims to shape the attitudes of learners regarding the field of Statistics. Specifically, the course aims to
- Motivate in students an intrinsic interest in statistical thinking.
- Instill the belief that Statistics is important for scientific research.
- Provide a foundation and motivation for exposure to statistical ideas subsequent to the course.
- Demonstrate the ability to apply fundamental concepts in exploratory data analysis.
- Design studies for obtaining data whilst avoiding common design flaws that incur bias, inefficiency and confounding.
- Demonstrate an understanding of the basic concepts of probability and random variables.
- Understand the concept of the sampling distribution of a statistic, and in particular describe the behavior of the sample mean.
- Apply inferential methods relating to the means of Normal distributions.
- Apply and interpret basic summary and techniques for data and use inferential methods.

### **COURSE CONTENTS**

#### **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 TEXT 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", KitabMarkaz, Bhawana Bazar Faisalabad.

**COMMUNITY BASED MEDICINE & REHABILITATION**

**CREDIT HOIURS 3(3-0)**

**COURSE DESCRIPTION**

This course is designed for the Physical Therapy students in order to develop strong background knowledge regarding the community health, wellbeing and community based rehabilitation. It also gives knowledge about the issues of community health, policies and procedures for their effective rehabilitation management. It provide awareness about the problems faced by people in community at all levels and effective strategies to solve these issues

**LEARNING OBJECTIVES**

- Describe impact of environmental, biological, social and behavioral risk factors on health and disease through the epidemiologic methods.

- Discuss agent, host and environmental factors determining health and disease.
- Describe complete nutritional assessment of individual using clinical, Anthropometric and diet survey tools
- Discuss the community health, diagnosis and to take remedial measure for improving community health
- Discuss various types of disabilities existing in special children

## **COURSE CONTENTS**

### **COMMUNITY BASED MEDICINE**

#### **INTRODUCTION**

- History of Community medicine & rehabilitation
- Definition, concept of Health & illness of diseases
- Natural History of diseases, levels & prevention.

#### **ENVIRONMENTAL SANITATION & MEDICAL ENTOMOLOGY**

- water
- waste disposal
- Environmental problems & pollution.

#### **GENETICS**

- Prevention of genetic diseases
- Genetic counseling.

#### **GENERAL EPIDEMIOLOGY**

##### **DESCRIPTIVE EPIDEMIOLOGY**

- Time
- Place
- Person.

##### **ANALYTICAL EPIDEMIOLOGY**

- Case control
- Cohort studies.

##### **EXPERIMENTAL EPIDEMIOLOGY RANDOMIZED CONTROL TRIAL SYSTEMIC EPIDEMIOLOGY**

- Vector borne diseases
- Water borne diseases
- Air borne diseases
- Contact diseases
- Diseases of major public health and its importance along with national health programs wherever Applicable

##### **NON-COMMUNICABLE DISEASES**

- Diabetes



- Hypertension
- Heart diseases
- Blindness
- Accidents
- Geriatric problems.

#### **OCCUPATIONAL HEALTH PROBLEMS**

- M.C.H. and family welfare 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**

- P. H. C. district level
- State level and central level.
- P. H. C. Organization and Function
- Role of Non-Governmental Organization.

#### **HEALTH EDUCATION**

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

#### **COMMUNITY BASED REHABILITATION 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

- Hydrocephalus
- 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

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.
3. *Community based rehabilitation worker manual, marion loveday, global health publication*
4. *Introduction to Special Education* By: Allen and Beacon,(1992), A Simon &SuperterComp.Needham Heights
5. *Exceptional Children and Adults*, Patton, J.R. (1991); Boston Scott Foresmen and Co.
6. *Exceptional Children in Focus* by: Patton J.R. (1991); New York, Macmillan pub. Co

#### SUPERVISED CLINICAL PRACTICE-IICREDIT HOURS 3(0-3)

#### SYSTEMS REVIEW

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
6	SUPERVISED BY TRAINED PT	SYSTEMS REVIEW	ALL WARDS	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

(balance, gait, locomotion, transfers, and transitions) and motor function (motor control and motor learning).

- Documentation of all listed competencies in SOAP notes format

#### **Note**

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

#### **SEVENTH SEMESTER**

1. **MEDICINE - I**
2. **SURGERY - I**
3. **RADIOLOGY & DIAGNOSTIC IMAGING**
4. **MUSCULOSKELETAL PHYSICAL THERAPY**
5. **EVIDENCE BASED PRACTICE**
6. **SUPERVISED CLINICAL PRACTICE-III**

#### **MEDICINE-ICREDIT HOURS 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 systemic diseases, focusing on epidemiology, pathology, histology, etiology, as well as primary and secondary clinical characteristics and their management.

##### **LEARNING OBJECTIVES**

- Describe medical terminologies, abbreviations, epidemiology, etiology, primary and secondary clinical characteristics of Cardiovascular, Rheumatology and bone, and Respiratory diseases.
- Explain briefly an overview of medical management of listed diseases/disorders.

##### **COURSE CONTENTS**

##### **CARDIOVASCULAR DISEASES**

##### **CARDIAC DISEASES**

- Chest pain
- Dyspnoea
- Palpitation
- Peripheral edema
- Syncope
- Cardiac failure

- Acute pulmonary edema
- Cardiogenic shock
- Systemic hypertension
- Ischemic heart disease
- Angina pectoris
- Unstable angina
- Myocardial infarction
- Rheumatic fever
- Valvular heart diseases
- Congenital heart diseases
- Ventricular septic defect
- Atrial septal defect
- pulmonary heart disease
- Pericardial disease
- Pulmonary hypertension
- Cardiac arrhythmias and heart in pregnancy.

#### **VASCULAR DISEASES**

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

#### **RHEUMATOLOGY AND BONE DISEASES: ARTHRITIS**

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

#### **BACK PAIN**

- Back Pain due to serious disease
- Inflammatory Back Pain
- Disc disease
- Mechanical problems
- Soft tissues problems
- Psychogenic Back Pain

- Nonspecific Back Pain
- Neck pain.

#### **SOFT TISSUE RHEUMATISM: BONE DISEASES**

- Paget's disease
- Infections of bones
- Neoplastic disease
- Skeletal dysplasia
- Other hereditary diseases.

#### **RESPIRATORY DISEASES**

##### **DISEASES OF UPPER RESPIRATORY TRACT**

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

##### **DISEASE OF LOWER RESPIRATORY TRACT**

- Acute & chronic Bronchitis
- Bronchiectasis
- Cystic fibrosis
- Asthma
- Emphysema
- Pneumonias
- Tuberculosis
- Pulmonary fibrosis
- Radiation damage
- Common tumours 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 BOOKS**

1. Practice of medicine by: Davidson.
2. Clinical medicine by: Parveen j Kumar & Michael Clark.

3. Short text book of medicine by: M. Inam Danish.
4. Hutchison's clinical methods by: Michael swash. 21<sup>st</sup> edition.
5. Bed side techniques.

### **SURGERY-ICREDIT HOURS**

**3(3-0)**

### **COURSE DESCRIPTION**

This course intends to familiarize the students with principles of orthopaedic surgery along with detail description of surgical terminologies 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.

### **LEARNING OBJECTIVES**

- Describe in detail surgical terminologies, abbreviations, etiology, primary and secondary clinical characteristics, classifications, indications and complications for surgeries listed orthopedic conditions
- Explain briefly an overview of surgical management of the listed conditions.

### **COURSE CONTENTS**

#### **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 & management of traumatic dislocation/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
  - Cervico-lumbar injuries
  - Whiplash of the cervical spine
  - Crush injuries
  - Spinal pain
  - Degenerative and Inflammatory Conditions:
    - Osteo-orthosis/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

#### **TUMOURS**

- 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
- Coxavera

- Coxavalga
- 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
- Dupuytren's contracture.

#### **RECOMMENDED BOOKS**

1. Short practice of surgery by Baily and Love's.
2. Text Book of Surgery by Ijaz Ahsan.
3. Outline of Fractures.

#### **RADIOLOGY & DIAGNOSTIC IMAGING CREDIT HOURS 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.

##### **LEARNING OBJECTIVES**

- Describe in detail examination and understanding of radiological imaging (X-Rays) of Extremities, Spine and Chest.
- Explain briefly an overview of radiological imaging including Mammography, Fluoroscopy, Computer Tomography, Magnetic Resonance Imaging, Ultrasound, Endoscopy, Nuclear Medicine and Interventional Radiology.
- Explain briefly indications to prescribe X-Rays, Mammography, MRI and Ultrasound.

## **COURSE CONTENTS**

### **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**

- 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)**

- 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)**

- 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**

- 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**

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

### **INTERVENTIONAL RADIOLOGY**

#### **RECOMMENDED BOOKS**

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

### **MUSCULOSKELETAL PHYSICAL THERAPY CREDIT HOURS 3(2-1)**

#### **COURSE DESCRIPTION**

This course includes a study of applied anatomy and physiology of the musculoskeletal system and pathological changes of the system and function, including diagnostic tests and measurements. The use of evidence-based physical therapy intervention for musculoskeletal conditions will be emphasized. The course will focus on medical terminologies, clinical examination, evaluation, comparing contemporary,

traditional interventions and the impact of evolving technology in the area of musculoskeletal physical therapy

### **LEARNING OBJECTIVES**

- Describe in detail applied anatomy and physiology of the musculoskeletal system.
- Explain physiotherapy terminologies regarding musculoskeletal system.
- Describe in detail principles and concepts of musculoskeletal physical therapy examination, evaluation, assessment, documentation and management.

### **COURSE CONTENTS**

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

#### **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.

## **EXERCISE INTERVENTIONS BY BODY REGION**

### **THE SPINE AND POSTURE: STRUCTURE, FUNCTION, POSTURAL IMPAIRMENTS & 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, & 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: non-operative management
- Glenohumeral joint surgery and postoperative management
- Painful shoulder syndromes (rotator cuff disease, impingement syndromes, shoulder instabilities):
- Non-operative management
- Painful shoulder syndromes: surgery and postoperative management
- Shoulder dislocations: non-operative management



- Shoulder instabilities: surgery and post-operative 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 & 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 & 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: non-operative 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: non-operative management
- Joint surgery and post-operative management
- Fractures of the hip—surgical and postoperative management

- Painful hipsyndromes/overuse syndromes:non-operative 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: non-operative management
- Joint surgery and post-operative management
- Patellofemoral dysfunction: non-operative management
- Patellofemoral and extensor mechanism dysfunction: Surgical and postoperative management
- Ligament injuries: non-operative management
- Ligament injuries: surgical and postoperative Management
- Meniscal tears: non-operative 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 & 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: non-operative management
- Joint surgery and post-operative management
- Overuse (repetitive trauma) syndromes: non-operative management
- Ligamentous injuries: non-operative 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

### **LAB WORK**

- 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, and extremities.

- 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 BOOKS**

1. Therapeutics Exercises and Technique, By: Carolyn Kisner & Lynn Allen Colby 4th 5th edition.
2. Therapeutics Exercises: Techniques for Intervention By: Willim D. Bandy.
3. Clinical decision making in therapeutic exercise By: Patricia e. Sullivan & prudence d. Markos, Appleton & Lange Norwalk, Connecticut.
4. 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.
5. Orthopaedic Physical Therapy By: Donatelli & Michael J. Wooden 4th Edition.
6. Physiotherapy in Orthopaedics, A problem-solving approach By: Atkinson, Coutts & Hassenkamp 2<sup>nd</sup> Edition.
7. Clinical orthopaedic rehabilitation By S. Brent. Brotzman & Kevin. E. Wilk, 2<sup>nd</sup> edition, Mosby publishers.
8. Management of Common Musculoskeletal Disorder by: Hertling, D, and Kessler RM Physical Therapy Principles and Methods. 3<sup>rd</sup> ed. Philadelphia. PA: WB Saunders.
9. Orthopedic Physical Assessment. Magee, D. 4<sup>th</sup> ed. Philadelphia PA: WB Saunders 1995.
10. Physical Rehabilitations Assessments and Treatment". By Susan B, O'Sullivan & Thomas J. Schmitz , 4<sup>th</sup> edition.
11. Tidy's Physiotherapy by Thomas A Skinner & Piercy.

### **EVIDENCE BASED PRACTICE CREDIT HOURS 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. Current journal articles, texts, and online resources will be used in the course to develop critical reading and writing skills.

### **LEARNING OBJECTIVES**

- Discuss in detail the concept of evidence based practice in physical therapy.
- Demonstrate the latest skills needed for obtaining, evaluating, critiquing and applying the scientific literature pertaining to physical therapy practice.

### **COURSE CONTENTS**

#### **EVIDENCE-BASED PHYSIOTHERAPY**

- An introduction about evidence-based Physiotherapy:
- High quality clinical research
- Patient preferences
- practice knowledge
- Additional factors
- Introduction to clinical decision making and process
- Importance of evidence-based Physiotherapy for patients, physiotherapists, profession and funders of physiotherapy services
- History of Evidence-Based Health Care
- Steps for practicing evidence-based Physiotherapy.

#### **INFORMATIONAL NEEDS**

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

#### **CONSTITUTION OF 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 OR

- Finding Evidence of Effects of Interventions
- PEDro
- The Cochrane Library
- Finding Evidence of Prognosis and Diagnostic Tests
- Finding Evidence of Experiences
- CINAHL
- PubMed
- 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
- Unprofessional 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.

### **LAB WORK**

- 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 BOOKS:**

1. Practical Evidence based physiotherapy By, Rob Herbert, GroJamtdvedt, Judy Mead & KareBirger Hagen.
2. Asking the right question-A guide to critical thinking, 8<sup>th</sup> Edition By, M. Neil. Browne & Stuart M Keeley.
3. Additional reading material as assigned.

### **SUPERVISED CLINICAL PRACTICE – III CREDITS 3 (0-3)**

#### **MUSCULOSKELETAL**

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
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7	Supervised by Trained PT	Musculoskeletal Examination	All wards	As listed below
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### **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.

### **CLINICAL 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
- 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:**

- Accessory movement tests
- Anthropometrics
- Limb length
- Limb girth
- Body composition
- Functional strength testing
- Joint integrity
- Joint mobility
- Ligament laxity tests
- Muscle length
- Muscle strength including manual muscle testing, dynamometry, one repetition max
- Palpation
- Range of motion including goniometric measurements.

**PERFORM ORTHOTIC TESTS AND MEASURES INCLUDING**

- Components, alignment, fit, and ability to care for orthotic, protective, and supportive devices and equipment.
- Evaluate the need for orthotic, protective, and supportive devices used during functional activities.



- Remediation of impairments in body function and structure, activity limitations, and participation restrictions with use of orthotic, protective, and supportive device.
- Residual limb or adjacent segment, including edema, range of motion, skin integrity and strength.
- Safety during use of orthotic, protective, and supportive device.
- Perform prosthetic tests and measures including\*:
- Alignment, fit, and ability to care for prosthetic device.
- Prosthetic device use during functional activities.
- Remediation of impairments in body function and structure, activity limitations, and participation restrictions, with use of prosthetic device.
- Evaluation of residual limb or adjacent segment, including edema, range of motion, skin integrity, and strength.
- Safety during use of the prosthetic device.
- Perform tests and measures for assistive and adaptive devices including\*:
- Assistive or adaptive devices and equipment use during functional activities.
- Components, alignment, fit, and ability to care for the assistive or adaptive devices and equipment.
- Remediation of impairments in body function and structure, activity limitations, and participation restrictions with use of assistive or adaptive devices and equipment.
- Safety during use of assistive or adaptive equipment.

#### **EVALUATION**

- Clinical reasoning
- Clinical decision making
- 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.
- Use available evidence in interpreting the examination findings.
- Verbalize possible alternatives when interpreting the examination findings.
- Cite the evidence (patient/client history, lab diagnostics, tests and measures and scientific literature) to support a clinical decision.

#### **DIAGNOSIS**

- Integrate the examination findings to classify the patient/client problem in terms of body functions and structures, and activities and participation (practice patterns in the Guide)

- 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**

- Determine the predicted level of optimal functioning and the amount of time required to achieve that level.
- Recognize barriers that may impact the achievement of optimal functioning within a predicted time frame including:
  - Age
  - Medication(s)
  - Socioeconomic status
  - Co-morbidities
  - Cognitive status
  - Nutrition
  - Social Support
  - Environment.

### **PLAN OF CARE**

- Goal setting
- Coordination of Care
- Progression of care
- Discharge
- Design a Plan of Care
- Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.
- Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.
- Identify patient/client goals and expectations.
- Identify indications for consultation with other professionals.
- Make referral to resources needed by the patient/client (assumes knowledge of referral sources).
- Select and prioritize the essential interventions that are safe and meet the specified functional goals and outcomes in the plan of care
- Identify precautions and contraindications
- provide evidence for patient-centered interventions that are identified and selected
- define the specificity of the intervention (time, intensity, duration, and frequency)
- Set realistic priorities that consider relative time duration in conjunction with family, caregivers, and other health care professionals.

- Establish criteria for discharge based on patient goals and current functioning and disability.
- Coordination of Care
- Identify who needs to collaborate in the plan of care.
- Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral.
- Refer and discuss coordination of care with other health care professionals.
- Articulate a specific rationale for a referral.
- Advocate for patient/client access to services.
- Progression of Care
- Identify outcome measures of progress relative to when to progress the patient further.
- Measure patient/client response to intervention.
- Monitor patient/client response to intervention.
- Modify elements of the plan of care and goals in response to changing patient/client status, as needed.
- Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
- Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan
- Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
- Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.
- Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
- Include patient/client and family/caregiver as a partner in discharge.
- Discontinue care when services are no longer indicated.
- When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
- 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
- Demonstrate appropriate sequencing of events related to universal precautions.
- Use Universal Precautions.
- Determine equipment to be used and assemble all sterile and non-sterile materials.
- Use transmission-based precautions.
- Demonstrate aseptic techniques.
- Apply sterile procedures.
- Properly discard soiled items.

#### **BODY MECHANICS AND POSITIONING**

- Apply proper body mechanics (utilize, teach, reinforce, and observe).
- Properly position, drape, and stabilize a patient/client when providing physical therapy.

#### **INTERVENTIONS**

- Coordination, communication, and documentation may include:
- Addressing required functions:
- 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.
- Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
- Follow advance directives.
- Admission and discharge planning.
- Case management.
- Collaboration and coordination with agencies, including:
- Home care agencies
- Equipment suppliers
- Schools
- Transportation agencies
- Payer groups
- Communication across settings, including:
- Case conferences

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

**THERAPEUTIC EXERCISE MAY INCLUDE PERFORMING**

- Body mechanics and postural stabilization:
  - Body mechanics training
  - Postural control training
  - Postural stabilization activities
  - Posture awareness training

- Flexibility exercises:
- Muscle lengthening
- Range of motion
- Stretching
- Gait and locomotion training:
- Developmental activities training
- Gait training
- Device training
- Perceptual training
- Basic wheelchair training
- Strength, power, and endurance training for head, neck, limb, and trunk
- Active assistive, active, and resistive exercises (including concentric, dynamic/isotonic, eccentric, isokinetic, isometric, and plyometric exercises)
- Aquatic programs
- Task-specific performance training
- Strength, power, and endurance training for pelvic floor:
- Active (Kegel)
- Strength, power, and endurance training for ventilatory muscles
- Active and resistive
- Manual therapy techniques may include:
- Passive range of motion
- Massage:
- Connective tissue massage
- Therapeutic massage
- Manual traction
- Mobilization/manipulation:
- Soft tissue (thrust and non-thrust)
- Spinal and peripheral joints (thrust and non-thrust)
- 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:
- Bed mobility and transfer training
- Age appropriate functional skills
- Barrier accommodations or modifications
- Device and equipment use and training:
- Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)
- Orthotic, protective, or supportive device or equipment training during self-care and home management

- Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
- Functional training programs
- Simulated environments and tasks
- Task adaptation
- Injury prevention or reduction:
- Safety awareness training during self-care and home management\*
- Injury prevention education during self-care and home management
- Injury prevention or reduction with use of devices and equipment
- Prescription, application, and, as appropriate, fabrication of devices and equipment may include:
  - Adaptive devices
  - Hospital beds
  - Raised toilet seats
  - Seating systems – prefabricated
  - Assistive devices
  - Canes
  - Crutches
  - Long-handled reachers
  - Static and dynamic splints – prefabricated
  - Walkers
  - Wheelchairs
  - Orthotic devices:
    - Prefabricated braces
    - Prefabricated shoe inserts
    - Prefabricated splints
    - Prosthetic devices (lower-extremity)
  - Protective devices:
    - Braces
    - Cushions
    - Helmets
    - Protective taping
  - Supportive devices:
    - Prefabricated compression garments
    - Corsets
    - Elastic wraps
    - Neck collars
    - Slings
  - Supplemental oxygen - apply and adjust
  - Supportive taping

- Electrotherapeutic modalities may include:
- Biofeedback
- Electrotherapeutic delivery of medications (eg, iontophoresis)
- Electrical stimulation:
- Electrical muscle stimulation (EMS)
- Functional electrical stimulation (FES)
- High voltage pulsed current (HVPC)
- Neuromuscular electrical stimulation (NMES)
- Transcutaneous electrical nerve stimulation (TENS)
- Physical agents and mechanical modalities may include:
- *Physical agents:*
- Cryotherapy:
- Cold packs
- Ice massage
- Vapocoolant spray
- Hydrotherapy:
- Contrast bath
- Pools
- Whirlpool tanks
- Sound agents:
- Phonophoresis
- Ultrasound
- Thermotherapy
- Dry heat
- Hot packs
- Paraffin baths
- Mechanical modalities: Compression therapies (prefabricated)
- Compression garments: Skill Category Description of Minimum Skills
- Vasopneumatic compression devices
- Taping
- Compression bandaging (excluding lymphedema)
- Gravity-assisted compression devices:
- Standing frame
- Tilt table
- Mechanical motion devices:
- Continuous passive motion (CPM)
- Traction devices
- Intermittent
- Positional
- Sustained
- Documentation of all listed competencies in SOAP notes format

**Note**



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

#### **EIGHTH SEMESTER**

1. **MEDICINE - II**
2. **SURGERY - II**
3. **NEUROLOGICAL PHYSICAL THERAPY**
4. **RESEARCH METHODOLOGY & SCIENTIFIC INQUIRY**
5. **EMERGENCY PROCEDURE & PRIMARY CARE IN PHYSICAL THERAPY**
6. **SUPERVISED CLINICAL PRACTICE - IV**

#### **MEDICINE-IICREDIT HOURS 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 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.

##### **LEARNING OBJECTIVES**

- Discuss history and physical examination related to dermatology, diseases of the brain and the spinal cord, renal diseases, blood and other miscellaneous conditions mentioned in the course contents.
- Identify social and psychological components of patients' medical problems.
- Discuss disease process, indications and limitations of clinical sources such as laboratory and roentgen graphic studies, consults, family input and old records to request and interpret data pertinent to problem solving.

##### **COURSE CONTENTS**

###### **DERMATOLOGY**

- Acne vulgaris
- Psoriasis
- Boils
- Carbuncles
- Alopecia
- Mycosis fungoides

- Polymorphic light eruptions
- Vitiligo
- Pityriasis
- Hyperhidrosis

#### **DISEASES OF BRAIN AND SPINAL CORD**

- Identify the common neurological symptoms including brain death, Sleep, Unconsciousness and Coma.
- Carry out general neurological examination
- Stroke, types of stroke, Parkinson's disease, Epilepsy, Multiple Sclerosis, Infective and Inflammatory diseases, 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
- Different types of Intracranial tumors

#### **RENAL DISEASES**

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

#### **DISEASES OF THE BLOOD**

- Describe Anaemia, Types of Anaemia, Bleeding and Coagulation, Haemophilia and Thrombosis

#### **MISCELLANEOUS DISEASES**

- Describe Diabetes Mellitus and its complications, Diabetic Neuropathy, Diabetic foot and Steroid induced Myopathy.

#### **RECOMMENDED BOOKS**

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

#### **SURGERY – II**

**CREDIT HOURS 3 (3-**

**0)**

#### **COURSE DESCRIPTION**

This course intends to familiarize students with principles of surgery along with familiarization with terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores various

conditions needing surgical attention, focusing on epidemiology, pathology, as well as primary and secondary clinical characteristics and their surgical management

### **LEARNING OBJECTIVES**

- Demonstrate the pre- and post-operative care of patients.
- Describe presentations of major surgical problems, establish correlations among clinical observation, surgical (operative) pathology, and the physiological alterations achieved through surgery.
- Differentiate the surgical health care delivery to both inpatients and outpatients in a variety of settings
- Describe the surgical management of disease.
- Recognize the entire treatment cycle of the surgical patient from diagnosis to operative management and through recovery.

### **COURSE CONTENTS**

#### **GENERAL SURGERY**

- Describe the 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
- Explain chest and abdominal trauma, Hemorrhage, hemostasis and blood transfusion.
- Classification of shock, Fluid and electrolyte balance, Classification of body fluid changes, Pre, intra and post-operative fluid therapy.
- precautions for Surgery in diabetic patients
- Classify Burns, Types and degrees of Burns in pediatric and adults,
- Classify Grafts, Types of Grafts, Identify post- grafting precautions,
- Different types of tumors and their classifications.
- Discuss Preoperative assessment & preparation, Post -operative treatment, complications and their management.
- Describe the Types of anaesthesia, Local anaesthetic agents and Regional anaesthesia (spinal and epidural), Intravenous anaesthetic agents, Muscle relaxants, Inhalational anaesthetic agents, Anaesthesia and associated diseases, Complications of anaesthesia, Perioperative management, Recovery from anaesthesia.
- Review Pain management and postoperative care.
- Identify Ulcers, sinuses and fistulas
- Describe 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

- Describe the Indications of Transplantation, Post- Operative Complications and precautions of Transplantation of liver and kidney.

## **THORACIC SURGERY**

### **PULMONARY SURGERY**

- Explain the Indications of pulmonary surgery, types of incision, types of operation, complications of pulmonary surgery, drains, and tubes.
- Describe pneumonectomy, lobectomy, thoracoplasty and Operations on pleura.
- Recognize the types of Chest injuries, Causes, management procedures.
- Describe the Diseases of chest wall and pleura, Diseases of bronchi
- Identify different types of Lung tumors and their classifications, Lung abscess, Hydatid disease of lung, pulmonary embolism, Mediastinal masses, Problems related to diaphragm

### **CARDIAC SURGERY**

- Explain the Indications of Cardiac surgery, 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, Congenital heart disease Acquired heart diseases, Diseases of the pericardium
- Describe the Indications of Cardiac Transplantation, Post- Operative Complications and precautions of Transplantation.

### **VASCULAR SURGERY**

- Describe the Indications of Vascular surgery, Investigation in vascular disease types of operation, Complication of vascular surgery, arterial occlusion, Gangrene, amputation and its types, 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**

- Describe the Indications of Cranial surgery, Special investigation in brain diseases and traumas, Types of operations and complications of cranial surgery

- Explain Traumatic brain injuries, Acute intracranial hematomas and Fractures of the skull
- Describe the Intra cranial abscess, intracranial tumors, intracranial aneurysm and hydrocephalus.

### **SURGERY OF VERTEBRAL COLUMN, SPINAL CORD AND PERIPHERAL NERVES**

- Describe Dislocation and management of dislocation of vertebral column, Tumors of vertebral column
- Explain Prolapse intervertebral disc, Disc protrusion, Spondylosis and spondylolisthesis.
- Classify Spinal cord injuries and syndromes.
- Assess the level, complete and incomplete spinal cord injuries and rehabilitation potential.
- Describe the Surgical, medical Management and post- operative care of Spinal cord injuries.
- Describe Tumors of spinal cord types of operations performed on nerves, Nerve injuries and their surgical management,
- Describe the lesions of cranial and spinal nerves and their management.

### **RECOMMENDED 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.

### **NEUROLOGICAL PHYSICAL THERAPY CREDIT HOURS 3(2-1)**

#### **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. Clinical competence in the evaluation and treatment of persons with neurological impairments is to be developed. It will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area.

#### **LEARNING OBJECTIVES**

- Demonstrate assessment of patients with various neurological pathologies.
- Explain various intervention strategies & procedures to manage patients with various neurological pathologies.
- Describe motor control & motor learning theories and their applications with regard to contemporary management of the neurological problems.
- Describe motor control & neuro developmental approaches of interventions.
- Discuss and demonstrate to manage patients with various neurological pathologies.

## **COURSE CONTENTS**

### **APPLIED ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM**

- Functional and applied anatomy of Brain, Spinal cord, CNS Support Structures, Neurons, Peripheral nervous system, autonomic Nervous System and Spinal Level Reflexes.

### **NEUROLOGICAL EXAMINATION**

- Perform assessment of patients with various neurological pathologies.
- Conduct & document clinical examination (History, System review, Test and measures, used in standardized assessment procedure
- Evaluate and Analyze clinical assessment procedures to construct a problem list, long term Goals, Short term goals, Treatment plan, Progression and discharge planning..

### **INTERVENTIONS**

- Different theories of Motor Control and Motor Learning, their limitations and clinical implications
- Neurodevelopmental (NDT) approaches and their clinical implications in the management of patients with neurological pathologies such as;
  - Roods approach
  - Bobath approach
  - Kabat, Knott, Voss (Proprioception neuro facilitation PNF Approach).
  - Burnstorm Approach.
- Contemporary approaches and their clinical implications in the management of patients with neurological pathologies such as;
  - Motor Control / Motor Learning Approach
  - Neural plasticity/ adoptability

- Constraint induced movement therapy (CIMT)
- Modified Constrained Induced Movement Therapy (mCIMT)
- Task-Related Training Approach
- Compensatory Training Approach
- Normal Reach, Grasp and Manipulation.
- Construct treatment strategies to improve, strength, Balance, coordination, locomotion and gait, skill acquisition, postural control, mobility functions.
- Role of sensory system in improving motor control and sensory rehabilitation.

### **NEUROLOGICAL DYSFUNCTIONS**

- Assess and manage Stroke, types of stroke, problems associated with stroke
- Assess and manage traumatic Brain Injury (TBI), Types and severity of Problems associated with TBI
- Assess and manage Spinal Cord Injury (SCI), Complete and incomplete SCI, clinical Syndromes and problems associated with SCI.
- Assess and manage brain and spinal cord disorders such as;
  - Multiple Sclerosis (MS)
  - Cerebellar Disorders
  - Parkinson's Disease (PD)
  - Motor Neuron Disease (MND)
  - Poly Neuropathies.
  - Post polio Syndrome (PPS)
  - Vestibular Disorders
  - Cranial Nerves Disorders
  - Myasthenia gravis
  - Spinal muscular atrophy

### **PERIPHERAL NERVE DISORDERS AND MANAGEMENT**

- Peripheral nerve structure; nerve structure, nervous system mobility characteristics
- Common sites of injury to peripheral nerves, impaired nerve function and recovery process
- Neural tension disorders and their managements
- Neuromuscular disorders involving impaired nerve function such as:
  - Thoracic outlet syndrome
  - Carpal tunnel syndrome
  - Compression in tunnel of Guyon
  - Complex regional pain syndrome:
  - Reflex sympathetic Dystrophy and causalgia.

### **LAB WORK**

- 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

### **RECOMMENDED 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

### **RESEARCH METHODOLOGY & SCIENTIFIC INQUIRY CREDIT HOURS 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.

#### **LEARNING OBJECTIVE**

- Identify the basic concepts of research and scientific inquiry and its methodologies
- Identify appropriate research topics
- Define appropriate research problem and parameters
- Construct a project proposal to undertake a research project.
- Discuss scientific Inquiry, its principle and application in medical research.
- Describe Search techniques for literature review
- Differentiate between different levels of evidence, appraisal and different studies with respect to their effectiveness in literature.

#### **COURSE CONTENTS**

##### **RESEARCH FUNDAMENTALS**

- Research in physical therapy and rehabilitation
- Role, importance, principles and application of Ethics in Rehabilitation research.
- Basic vs applied research.



- Research Problems / Questions, and Hypotheses, Research Paradigms, Research Validity and reliability

### **SAMPLING**

- Discuss Selection of sample: sample & population, basic considerations in sampling, determination of sample size, elimination of sampling bias and types of sampling such as: Random sampling, stratified random sampling, cluster sampling and systematic sampling.

### **RESEARCH DESIGN**

- Describe different research designs
- Differentiate between experimental & non-experimental, qualitative and quantitative and epidemiological research designs.
- Discuss different research methodologies used in experimental, and non-experimental, qualitative and quantitative and epidemiological research designs

### **RESEARCH PROJECT**

- Discuss various components of research synopsis and Thesis
- Develop a Research Plan while taking into account, the ethical, legal and professional obligations

### **INSTRUMENTATION AND DATA COLLECTION**

- Discuss, objectivity and standardization, types of tests and scales, validity and reliability of an instrument, assessment of validity and reliability, development of tests/scale

### **DATA ANALYSIS & INTERPRETATION**

- Analyze data
- Describe types of measurement scales, descriptive statistics and inferential statistic.
- Perform data entry and Analysis using statistical package for Social Sciences (SPSS)

### **PREPARATION OF A RESEARCH REPORT**

- Use Formatting & styling, citation, references & bibliography
- Differentiate theses writing, dissertations & journal articles writing.

### **SCIENTIFIC INQUIRY**

- Describe scientific inquiry, Evidence based approach to scientific inquiry, Principles of scientific inquiry, the application of scientific inquiry to physical therapy.
- Access digital libraries and different research databases, Effective searching and reviewing literature material.
- Interpret Critical appraisal of published research in the areas of:
  - Examination and Evaluation

- Diagnosis
- Prognosis
- Intervention
- Harm
- Interpret Critical evaluation of Randomized Control Trial (RCT), Systemic review, Diagnosis and screening tests, Case reports
- Discuss how to conduct clinical research and hierarchy of evidences in clinical researches

#### **LAB WORK**

- Literature review
- Selection of research topic & submission of research proposal

#### **RECOMMENDED BOOKS**

1. *Essentials of clinical research* By Stephan P. Glasser.
2. *Rehabilitation Research (Principles and Applications)* 3<sup>rd</sup> Edition By Elizabeth Domholdt.

### **EMERGENCY PROCEDURES & PRIMARY CARE IN PHYSICAL THERAPY CREDIT HOURS 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, first aid and emergency. The course is designed to provide knowledge and skills in emergency techniques and in the application of appropriate action necessary to take care of the patient/client.

#### **LEARNING OBJECTIVE**

- Provide knowledge and skill in emergency techniques
- Application of appropriate action necessary to take care of the patient/client
- Describe Basic life support
- Describe first aid and emergency preparedness

#### **COURSE CONTENTS**

##### **ORGANIZATION AND ADMINISTRATION OF EMERGENCY CARE**

- Developing and implementing emergency action plan, Emergency team.
- Initial patient assessment and care, Emergency equipment, Venue location, Emergency transportation, Emergency care facilities, Legal need and documentation.

### **PHYSICAL EXAMINATION OF THE CRITICALLY INJURED PATIENT/ATHLETE**

- Conduct Scene assessment, Vital signs and safety
- Description of Body substance, isolation precautions
- Differentiate between Primary survey and Secondary survey

#### **AIRWAY MANAGEMENT**

- Air way anatomy, Air way compromise, Oxygen therapy and advanced airway devices.

#### **SUDDEN CARDIAC DEATH**

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

#### **HEAD INJURIES**

- Patho-mechanics of brain injuries
- Identify cerebral concussion, contusion, cerebral hematoma, Second impact syndrome.
- Performing Initial on site assessment, Sideline assessment, Special tests for assessment of coordination and cognition

#### **EMERGENCY CARE OF CERVICAL SPINE INJURIES**

- Mechanism of injuries to the spinal cord, Assessment and management.

#### **EMERGENCY GENERAL MEDICAL CONDITIONS**

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

#### **ENVIRONMENT-RELATED CONDITIONS**

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

#### **ORTHOPEDIC INJURIES**

- Describe Basic emergency medical care, Fundamentals of skeletal fractures and
- Perform Splinting techniques for;
- Fractures and dislocations of upper extremity
- Fractures and dislocations of lower extremity
- Fractures and dislocations of spine.

### **ABDOMINAL INJURIES**

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

### **THORACIC INJURIES**

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

### **THE PSYCHOLOGICAL AND EMOTIONAL IMPACT OF EMERGENCY SITUATIONS**

- Defining psychological trauma
- Describe Psychological trauma in athletic environment and Pharmacologic considerations for the physical therapist
- Define The psychological emergency response in both external and internal team members
- Describe the science behind the art the patient's interview.

### **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.
- Basic Life Supports & Supervised Intra Muscular/Intra venous Injection Therapy

**DISASTER MANAGEMENT**

- Floods
- Earth quakes
- Blasts
- Fire
- War
- Foods and communication in disasters

**RECOMMENDED BOOKS**

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

**SUPERVISED CLINICAL PRACTICE – IV CREDIT HOURSS 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**

- Analyze data 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.
- Recognize and characterize signs and symptoms of inflammation.
- Perform neurological tests and measures including:
  - Arousal, attention and cognition tests and measures.
  - Cranial and peripheral nerve integrity tests and measures.
    - Motor distribution of the cranial nerves (eg, muscle tests, observations)
    - Motor distribution of the peripheral nerves (eg, dynamometry, muscle tests observations, thoracic outlet tests)
    - Response to neural provocation (e.g. tension test, vertebral artery compression tests)

- Response to stimuli, including auditory, gustatory, olfactory, pharyngeal, vestibular, and visual (eg, observations, provocation tests)
- Neuromotor development and sensory integration tests
- Acquisition and evolution of motor skills, including age-appropriate development
  - Sensorimotor integration, including postural responses, equilibrium, and righting reactions
- Tests and measures for reflex integrity including:
  - Deep reflexes (eg, myotatic reflex scale, observations, reflex tests)
  - Postural reflexes and reactions, including righting, equilibrium and protective reactions
  - Primitive reflexes and reactions, including developmental
  - Resistance to passive stretch
  - Superficial reflexes and reactions
  - Resistance to velocity dependent movement
- Sensory integrity tests and measures that characterize or quantify including:
  - Light touch
  - Sharp/dull
  - Temperature
  - Deep pressure
  - Localization
  - Vibration
  - Deep sensation
  - Stereognosis
  - Graphesthesia.

### **EVALUATION**

- 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.
- Use available evidence in interpreting the examination findings.
- Verbalize possible alternatives when interpreting the examination findings.
- Cite the evidence (patient/client history, lab diagnostics, tests and measures and scientific literature) to support a clinical decision.

### **DIAGNOSIS**

- 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)

- 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**

- Determine the predicted level of optimal functioning and the amount of time required to achieve that level.
- Recognize barriers that may impact the achievement of optimal functioning within a predicted time frame including
  - Age
  - Medication(s)
  - Socioeconomic status
  - Co-morbidities
  - Cognitive status
  - Nutrition
  - Social Support
  - Environment

### **PLAN OF CARE**

- Perform Goal setting, Coordination of Care, Progression of care, Discharge
- Design a Plan of Care
- Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.
- Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.
- Identify patient/client goals and expectations.
- Identify indications for consultation with other professionals.
- Make referral to resources needed by the patient/client (assumes knowledge of referral sources).
- Select and prioritize the essential interventions that are safe and meet the specified functional goals and outcomes in the plan of care
- identify precautions and contraindications,
- provide evidence for patient-centered interventions that are identified and selected,
- define the specificity of the intervention (time, intensity, duration, and frequency),
- Set realistic priorities that consider relative time duration in conjunction with family, caregivers, and other health care professionals).
- Establish criteria for discharge based on patient goals and current functioning and disability.



### **COORDINATION OF CARE**

- Identify who needs to collaborate in the plan of care.
- Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral
- Refer and discuss coordination of care with other health care professionals
- Articulate a specific rationale for a referral.
- Advocate for patient/client access to services.

### **PROGRESSION OF CARE**

- Identify outcome measures of progress relative to when to progress the patient further.
- Measure patient/client response to intervention.
- Monitor patient/client response to intervention.
- Modify elements of the plan of care and goals in response to changing patient/client status, as needed.
- Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
- Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.

### **DISCHARGE PLAN**

- Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
- Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.\*
- Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
- Include patient/client and family/caregiver as a partner in discharge.\*
- Discontinue care when services are no longer indicated.
- When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
- Determine the need for equipment and initiate requests to obtain.

### **INTERVENTIONS**

- Perform Safety, Emergency Care, CPR and First Aid, Standard Precautions, Body Mechanics and Positioning
- Demonstrate appropriate sequencing of events related to universal precautions.

- Determine equipment to be used and assemble all sterile and non-sterile materials.
- Use transmission-based precautions.
- Demonstrate aseptic techniques.
- Apply sterile procedures.
- Properly discard soiled items.

#### **APPLY BODY MECHANICS AND POSITIONING**

- Apply proper body mechanics (utilize, teach, reinforce, and observe) properly position, drape, and stabilize a patient/client when providing physical therapy.

#### **INTERVENTIONS**

- Coordination, communication, and documentation may include:
- Addressing required functions:
- 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.
- Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
- Follow advance directives.

#### **ADMISSION AND DISCHARGE PLANNING**

- Case management.
- Collaboration and coordination with agencies, including:
- Home care agencies
- Equipment suppliers
- Schools
- Transportation agencies
- Payer groups

#### **COMMUNICATION ACROSS SETTINGS, INCLUDING**

- Case conferences
- Documentation
- Education plans
- Cost-effective resource utilization.
- Data collection, analysis, and reporting of:
- Outcome data
- Peer review findings
- Record reviews
- Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:

- Elements of examination, evaluation, diagnosis, prognosis, and Intervention
- Changes in body structure and function, activities and participation.
- Changes in interventions
- Outcomes of intervention
- Interdisciplinary teamwork:
- Patient/client family meetings
- Patient care rounds
- Case conferences
- Referrals to other professionals or resources.
- Patient/client-related instruction may include:
- Instruction, education, and training of patients/clients and caregivers regarding:
- Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)
- Enhancement of performance
- Plan of care:
- Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.
- Preferred interventions, alternative interventions, and alternative modes of delivery
- Expected outcome
- Health, wellness, and fitness programs (management of risk factors)
- Transitions across settings

#### **THERAPEUTIC EXERCISE MAY INCLUDE PERFORMING**

Balance coordination and agility training:

- Developmental activities training
- Motor function (motor control and motor learning) training
- Neuromuscular education or reeducation
- Perceptual training
- Posture awareness training
- Sensory training or retraining
- Standardized, programmatic approaches
- Task-specific performance training
- Neuromotor development training:
- Developmental activities training\*
- Motor training
- Movement pattern training
- 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: Bed mobility and transfer training, Age appropriate functional skills
- Barrier accommodations or modifications
- Device and equipment use and training:
- Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
- Orthotic, protective, or supportive device or equipment training during self-care and home management\*
- Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)\*
- Functional training programs:
- Simulated environments and tasks\*
- Task adaptation
- Injury prevention or reduction:
- Safety awareness training during self-care and home management\*
- Injury prevention education during self-care and home management
- Injury prevention or reduction with use of devices and equipment
- Prescription, application, and, as appropriate, fabrication of devices and equipment may include:
- Adaptive devices:
- Hospital beds
- Raised toilet seats
- Seating systems – prefabricated
- Assistive devices:
- Canes
- Crutches
- Long-handled reachers
- Static and dynamic splints – prefabricated
- Walkers
- Wheelchairs
- Orthotic devices:
- Prefabricated braces
- Prefabricated shoe inserts
- Prefabricated splints
- Prosthetic devices (lower-extremity)
- Protective devices:

- Braces
- Cushions
- Helmets
- Protective taping
- Supportive devices
- Prefabricated compression garments
- Corsets
- Elastic wraps
- Neck collars
- Slings
- Supplemental oxygen - apply and adjust
- Supportive taping
- Electrotherapeutic modalities may include:
- Biofeedback
- Electrotherapeutic delivery of medications (eg, iontophoresis)
- Electrical stimulation: Electrical muscle stimulation (EMS), Functional electrical stimulation (FES) High voltage pulsed current (HVPC) Neuromuscular electrical stimulation (NMES) Transcutaneous electrical nerve stimulation (TENS)
- Physical agents and mechanical modalities may include:  
*Physical agents;*
- Cryotherapy
- Cold packs
- Ice massage
- Vapocoolant spray
- Hydrotherapy
- Contrast bath
- Pools
- Whirlpool tanks
- Sound agents
- Phonophoresis
- Ultrasound
- Thermotherapy
- Dry heat
- Hot packs
- Paraffin baths
- Mechanical modalities:
- Compression therapies (prefabricated)
- Compression garments: Skill Category Description of Minimum Skills
- Vasopneumatic compression devices\*
- Taping
- Compression bandaging (excluding lymphedema)
- Gravity-assisted compression devices:

- Standing frame
- Tilt table
- Mechanical motion devices
- Continuous passive motion (CPM)
- Traction devices
- Intermittent
- Positional
- Sustained
- Documentation of all listed competencies in SOAP notes format.

**Note**

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

**NINTH SEMESTER**

1. **CARDIOPULMONARY PHYSICAL THERAPY**
2. **PROSTHETICS & ORTHOTICS**
3. **CLINICAL DECISION MAKING & DIFFERENTIAL IAGNOSIS**
4. **MANUAL THERAPY**
5. **PROFESSIONAL PRACTICE (LAWS, ETHICS & ADMINISTRATION)**
6. **INTEGUMENTARY PHYSICAL THERAPY**
7. **SUPERVISED CLINICAL PRACTICE-V**

**CARDIOPULMONARY PHYSICAL THERAPY CREDIT HOURS 3(2-1)**

**COURSE DESCRIPTION**

This course includes applied anatomy, applied physiology and pathology of the cardiopulmonary system. This course discuss 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 cardiopulmonary systems disorders. The use of evidence-based physical therapy intervention for cardiopulmonary 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.

**COURSE OBJETIVES**

- Demonstrate the basic knowledge of applied anatomy, physiology & pathology.
- Demonstrate, evaluate & perform examination in cardiopulmonary conditions

- Apply evidence based physical therapy intervention.

## **COURSE CONTENTS**

### **MEDICAL TERMINOLOGY REGARDING CARDIOPULMONARY SYSTEM**

#### **INTRODUCTION**

#### **APPLIED 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.

#### **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 (Overview with reference to the Physical Therapist)**

- Introduction
- Assessment
- The transplantation process
- Donors
- Operative procedures
- Postoperative care
- Rejection of the transplanted organs
- Immunosuppressant
- Special considerations for the physiotherapist
- Denervation of the heart/lungs
- 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 programme
- 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.

#### **LAB WORK**

- Principles of assessment and outcome measures
- Documentation in SOAP notes format
- Evidence based cardiopulmonary Physical Therapy Treatment protocols.
- Airway clearance
- Breathing exercises
- Postural drainage
- Cardio pulmonary exercise prescriptions
- Practical related to the course work

#### **RECOMMENDED BOOKS**

1. Physiotherapy in Respiratory Care; An evidence based approach to respiratory and cardiac management, By Alexandra Hough (3<sup>rd</sup> Edition) Nelson Thornes.
2. Essentials of Cardiopulmonary Physical Therapy (2<sup>nd</sup> Edition) By Hillegass and Sadowsky.
3. *Physiotherapy for respiratory and cardiac problems*, By: Jennifer A. Pryor & Barbara A. Webber, 2<sup>nd</sup> edition, Churchill Livingstone.
4. *Tidy's Physiotherapy* by Thomas A Skinner & Piercy.
5. *Therapeutics Exercises and Technique* by Carolyn Kisner & Laynn Allen Colby 5<sup>th</sup> & 6<sup>th</sup> edition.
6. *Cash's Text book of General Medical & Surgical Condition for Physiotherapists* by Patrica A. Downie.
7. *Cash's Textbook of chest, heart and vascular condition for physiotherapist* by Patrica A. Downie.
8. *Chest Physio for the War wounded*, by Mahboob-urRehman, National Book Foundation.

#### **PROSTHETICS & ORTHOTICS CREDIT HOURS 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 to utilize prosthetic or orthotic devices. Basic principles of mechanical physics and material characteristics will be applied.

#### **LEARNING OBJECTIVE**

- Describe various types of prosthetics & Orthotics
- Discuss the prescription of orthotics and prosthetics according to the different conditions

#### **COURSE CONTENTS**

##### **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 Protheses for Recreation
- Future Prosthetic Advances and Challenges
- Future Surgical and Educational Advances and Challenges.

#### **RECOMMENDED BOOKS**

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

2. Orthotics a comprehensive clinical approach By: Joan E Eldestein& Jan Bruckner.

**CLINICAL DECISION MAKING & DIFFERENTIAL DIAGNOSIS  
CREDIT HOURS 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 neuro-musculoskeletal 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.

**LEARNING OBJECTIVES**

- Discuss the screening and differentiate the medical conditions
- Discuss clinical decision making in physical therapy.

**COURSE CONTENTS**

**SCREENING AND INTERVIEWING, THE PT SCOPE OF PRACTICE:  
TO REFER OR TREATINTRODUCTION 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
- Multi segmental 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.

#### **CLINICAL DECISION MAKING (CDM)**

- Definition
- Process of CDM
- Skills required for CDM
- Models of CDM

#### **RECOMMENDED BOOKS**

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

**MANUAL THERAPY CREDIT HOURS****3(2-1)****COURSE DESCRIPTION**

This course provides review of all Manual Therapy techniques, covering spine, peripheral joint mobilizations, Temporo-Mandibular joint, advanced myofascial trigger point therapy, Proprioceptive training, muscle energy techniques, strain counter strain techniques, neuromobilization combination techniques and mobilization, manipulation techniques.

**LEARNING OBJECTIVES**

- Discuss various concepts of manual therapy techniques
- Discuss principles of manual therapy
- Demonstrate skills in application of manual therapy techniques

**COURSE CONTENTS****FOUNDATION CONCEPTS 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
- Non resting positions
- Joint locking
- Bone and joint movement
- Rotations of a vertebral bone
- Standard bone movements
- Combined bone movements
- Coupled movements
- Non coupled movements
- Joint roll-gliding associated with bone rotations
- Joint roll-gliding
- Abnormal roll-gliding
- Translation of vertebral bone
- Joint play associated with bone translation.

### **TRANSLATORIC JOINT PLAY**

- The Kaltenbom Treatment Plane
- Translatoric Joint Play Movements
- Determining the direction of restricted gliding
- Glide test
- Kaltenbom Convex-Concave Rule
- Grades of translatoric movement
- Normal grades of translatoric movement (Grades I - III)
- Palpating resistance to normal movement
- Pathological grades of translatoric movement
- Using translatoric grades of movement.

### **TESTS OF FUNCTION**

- Principles of function testing
- Assessing quantity of movement
- Measuring rotatoric movement with a device
- Manual grading of rotatoric movement ( - 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
- Translatoric 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 -II SZ)
- Vibrations and oscillations
- Relaxation mobilization
- Relaxation-traction mobilization (Grade I -II)
- Stretch mobilization
- Stretch-traction mobilization (Grade III)
- Stretch-glide mobilization (Grade I)
- 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**

## **PERIPHERAL JOINT MOBILIZATION TECHNIQUES**

### **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.

## **LAB WORK**

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 BOOKS**

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

### **PROFESSIONAL PRACTICE IN PHYSICAL THERAPY CREDIT HOURS 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 changes in the profession and its responsibilities to the profession, the public and to the health care team.

### **LEARNING OBJECTIVES**

- Discuss cultural competencies, education techniques, ethics, law & administration in Physical therapy practices.

### **COURSE CONTENTS**

#### **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.
- Practical related to the course work

##### **CONSULTATION IN PHYSICAL THERAPY**

- Introduction to Consultation in Physical Therapy:
- The Way the Consultation is Carried out:
- Patient-Related Consultation:
- Client-Related Consultation:
- Consultation Activities of Physical Therapist:
- Responding to a request for a second opinion:
- Advising a referring practitioner about the indications for intervention:
- Advising employers about the requirements of the Patients/Clients with Disabilities:
- Instructing employers about pre-placement in accordance with provisions of the Patients/Clients with Disabilities:
- Educating other health practitioners (eg, in injury prevention):
- Performing environmental assessments to minimize the risk of falls:
- Conducting a program to determine the suitability of employees for specific job assignments:
- Examining school environments and recommending changes to improve accessibility for students with disabilities:
- Developing programs that evaluate the effectiveness of an intervention plan in reducing work-related injuries:

- Working with employees, labor unions, and government agencies to develop injury reduction and safety programs:
- Participating at the local, state, and federal levels in policymaking for physical therapy services:
- Providing expert legal opinion:

### **SCREENING IN PHYSICAL THERAPY**

- Introduction to Screening in Physical Therapy
- The Way the Screening is Carried Out
- The Basis of Screening
- Problem-focused, systematic collection and analysis of data to
- Identify individuals at risk in order to provide primary Prevention:
- Identify those in need of physical therapy intervention or other rehabilitative services
- Ascertain the presence of positive findings that require attention by another health care practitioner in order to provide secondary or tertiary prevention
- Candidates for Screening
- Screening Activities of Physical Therapist
  - Identifying children who may need an examination for idiopathic scoliosis
  - Identifying risk factors in the workplace
  - Pre-performance testing of individuals active in sports
  - Identifying an individual's lifestyle factors (eg, exercise, stress, weight) that may lead to increased risk for serious health problems
  - Identifying elderly individuals in a community center or nursing home who are at high risk for slipping, tripping, or falling

### **DELEGATION IN PHYSICAL THERAPY**

- Introduction to Delegation in Physical Therapy:
- Delegation Pertinent Responsibilities of Physical Therapist:
- Interpretation of record of patient referred by health care provider:
- Initial evaluation and problem identification of patient:
- Development of plan of care and goals of treatment:
- Determination of appropriate portion of treatment program to be delegated to a physical therapist's assistant:
- Delegation of treatment to be administered by physical therapist's assistant:
- Instruction to the physical therapist's assistant regarding:
  - The specific program of treatment of a patient:
  - Any precaution to be taken to protect a patient:
  - Any special problem of a patient:

- Any procedure which should not be administered to a patient:
- The proper methods for documenting the treatment that is administered to the patient:
- Any other information required to treat a patient:
- Treatment review in a timely manner:
- Documentation of goal of treatment:
- Revision of plan of care when indicated:
- Revision of Documentation done by PTA during periodic reviews of the patient and make note of those reviews in the evaluation or reassessment of the patient:
- Case management and dissemination of any written and oral reports:
- Performance of final evaluation upon the discharge:
- When and When Not to Delegate:
  - National Perspectives:
  - International Perspectives:
- To Whom and to Whom Not to Delegate:
  - National Perspectives:
  - International Perspectives:
- Supervision of Treatment Program Delegated to a Physical Therapist's Assistant by Physical Therapist:

#### **CULTURAL COMPETENCY IN PHYSICAL THERAPY**

- General Consideration of Cultural Competence in Physical Therapy
  - Cultural Competence
  - Key Concepts
- Culture
- Principles and Assumptions
- Power and Privilege
- Exploring Differences
- Equitable Access
- Racism & Oppression
  - Elements of Cultural Competence
  - National Diverse Communities
  - International Diverse Communities
  - Providing Health Care in a Multicultural Society
  - Patient and Client Encounter Questions
  - LIAASE: A General Cultural Competence Tool
  - Health Professional Self-Assessment Tool
  - Steps to Cultural Study and Cultural Competence
  - Therapist's vs Patient's Culture
- Physical Therapist's Culture
- Understanding Patient's Culture
- Addressing Conflict

- LIAASE (Learn, Inquire, Avoid Polarization, Avoid Arguing and Defending, Show Empathy ): A General Cultural Competence Tool
- Health Professional Self-Assessment Tool

### **STANDARDS OF COMPETENCE IN PHYSICAL THERAPY**

- Need for developing standards of competence
- Assumptions behind the standards
- Why have standards not been developed for the physical therapist assistant
- Continuing competence
- How were these standards developed
- How are the standards presented
- To whom do these standards apply
- Domain 1-Professional Practice
  - Professional Accountability
  - Professional Behavior
  - Professional Development
- Domain 2-Patient/Client Management
  - Examination, Evaluation And Diagnosis
  - Plan Of Care
  - Implementation
  - Education
  - Discharge
- Cultural Heritage
- Communication in Cultural Context
- Family Roles and Organization Within Culture
- Cultural Workforce Issues
- High Risk Health Behaviors, Biocultural Ecology, and Nutrition in Light of Culture:
- Spirituality and Cultural Death Rituals
- Cultural Healthcare Practices and Roles of Healthcare Practitioners
- Selected Ethnic Cultures
  - Cultural Considerations for
    - Pakistani Cultures:
    - American / Black Cultures
    - Chinese Culture
    - Latino/Hispanic Client
    - American Indian Cultures
    - Middle Eastern Cultures
    - Jewish Clients
- Culture of Various Physical Therapy Populations
  - Disability across Cultures
  - Veteran and Military Culture and Physical Therapy

- The Challenge and Culture of Poverty and Homelessness
- Physical Therapy Cultural Encounters in Pediatrics
- Physical Therapy Cultural Encounters in Geriatrics
- 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

#### **LAWS, REGULATIONS, AND POLICIES FOR PHYSICAL THERAPY**

- National Laws, Regulations, and Policies for Physical Therapy:
- International Laws, Regulations, and Policies for Physical Therapy:
  - Arab Countries' Laws, Regulations, and Policies for Physical Therapy (e.g., UAE and KSA etc):
  - European Laws, Regulations, and Policies for Physical Therapy:
  - Australian & New Zealander Laws, Regulations, and Policies for Physical Therapy:
  - American Laws, Regulations, and Policies for Physical Therapy:
- Statutes and Regulations:
  - Statutes:
  - Regulations
  - Creating Statutes and regulation:
  - The Court System:
    - Criminal versus Civil Law
  - Criminal Law:
  - Civil Law:
  - Policies:
    - The American Physical Therapy Association:
    - Payer Reimbursement Policies:
    - Employer Policies:
- An Overview of Laws, Regulations, and Policies of different States for Physical Therapy:
  - The roles of World Confederation for Physical Therapy



(WCPT)

## **EDUCATION TECHNIQUES**

### **THE TEACHING-LEARNING PROCESS**

- Teaching Responsibilities:
- Components of the Teaching Process:
  - Analysis of the learner / assessment:
  - Analysis of data, formulation of objectives of instruction:
  - Analysis of instruction / planning:
  - Implantation:
  - Evaluation:
  - Documentation:

### **EDUCATIONAL THEORY**

- Learning Theories:
  - Behaviorist:
  - Cognitive:
  - Humanist:
  - Adult learning:
- Behavioral Objectives from the Educational Domains:
  - Cognitive:
  - Affective:
  - Psychomotor:

### **EDUCATION IN THE ACADEMIC ENVIRONMENT**

- Curriculum Design for Physical Therapy Educational Programs:
- From Curricular Goals to Instruction: Preparing to Teach:
- Teaching and Learning in Academic Settings:
- Physical Therapy Education in the Digital Age: Leveraging Technologies to Promote Learning:
- Assessing and Improving the Teaching and Learning Process in Academic Settings:
- Authentic Assessment: Simulation-Based Education:
- Strategies for Planning and Implementing Inter-professional Education

### **EDUCATION IN PRACTICE ENVIRONMENTS**

- Preparation for Teaching in Clinical Settings:
- Techniques for Teaching in Clinical Settings:
- Qualities of a Good Clinical Teacher:
- Facilitating the Teaching and Learning of Clinical Reasoning:
- Patient Education and Health Literacy:
- Applied Behavioral Theory and Adherence: Models for
  - Practice:
- Teaching and Learning Psychomotor Skills:

## **RECOMMENDED BOOKS**

1. *Professionalism in Physical Therapy: History, Practice, & Development*, Lisa L. Dutton, PT, PhD.
2. APTA. *Guide to Physical Therapy Practice: Revised second edition*. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85.
3. Handbook of Teaching for Physical Therapists
4. Katherine Shepard, Gail Jensen, 2011, ISBN: 978-1-4557-3470-2

## **INTEGUMENTARY PHYSICAL THERAPY CREDIT HOURS 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, 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.

### **LEARNING OBJECTIVES**

- Evaluate and assess integumentary conditions
- Demonstrate physical therapy intervention in integumentary conditions.

### **MEDICAL TERMINOLOGY REGARDING INTEGUMENTARY 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

### **BURNS**

- Skin and appendage
- Classification of burns
- Types of burns
- Criteria of care in burn center
- Physical therapy in different phases of burns

### **CASE HISTORIES**

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

### **RECOMMENDED BOOKS**

1. Wound Care Essentials, practice principles, By Sharon Baranoski& Elizabeth A. Ayello.
2. APTA. *Guide to Physical Therapy Practice: Revised second edition*. Alexandria, VA: American Physical Therapy Association; 2003. ISBN: 978-1-887759-85.

### **SUPERVISED CLINICAL PRACTICE – VCREDIT HOURS 3(0-3)**

#### **CARDIOVASCULAR AND PULMONARY**

<b>SEMESTER</b>	<b>SUPERVISION</b>	<b>FOCUS</b>	<b>WARDS</b>	<b>COMPETENCIES</b>
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

## **CLINICAL 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:
  - Heart rate
  - Respiratory rate, pattern and quality
  - Blood pressure
  - Aerobic capacity test\* (functional or standardized) such as the 6-minute walk test
  - Pulse Oximetry
  - Breath sounds – normal/abnormal
  - Response to exercise (RPE)
  - Signs and symptoms of hypoxia
  - Peripheral circulation (deep vein thrombosis, pulse, venous stasis, lymphedema).

#### **EVALUATION**

- Clinical reasoning
- Clinical decision making
- 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.
- Use available evidence in interpreting the examination findings.
- Verbalize possible alternatives when interpreting the examination findings.
- Cite the evidence (patient/client history, lab diagnostics, tests and measures and scientific literature) to support a clinical decision

#### **DIAGNOSIS**

- 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)
- 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**

- Determine the predicted level of optimal functioning and the amount of time required to achieve that level.
- Recognize barriers that may impact the achievement of optimal functioning within a predicted time frame including
  - Age
  - Medication(s)
  - Socioeconomic status
  - Co-morbidities
  - Cognitive status
  - Nutrition
  - Social Support
  - Environment.

### **PLAN OF CARE**

- Goal setting
- Coordination of Care
- Progression of care
- Discharge
- Design a Plan of Care
- Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes
- Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.
- Identify patient/client goals and expectations
- Identify indications for consultation with other professionals
- Make referral to resources needed by the patient/client (assumes knowledge of referral sources)
- 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)
- Establish criteria for discharge based on patient goals and current functioning and disability
- Coordination of Care
- Identify who needs to collaborate in the plan of care.
- Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral.

- Refer and discuss coordination of care with other health care professionals.
- Articulate a specific rationale for a referral.
- Advocate for patient/client access to services.
- Progression of Care
- Identify outcome measures of progress relative to when to progress the patient further.
- Measure patient/client response to intervention.
- Monitor patient/client response to intervention.
- Modify elements of the plan of care and goals in response to changing patient/client status, as needed
- Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
- Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan
- Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
- Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with re-evaluation.
- Prepare needed resources for patient/client to ensure timely discharge, including follow-up care
- Include patient/client and family/caregiver as a partner in discharge
- Discontinue care when services are no longer indicated.
- When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
- 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
- Demonstrate appropriate sequencing of events related to universal precautions.
- Use Universal Precautions.
- Determine equipment to be used and assemble all sterile and non-sterile materials.
- Use transmission-based precautions.
- Demonstrate aseptic techniques.
- Apply sterile procedures
- Properly discard soiled items
- Body Mechanics and Positioning
- Apply proper body mechanics (utilize, teach, reinforce, and observe)
- Properly position, drape, and stabilize a patient/client when providing physical therapy
- Coordination, communication, and documentation may include: Addressing required functions:
- 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.
- Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
- Follow advance directives.
- B. Admission and discharge planning.
- C. Case management.
- D. Collaboration and coordination with agencies, including:
  - Home care agencies
  - Equipment suppliers
  - Schools
  - Transportation agencies
  - Payer groups
- E. Communication across settings, including:
  - Case conferences
  - Documentation
  - Education plans
- F. Cost-effective resource utilization.
- G. Data collection, analysis, and reporting of:
  - Outcome data
  - Peer review findings
  - Record reviews



- H. Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:
  - Elements of examination, evaluation, diagnosis, prognosis, and Intervention
  - Changes in body structure and function, activities and participation
  - Changes in interventions
  - Outcomes of intervention
    - Interdisciplinary teamwork
    - Patient/client family meetings
    - Patient care rounds
    - Case conferences
  - Referrals to other professionals or resources.
  - Patient/client-related instruction may include:
    - Instruction, education, and training of patients/clients and caregivers regarding:
      - Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)
      - Enhancement of performance
      - Plan of care:
      - Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.
      - Preferred interventions, alternative interventions, and alternative modes of delivery
      - Expected outcomes
      - Health, wellness, and fitness programs (management of risk factors)
      - Transitions across settings.

**THERAPEUTIC EXERCISE MAY INCLUDE PERFORMING**

- A. Aerobic capacity/endurance conditioning or reconditioning
- Gait and locomotor training
  - Increased workload over time (modify workload progression)
  - Movement efficiency and energy conservation training
  - Walking and wheelchair propulsion programs
  - Cardiovascular conditioning programs

**B. RELAXATION**

- Breathing strategies
- Movement strategies
- Relaxation techniques
- C. Airway clearance techniques may include
  - Breathing strategies

- Active cycle of breathing or forced expiratory techniques
- Assisted cough/huff techniques
- Paced breathing
- Pursed lip breathing
- Techniques to maximize ventilation (e.g., maximum inspiratory hold, breath stacking, manual hyperinflation)
- Manual/mechanical techniques
- Assistive devices.
- Positioning
- Positioning to alter work of breathing
- 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
- Bed mobility and transfer training
- Age appropriate functional skills
  - Barrier accommodations or modifications
  - Device and equipment use and training:
- Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)
- Orthotic, protective, or supportive device or equipment training during self-care and home management
- Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)
- Functional training programs
- Simulated environments and tasks
- Task adaptation
- Injury prevention or reduction
  - Safety awareness training during self-care management
  - Injury prevention education during self-care management
  - Injury prevention or reduction with use of equipment
- Prescription, application, and, as appropriate, fabrication of devices and equipment may include
- Adaptive devices
- Hospital beds
- Raised toilet seats
- Seating systems – prefabricated
- Assistive devices
- Canes
- Crutches

- Long-handled reachers
- Static and dynamic splints – prefabricated
- Walkers
- Wheelchairs
- Orthotic devices
- Prefabricated braces
- Prefabricated shoe inserts
- Prefabricated splints.
- Prosthetic devices (lower-extremity)
- Protective devices
- Braces
- Cushions
- Helmets
- Protective taping
- Supportive devices
- Prefabricated compression garments
- Corsets
- Elastic wraps
- Neck collars
- Slings
- Supplemental oxygen - apply and adjust
- Supportive taping
- Electrotherapeutic modalities may include
- Biofeedback
- Electrotherapeutic delivery of medications (eg, iontophoresis)
- Electrical stimulation
- Electrical muscle stimulation (EMS)
- Functional electrical stimulation (FES)
- High voltage pulsed current (HVPC)
- Neuromuscular electrical stimulation (NMES)
- Transcutaneous electrical nerve stimulation (TENS)
- Physical agents and mechanical modalities may include:
- *Physical agents:*
- Cryotherapy
- Cold packs
- Ice massage
- Vapocoolant spray
- Hydrotherapy
- Contrast bath
- Pools
- Whirlpool tanks
- Sound agents
- Phonophoresis

- Ultrasound
- Thermotherapy
- Dry heat
  - Hot packs
  - Paraffin baths

#### **MECHANICAL MODALITIES**

- Compression therapies (prefabricated)
- Compression garments
- Skill Category Description of Minimum Skills
- Vasopneumatic compression devices
- Taping
- Compression bandaging (excluding lymphedema)
- Gravity-assisted compression devices
- Standing frame
- Tilt table
- Mechanical motion devices
  - Continuous passive motion (CPM)
- Traction devices
- Intermittent
- Positional
- Sustained
- Documentation of all listed competency in SOAP notes format

#### **Note**

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

#### **TENTH SEMESTER**

1. **OBSTETRICS & GYNEACOLOGICAL PHYSICAL THERAPY**
2. **PAEDIATRIC PHYSICAL THERAPY**
3. **GERONTOLOGY & GERIATRIC PHYSICAL THERAPY**
4. **SPORTS PHYSICAL THERAPY**
5. **SUPERVISED CLINICAL PRACTICE - VI**
6. **RESEARCH PROJECT**

#### **OBSTETRICS & GYNEACOLOGICAL PHYSICAL THERAPY CREDIT HOURS 2(2-0)**

#### **COURSE DESCRIPTION**

This course intends to provide Introduction to physical therapy practice for evaluation and treatment of pelvic floor dysfunction, 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.

#### **LEARNING OBJECTIVES**

- Discuss common gynecological conditions relevant to physical Therapy
- Evaluate the women's health problems
- Discuss rehabilitation plan for gynecological patients.

#### **COURSE CONTENTS**

##### **MEDICAL TERMINOLOGY REGARDING GYNECOLOGY, OBSTETRICS AND WOMEN'S HEALTH**

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

##### **ONCOLOGICAL ISSUE WITH WOMEN'S HEALTH**

- Management of breast cancer
- Management of 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.

##### **CASE HISTORIES**

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

### **RECOMMENDED BOOKS**

1. Physiotherapy in Obstetrics and Gynecology By: Jill Mantle, Jeanette Haslam, Sue Barton, 2<sup>nd</sup> edition.
2. Textbook of Physiotherapy for Obstetric and Gynecological Conditions (Paperback) By (author) G.B. Madhur.

### **PEDIATRIC PHYSICAL THERAPY CREDIT HOURS 2 (2-0)**

#### **COURSE DESCRIPTION**

- This course addresses both the medical and rehabilitation management of the pediatric patients using an interdisciplinary approach. The etiology and clinical features of common diseases/ disorders observed in the pediatric population will be emphasized. Students will participate in case studies and an interdisciplinary evaluation project.

#### **LEARNING OBJECTIVES:**

- Discuss common Pediatric conditions relevant to physical Therapy
- Evaluate the pediatric problems
- Formulate effective rehabilitation plan for pediatric patients.

### **COURSE CONTENTS**

#### **MEDICAL TERMINOLOGY REGARDING PEDIATRICS**

- 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
- Electro diagnosis 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 Duchene Muscular

- Hemophilia
- Lower Limb Deformities
- Orthopedics and Musculoskeletal Conditions
- TalipesEquino Varus
- Torticolis
- Pediatric Limb Deficiencies
- Neuromuscular Diseases
- Myopathies
- Traumatic Brain Injury
- Cerebral Palsy
- Spinal Cord Injuries
- Spina Bifida
- Oncology and palliative care.

#### **CASE HISTORIES**

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

#### **RECOMMENDED BOOKS**

1. *Physical Therapy for Children* By, Suzann K. Campbell, Robert J. Palisano&Darl W. Vander Linden.
2. *Paediatric Rehabilitation Principles and practice* (Fourth Edition) By, Michael A Alexander & Dennis j. Matthews.
3. *Additional reading material as assigned.*

#### **GERONTOLOGY & GERIATRIC PHYSICAL THERAPY CREDIT HOURS 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 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 geriatric conditions are discussed. The use of evidence-based physical therapy intervention for geriatric 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.

##### **LEARNING OBJECTIVES**

- Discuss common Geriatric conditions relevant to physical Therapy and get insight into the human development

- Evaluate the Geriatric problems
- Formulate effective rehabilitation plan for Geriatric patients.

## **COURSE CONTENTS**

### **GERONTOLOGY**

- Introduction to Gerontology
- Demographic Trends of an Aging Society
- Social Gerontology
- The Physiology and Pathology of Aging
- The Cognitive and Psychological Changes Associated with Aging
- Functional Performance in Later Life: Basic Sensory, Perceptual, and Physical Changes Associated with Aging
- Geriatric Pharmacotherapy
- Sexuality and Aging
- Living Options and the Continuum of Care
- Legal and Financial Issues Related to Health Care for Older People
- Health Care Providers Working With Older Adults
- Future Concerns in an Aging Society
- Health Literacy and Clear Health Communication

### **GERIATRIC PHYSICAL THERAPY**

#### **MEDICAL TERMINOLOGY REGARDING GERIATRICS ATTITUDES AND AGEISM**

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

#### **NORMAL PHYSICAL CHANGES IN OLDER ADULTS**

- 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.

### **CASE HISTORIES**

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

### **RECOMMENDED BOOKS**

1. *Geriatric Physical Therapy* by Andrew A. Guccione.
2. *Fundamentals of Geriatric Medicine*.
3. *Gerontology for health care professional* by regula H robbnet/walter.
4. *Handbook of gerontology* by James A Blackburn and Catherine N Dulmus.

### **SPORTS PHYSICAL THERAPY CREDIT HOURS**

**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.

### **LEARNING OBJECTIVES**

- Discuss common sports injuries and get insight into the mechanics and Pathomechanics of sports injuries
- Discuss responsibilities of sports physiotherapist
- Evaluate the sports injuries
- Formulate rehabilitation plan for sports injuries.

### **COURSE CONTENTS**

#### **MEDICAL TERMINOLOGY RELATED TO SPORTS PHYSICAL THERAPY**

#### **INTRODUCTION TO SPORTS REHABILITATION**

- Introduction to sport injury management.

#### **INJURY SCREENING AND ASSESSMENT OF PERFORMANCE**

- Injury prevention and screening
- 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 CASE HISTORIES**

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

#### **RECOMMENDED BOOKS**

1. *Sports Rehabilitation and Injury Prevention* by: Paul Comfort & Earle Abrahamson, 1<sup>st</sup> Edition, 2010, Wiley Blackwell Publishers.
2. *Clinical Sports Medicine* by: Brukner & Khan, 4ed, McGraw-Hill Publishers.

3. *A guide to sports and injury management* by: Mike Bundy & Andy Leaver, 1<sup>st</sup> edition, 2010, Churchill Livingstone

**SUPERVISED CLINICAL PRACTICE-VICREDIT HOURS 4 (0-4)**

SEMESTER	SUPERVISION	FOCUS	WARDS	COMPETENCIES
10	Supervised by trained PT	Evaluation, Examination, and Intervention	Integumentary, gynecology & obstetrics, Geriatric, 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, nonsurgical, 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.

**CLINICAL 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)
    - Wheel chair 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
  - Activities, positioning, and postures that produce or relieve trauma to the skin.
- Assistive, adaptive, orthotic, protective, supportive, or prosthetic devices and equipment that may produce or relieve trauma to the skin.
- Skin characteristics, including blistering, continuity of skin color, dermatitis, hair growth, mobility, nail growth, sensation, temperature, texture and turgor.
- Activities, positioning, and postures that aggravate the wound or scar or that produce or relieve trauma.
- Signs of infection.

- 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
- 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.
- Use available evidence in interpreting the examination findings.
- Verbalize possible alternatives when interpreting the examination findings.
- Cite the evidence (patient/client history, lab diagnostics, tests and measures and scientific literature) to support a clinical decision.

#### **DIAGNOSIS**

- 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)
- 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**

- Determine the predicted level of optimal functioning and the amount of time required to achieve that level
- Recognize barriers that may impact the achievement of optimal functioning within a predicted time frame including
  - Age
  - Medication(s)
  - Socioeconomic status
  - Co-morbidities
  - Cognitive status
  - Nutrition
  - Social Support
  - Environment.

#### **PLAN OF CARE**

- Goal setting
- Coordination of Care

- Progression of care
- Discharge
- Design a Plan of Care
- Write measurable functional goals (short-term and long-term) that are time referenced with expected outcomes.
- Consult patient/client and/or caregivers to develop a mutually agreed to plan of care.
- Identify patient/client goals and expectations.
- Identify indications for consultation with other professionals
- Make referral to resources needed by the patient/client (assumes knowledge of referral sources)
- 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).
- Establish criteria for discharge based on patient goals and current functioning and disability
- Coordination of Care
- Identify who needs to collaborate in the plan of care.
- Identify additional patient/client needs that are beyond the scope of physical therapist practice, level of experience and expertise, and warrant referral
- Refer and discuss coordination of care with other health care professionals
- Articulate a specific rationale for a referral.
- Advocate for patient/client access to services. □ Progression of Care
- Identify outcome measures of progress relative to when to progress the patient further
- Measure patient/client response to intervention
- Monitor patient/client response to intervention.
- Modify elements of the plan of care and goals in response to changing patient/client status, as needed
- Make on-going adjustments to interventions according to outcomes including environmental factors and personal factors and, medical therapeutic interventions.
- Make accurate decisions regarding intensity and frequency when adjusting interventions in the plan of care.
- Discharge Plan

- Re-examine patient/client if not meeting established criteria for discharge based on the plan of care.
- Differentiate between discharge of the patient/client, discontinuation of service, and transfer of care with reevaluation.
- Prepare needed resources for patient/client to ensure timely discharge, including follow-up care.
- Include patient/client and family/caregiver as a partner in discharge
- Discontinue care when services are no longer indicated.
- When services are still needed, seek resources and/or consult with others to identify alternative resources that may be available.
- 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
- Demonstrate appropriate sequencing of events related to universal precautions
- Use Universal Precautions.
- Determine equipment to be used and assemble all sterile and non-sterile materials
- Use transmission-based precautions.
- Demonstrate aseptic techniques
- Apply sterile procedures.
- Properly discard soiled items.
- Body Mechanics and Positioning
- Apply proper body mechanics (utilize, teach, reinforce, and observe)
- Properly position, drape, and stabilize a patient/client when providing physical therapy
- Interventions
- Coordination, communication, and documentation may include:
  - Addressing required functions:



- 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
- Discern the need to perform mandatory communication and reporting (eg, incident reports, patient advocacy and abuse reporting).
- Follow advance directives.
  - Admission and discharge planning.
  - Case management.
  - Collaboration and coordination with agencies, including:
    - Home care agencies
    - Equipment suppliers
    - Schools
    - Transportation agencies
    - Payer groups
      - Communication across settings, including:
        - Case conferences
        - Documentation
        - Education plans
          - Cost-effective resource utilization.
          - Data collection, analysis, and reporting of:
            - Outcome data
            - Peer review findings
            - Record reviews
              - Documentation across settings, following APTA's Guidelines for Physical Therapy Documentation, including:
                - Elements of examination, evaluation, diagnosis, prognosis, and Intervention
                - Changes in body structure and function, activities and participation.
                - Changes in interventions
                - Outcomes of intervention
                  - Interdisciplinary teamwork:
- Patient/client family meetings
- Patient care rounds
- Case conferences
  - Referrals to other professionals or resources.
  - Patient/client-related instruction may include:
    - Instruction, education, and training of patients/clients and caregivers regarding:
      - Current condition, health condition, impairments in body structure and function, and activity limitations, and participation restrictions)
      - Enhancement of performance

- Plan of care:
- Risk factors for health condition, impairments in body structure and function, and activity limitations, and participation restrictions.
- Preferred interventions, alternative interventions, and alternative modes of delivery
- Expected outcomes
  - Health, wellness, and fitness programs (management of risk factors)
  - Transitions across settings

**THERAPEUTIC EXERCISE MAY INCLUDE PERFORMING**

- Integumentary repair and protection techniques may include
- Debridement-nonselective
- Enzymatic debridement
- Wet dressings
- Wet-to-dry dressings
- Wet-to-moist dressings
- Dressings
- Hydrogels
- Wound coverings
- Topical agents
- Cleansers
- Creams
- Moisturizers
- Ointments
- 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:
- Bed mobility and transfer training\*
- Age appropriate functional skills
  - Barrier accommodations or modifications
  - Device and equipment use and training:
- Assistive and adaptive device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)
- Orthotic, protective, or supportive device or equipment training during self-care and home management
- Prosthetic device or equipment training during ADL (specifically for bed mobility and transfer training, gait and locomotion, and dressing)

- Functional training programs
- Simulated environments and tasks
- Task adaptation
- Injury prevention or reduction:
- Safety awareness training during self-care and home management
- Injury prevention education during self-care and home management
- Injury prevention or reduction with use of devices and equipment
- Prescription, application, and, as appropriate, fabrication of devices and equipment may include
  - Adaptive devices
  - Hospital beds
  - Raised toilet seats
  - Seating systems – prefabricated
  - Assistive devices\*:
    - Canes
    - Crutches
    - Long-handled reachers
    - Static and dynamic splints – prefabricated
    - Walkers
    - Wheelchairs
    - Orthotic devices
    - Prefabricated braces
    - Prefabricated shoe inserts
    - Prefabricated splints
    - Prosthetic devices (lower-extremity)
    - Protective devices
    - Braces
    - Cushions
    - Helmets
    - Protective taping
    - Supportive devices
    - Prefabricated compression garments
    - Corsets
    - Elastic wraps
    - Neck collars
    - Slings
    - Supplemental oxygen - apply and adjust
    - Supportive taping
  - Electrotherapeutic modalities may include:
    - Biofeedback
    - Electrotherapeutic delivery of medications (eg, iontophoresis)
    - Electrical stimulation

- Electrical muscle stimulation (EMS)
- Functional electrical stimulation (FES)
- High voltage pulsed current (HVPC)
- Neuromuscular electrical stimulation (NMES)
- Transcutaneous electrical nerve stimulation (TENS)
- Physical agents and mechanical modalities may include:
  - Physical agents:*
    - Cryotherapy
- Cold packs
- Ice massage
- Vapocoolant spray
  - Hydrotherapy
- Contrast bath
- Pools
- Whirlpool tanks
- Sound agents
- Phonophoresis
- Ultrasound
- Thermotherapy
- Dry heat
- Hot packs
- Paraffin baths

#### **MECHANICAL MODALITIES**

- Compression therapies (prefabricated)
- Compression garments
- Skill Category Description of Minimum Skills
- Vasopneumatic compression devices
- Taping
- Compression bandaging (excluding lymphedema)
- Gravity-assisted compression devices
- Standing frame
- Tilt table
- Mechanical motion devices
- Continuous passive motion (CPM)
- Traction devices
- Intermittent
- Positional
- Sustained
- Documentation of all listed competencies in SOAP notes format

#### **Note**

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

**ANNEXURE - A**

## **English I (Functional English)**

**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 Françoise 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. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
- d) Speaking

### **English II (Communication Skills)**

**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 York.

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

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

### **Course Contents**

#### **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. McGraw-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 Northern Illinois University. General Editors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharon. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).

## ANNEXURE - B

### Pakistan Studies (Compulsory)

#### Introduction/Objectives

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

#### Course Outline

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

Political and constitutional phases:

  - a. 1947-58
  - b. 1958-71
  - c. 1971-77
  - d. 1977-88
  - e. 1988-99
  - f. 1999 onward
3. **Contemporary Pakistan**
  - a. Economic institutions and issues
  - b. Society and social structure
  - c. Ethnicity
  - d. Foreign policy of Pakistan and challenges
  - e. Futuristic outlook of Pakistan

#### Recommended Books

1. Burki, Shahid Javed. *State & Society in Pakistan*, The MacMillan Press Ltd 1980.
2. Akbar, S. Zaidi. *Issue in Pakistan's Economy*. Karachi: Oxford University Press, 2000.

3. S. M. Burke and Lawrence Ziring. *Pakistan's Foreign policy: An Historical analysis*. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. *Pakistan Political Roots & Development*. Lahore, 1994.
5. Wilcox, Wayne. *The Emergence of Bangladesh*, Washington: American Enterprise, Institute of Public Policy Research, 1972.
6. Mehmood, Safdar. *Pakistan KayyunToota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. *Ethno -National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. *Enigma of Political Development*. Kent England: Wm Dawson & sons Ltd, 1980.
9. Zahid, Ansar. *History & Culture of Sindh*. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. *Political Parties in Pakistan*, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. *The Political System of Pakistan*. Boston: Houghton Mifflin, 1967.
12. Aziz, K. K. *Party, Politics in Pakistan*, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, *Pakistan Under Martial Law*, Lahore: Vanguard, 1987.
14. Haq, Noor ul. *Making of Pakistan: The Military Perspective*. Islamabad: National Commission on Historical and Cultural Research, 1993.

## ANNEXURE - C

### ISLAMIC STUDIES (Compulsory)

#### 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-Baqara 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. Quran & 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 Umayyads
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 YousafIslahi,"
- 5 Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law" leaf Publication Islamabad, Pakistan.
- 6 Ahmad Hasan, "Principles of Islamic Jurisprudence" Islamic ResearchInstitute, International Islamic University, Islamabad (1993)
- 7 Mir Waliullah, "Muslim Jurisprudence and the Quranic Law of Crimes" Islamic Book Service (1982)
- 8 H. S. Bhatia, "Studies in Islamic Law, Religion and Society" Deep & DeepPublications New Delhi (1989)
- 9 Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia"Allamalqbal Open University, Islamabad (2001)

## ANNEXURE - D

**Note: One course will be selected from the following six courses of Mathematics.**

### COMPULSORY MATHEMATICS COURSES FOR BS (4 YEAR)

**(FOR STUDENTS NOT MAJORING IN  
MATHEMATICS)**

#### 1. MATHEMATICS I (ALGEBRA)

**Prerequisite(s):** Mathematics at secondary level

**Credit Hours:** 3 + 0

**Specific Objectives of the Course:** To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines.

#### **Course Outline:**

*Preliminaries:* Real-number system, complex numbers, introduction to sets, set operations, functions, types of functions. *Matrices:* Introduction to matrices, types, matrix inverse, determinants, system of linear equations, Cramer's rule.

*Quadratic Equations:* Solution of quadratic equations, qualitative analysis of roots of a quadratic equations, equations reducible to quadratic equations, cube roots of unity, relation between roots and coefficients of quadratic equations.

*Sequences and Series:* Arithmetic progression, geometric progression, harmonic progression. *Binomial Theorem:* Introduction to mathematical induction, binomial theorem with rational and irrational indices. *Trigonometry:* Fundamentals of trigonometry, trigonometric identities.

#### **Recommended Books**

1. Dolciani MP, Wooton W, Beckenback EF, Sharron S, *Algebra 2 and Trigonometry*, 1978, Houghton & Mifflin, Boston (suggested text)

2. Kaufmann JE, *College Algebra and Trigonometry*, 1987, PWS-Kent Company, Boston
3. Swokowski EW, *Fundamentals of Algebra and Trigonometry* (6<sup>th</sup> edition), 1986, PWS-Kent Company, Boston

## 2. MATHEMATICS II (CALCULUS)

**Prerequisite(s):** Mathematics I (Algebra)

**Credit Hours:** 3 + 0

**Specific Objectives of the Course:** To prepare the students, not majoring in mathematics, with the essential tools of calculus to apply the concepts and the techniques in their respective disciplines.

### Course Outline

*Preliminaries:* Real-number line, functions and their graphs, solution of equations involving absolute values, inequalities. *Limits and Continuity:* Limit of a function, left-hand and right-hand limits, continuity, continuous functions.

*Derivatives and their Applications:* Differentiable functions, differentiation of polynomial, rational and transcendental functions, derivatives.

*Integration and Definite Integrals:* Techniques of evaluating indefinite integrals, integration by substitution, integration by parts, change of variables in indefinite integrals.

### Recommended Books

1. Anton H, Bevens I, Davis S, *Calculus: A New Horizon* (8<sup>th</sup> edition), 2005, John Wiley, New York
2. Stewart J, *Calculus* (3<sup>rd</sup> edition), 1995, Brooks/Cole (suggested text)
3. Swokowski EW, *Calculus and Analytic Geometry*, 1983, PWS-Kent Company, Boston
4. Thomas GB, Finney AR, *Calculus* (11<sup>th</sup> edition), 2005, Addison-Wesley, Reading, Ma, USA

## 3. MATHEMATICS III (GEOMETRY)

**Prerequisite(s):** Mathematics II (Calculus)

**Credit Hours:** 3 + 0

**Specific Objectives of the Course:** To prepare the students, not majoring in mathematics, with the essential tools of geometry to apply the concepts and the techniques in their respective disciplines.



### Course Outline

*Geometry in Two Dimensions:* Cartesian-coördinate mesh, slope of a line, equation of a line, parallel and perpendicular lines, various forms of equation of a line, intersection of two lines, angle between two lines, distance between two points, distance between a point and a line.

*Circle:* Equation of a circle, circles determined by various conditions, intersection of lines and circles, locus of a point in various conditions.

*Conic Sections:* Parabola, ellipse, hyperbola, the general-second-degree equation

### Recommended Books

1. Abraham S, *Analytic Geometry*, Scott, Freshman and Company, 1969
2. Kaufmann JE, *College Algebra and Trigonometry*, 1987, PWS-Kent Company, Boston
3. Swokowski EW, *Fundamentals of Algebra and Trigonometry* (6<sup>th</sup> edition), 1986, PWS-Kent Company, Boston
4. **COURSE FOR NON-MATHEMATICS MAJORS IN SOCIAL SCIENCES**

|                               |                                  |
|-------------------------------|----------------------------------|
| <i>Title of subject:</i>      | MATHEMATICS                      |
| <i>Discipline</i>             | : BS (Social Sciences).          |
| <i>Pre-requisites</i>         | : SSC (Metric) level Mathematics |
| <i>Credit Hours</i>           | : 03 + 00                        |
| <i>Minimum Contact Hours:</i> | 40                               |
| <i>Assessment</i>             | : written examination;           |
| <i>Effective</i>              | : 2008 and onward                |

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**Aims** : To give the basic knowledge of Mathematics and prepare the students not majoring in mathematics.

**Objectives** : After completion of this course the student should be able to:

- Understand the use of the essential tools of basic mathematics;
- Apply the concepts and the techniques in their respective disciplines;
- Model the effects non-isothermal problems through different domains;

**Contents** :  
1. **Algebra**

*Preliminaries:* Real and complex numbers, Introduction to sets, set operations, functions, types of functions. *Matrices:* Introduction to matrices, types of matrices, inverse of matrices, determinants, system of linear equations, Cramer's rule. *Quadratic equations:* Solution of quadratic equations, nature of roots of quadratic equations, equations reducible to quadratic equations. *Sequence and Series:* Arithmetic, geometric and harmonic progressions. *Permutation and combinations:* Introduction to permutation and combinations, *Binomial Theorem:* Introduction to binomial theorem. *Trigonometry:* Fundamentals of trigonometry, trigonometric identities. *Graphs:* Graph of straight line, circle and trigonometric functions.

## 2. **Statistics**

*Introduction:* Meaning and definition of statistics, relationship of statistics with social science, characteristics of statistics, limitations of statistics and main division of statistics. *Frequency distribution:* Organisation of data, array, ungrouped and grouped data, types of frequency series, individual, discrete and continuous series, tally sheet method, graphic presentation of the frequency distribution, bar frequency diagram histogram, frequency polygon, cumulative frequency curve. *Measures of central tendency:* Mean medium and modes, quartiles, deciles and percentiles. *Measures of dispersion:* Range, inter quartile deviation mean deviation, standard deviation, variance, moments, skewness and kurtosis.

### **Recommended Books**

1. Swokowski. E. W., '*Fundamentals of Algebra and Trigonometry*', Latest Edition.
2. Kaufmann. J. E., '*College Algebra and Trigonometry*', PWS-Kent Company, Boston, Latest Edition.
3. Walpole, R. E., '*Introduction of Statistics*', Prentice Hall, Latest Edition.
4. Wilcox, R. R., '*Statistics for The Social Sciences*',

## 5. **MATHEMATICS FOR CHEMISTRY**

**Credit Hours:** 3

**Prerequisites:** Mathematics at Secondary level

**Specific Objectives of Course:**

To prepare the students not majoring in mathematics with the essential tools of Calculus to apply the concepts and the techniques in their respective disciplines.

### **Course Outline**

*Preliminaries:* Real Numbers and the Real Line, *Functions and their graphs:* Polynomial Functions, Rational Functions, Trigonometric Functions, and Transcendental Functions. Slope of a Line, Equation of a Line, Solution of equations involving absolute values, Inequalities. *Limits and Continuity:* Limit of a Function, Left Hand and Right Hand Limits, Continuity, Continuous Functions. *Derivatives and its Applications:* Differentiation of Polynomial, Rational and Transcendental Functions, Extreme Values of Functions. *Integration and Indefinite Integrals:* Integration by Substitution, Integration by Parts, Change of Variables in Indefinite Integrals. Least-Squares Line.

### **Recommended Books**

1. Thomas, Calculus, 11<sup>th</sup> Edition. Addison Wesley publishing company, 2005.
2. H. Anton, I. Bevens, S. Davis, Calculus, 8<sup>th</sup> edition, John Willey & Sons, Inc. 2005.
3. Hughes-Hallett, Gleason, McCallum, et al, Calculus Single and Multivariable, 3<sup>rd</sup> Edition. John Wiley & Sons, Inc. 2002.
4. Frank A. Jr, Elliott Mendelsohn, Calculus, Schaum's Outline Series, 4<sup>th</sup> edition, 1999.
5. E. W. Swokowski, Calculus and Analytic Geometry PWS Publishers, Boston, 1983.
6. John H. Mathews, Numerical Methods for Mathematics Science and Engineering, Prentice-Hall, Second Edition 1992.

## **6. MATHEMATICS FOR PHYSICS**

### **Contents**

1. **Preliminary calculus.**
  - Differentiation  
Differentiation from first principles; products; the chain rule; quotients; implicit differentiation; logarithmic differentiation; Leibnitz' theorem; special points of a function; theorems of differentiation.
  - Integration  
Integration from first principles; the inverse of differentiation; integration by inspection; sinusoidal function; logarithmic integration; integration using partial fractions; substitution

method; integration by parts; reduction formulae; infinite and improper integrals; plane polar coordinates; integral inequalities; applications of integration.

## **2. Complex numbers and hyperbolic functions**

- The need for complex numbers
- Manipulation of complex numbers  
Additions and subtraction; modulus and argument; multiplication; complex conjugate; division
- Polar representation of complex numbers Multiplication and division in polar form
- de Moivre's theorem  
Trigonometrical identities; finding the  $n$ th roots of unity; solving polynomial equations
- Complex logarithms and complex powers
- Applications to differentiation and integration
- Hyperbolic functions  
Definitions; hyperbolic-trigonometric analogies; identities of hyperbolic functions; solving hyperbolic equations; inverses of hyperbolic functions; calculus of hyperbolic functions

## **3. Series and limits**

- Series
- Summation of series  
Arithmetic series; geometric series; arithmetico-geometric series; the difference method; series involving natural numbers; transformation of series
- Convergence of infinite series  
Absolute and conditional convergence; convergence of a series containing only real positive terms; alternating series test
- Operations with series
- Power series  
Convergence of power series; operations with power series
- Taylor series  
Taylor's theorem; approximation errors in Taylor series; standard McLaurin series
- Evaluation of limits

## **4. Partial differentiation**

- Definition of the partial derivative
- The total differential and total derivative
- Exact and inexact differentials

- Useful theorems of partial differentiation
  - The chain rule
  - Change of variables
  - Taylor's theorem for many-variable functions
  - Stationary values of many-variable functions
  - Stationary values under constraints
- 5. Multiple integrals**
- Double integrals
  - Triple integrals
  - Applications of multiple integrals
    - Areas and volumes; masses, centers of mass and centroids; Pappus' theorems; moments of inertia; mean values of functions
    - Change of variables in multiple integrals
    - Change of variables in double integrals;
- 6. Vector algebra**
- Scalars and vectors
  - Addition and subtraction of vectors
  - Multiplication by a scalar
  - Basis vectors and components
  - Magnitude of a vectors
  - Multiplication of vectors
    - Scalar product; vector product; scalar triple product; vector triple product
  - Equations of lines and planes
    - Equation of a line; equation of a plane
  - Using vectors to find distances
    - Point to line; point to plane; line to line; line to plane
  - Reciprocal vectors
- 7. Matrices and vector spaces**
- Vectors spaces Basic vectors; the inner product; some useful inequalities
  - Matrices
    - The complex and Hermitian conjugates of a matrix
    - The determinant of a matrix
    - Properties of determinants
  - The inverse of a matrix
  - The rank of a matrix
  - Simultaneous linear equations
    - N simultaneous linear equations in N unknowns
  - Special square matrices

Diagonal; symmetric and antisymmetric; orthogonal; Hermitian; unitary normal

- Eigen vectors and eigen values  
Of a normal matrix; of Hermitian and anti-Hermitian matrices; of a unitary matrix; of a general square matrix
- Determination of eigen values and eigen vectors Degenerate eigen values

#### **8. Vector calculus**

- Differentiation of vectors Composite vector expressions; differential of a vector
- Integration of vectors
- Space curves
- Vector functions of several arguments
- Surfaces
- Scalar and vector fields
- Vector operators
- Gradient of a scalar field; divergence of a vector field; curl of a vector field
- Vector operator formulae
- Vector operators acting on sums and products; combinations of grad, div and curl
- Cylindrical and spherical polar coordinates
- Cylindrical polar coordinates; spherical polar coordinates.

## ANNEXURE - E

### Statistics-I

Credit 3 (2-1)

Definition and importance of Statistics in Agriculture, Data Different types of data and variables

Classification and Tabulation of data, Frequency distribution, stem-and-Leaf diagram, Graphical representation of data Histogram, frequency polygon, frequency curve.

Measure of Central tendency, Definition and calculation of Arithmetic mean, Geometric mean, Harmonic mean, Median quantiles and Mode in grouped and un-grouped data.

Measure of Dispersion, Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.

### Practical

- a. Frequency Distribution
- b. Stem-and-Leaf diagram
- c. Various types of Graphs
- d. Mean, Geometric mean Harmonic Mean,
- e. Median, Quartiles Deviation, mean Deviation.
- f. Standard Deviation, Variance, Coefficient of variation,
- g. Skewness and kenosis

### Recommended Books

1. Introduction to Statistical Theory Part- I by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. A. Concise Course in A. Level Statistic with world examples by J. Crashaw and J. Chambers (1994)
4. Basic Statistics an Inferential Approach 2<sup>nd</sup> Ed. (1986) Fran II. Dietrich-II and Thomas J. Keans

### Statistics-II

Credit 3 (2-1)

Sampling Probability and non-Probability Sampling, Simple random sampling stratified random sampling Systematic sampling error, Sampling distribution of mean and difference between two means.

Interference Theory: Estimation and testing of hypothesis, Type—I and type-II error, Testing of hypothesis about mean and difference between two means using Z-test and t-test, Paired t-test, Test of association of attributes using  $\chi^2$  (chi-square) Testing hypothesis about variance.

**Practical**

- a. Sampling random sampling
- b. Stratified random sampling.
- c. Sampling distribution of mean
- d. Testing of hypotheses regarding population mean
- e. Testing of hypotheses about the difference between population means
- f. Chi-square test
- g. Testing of Correlation Coefficient
- h. Fitting of simple linear regression
- i. One-way ANOVA
- j. Two-way ANOVA

**Recommended Books**

1. Introduction to Statistical Theory Part-II by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. Principles and Procedures of Statistics A Bio-material approach, 2<sup>nd</sup> Edition, 1980 by R. G. D Steal and James H. Tarric
4. Statistical Procedures for Agricultural Research 2<sup>nd</sup> Edition (1980) by K. A. Gomez and A. A. Gomez



## ANNEXURE - F

Introduction to Information and Communication Technologies

**Course Structure:** Lectures: 2 Labs: 1 **Credit Hours: 3**  
**Pre-requisite:** None **Semester: 1**

### 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.

After completing this course, a student will be able to:

- Understand different terms associated with ICT
- Identify various components of a computer system
- Identify the various categories of software and their usage
- Define the basic terms associated with communications and networking
- Understand different terms associated with the Internet and World Wide Web.
- Use various web tools including Web Browsers, E-mail clients and search utilities.
- Use text processing, spreadsheets and presentation tools
- Understand the enabling/pervasive features of ICT

### Course Contents

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**

1. Introduction to Computers by Peter Norton, 6th International Edition, McGraw-Hill
2. Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6<sup>th</sup> Edition, McGraw-Hill
3. Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer
4. Fundamentals of Information Technology by Alexis Leon, Mathews Leon, Leon Press.