SYLLABUS
FOR
MASTER OF PHYSIOTHERAPY
M.P.Th. FIRST YEAR
(NEUROLOGY)
M.P.Th. 101N: BASIC HEALTH SCIENCES

This course provides students an increased understanding of the functions of the nervous, system in disease and in health with an emphasis on current findings. The goal of this course is to provide a link between the basic and clinical neurosciences. The neural contributions to motor control, muscle tone, strength, sensation and CNS plasticity associated with human development and recovery from injury will be covered in this course. Through a study of pharmacology students will be provided information on the principles guiding the prescription of medications and their effects, side effects and influence on exercise when administered in disorders of the nervous system.

Following are the topics to be included but not limited to:

I. ANATOMY
   1. Anatomy of the Neuron
   2. Anatomy of the Reflex Arc
   3. Ascending and Descending Tracts
   4. Blood Supply of the Brain
   5. Structure of Nerve Fibers
   6. Autonomic Nervous System

II. PHYSIOLOGY
   1. Synapses
   2. Neuronal Mechanisms and Circuits for Processing Information
   3. Sensory Receptors and Their Basic Mechanisms of Action
   4. Vestibular System
   5. Balance
   6. Motor Functions
   7. Spasticity
   8. Muscle Physiology
   9. Contraction of Muscle and Fatigue
   10. Muscle Hypertrophy, Atrophy and Electrical Stimulation

III. PATHOLOGY
   1. Immune System
   2. Nervous System
3. Infections
4. Tumors
5. Alzheimer’s disease
6. Degenerative Disorders
7. Parkinson’s Disease
8. Stroke
9. Traumatic Brain Injury
10. Vestibular Dysfunction
11. Response of Peripheral Nerves to Injury

IV. PHARMACOLOGY

1. Pharmacokinetics.
2. Drugs affecting CNS
3. Barbiturates
4. Anti-anxiety
5. Anti depressant
6. Anti-Parkinson
7. Centrally acting skeletal muscle relaxants
8. Anti-convulsants
9. Narcotic and non-narcotic analgesics
10. NSAIDs
11. Local and General Anaesthetics
12. Drugs affecting ANS
13. Hormones
14. Insulin
15. Steroids

Suggested Readings

1. Gray’s Anatomy
2. Neuro-anatomy. Snell
3. Pharmacology in Rehabilitation. Ciccone
5. Boyd’s Textbook of Pathology – A. C. Ritchie
This course provides the student with information on the epidemiology, path mechanics, clinical presentation, relevant diagnostic tests and medical and surgical management of disorders of the nervous system. An overview of diagnostic imaging techniques are presented, with special emphasis on the role of the physical therapist in using imaging within the scope of physical therapy and to plan physical therapy care. Students will be able to use this information in planning and tailoring effective, specific, safe Physiotherapy treatment programmes.

Following are the topics to be included but not limited to:

NEUROLOGY & NEUROSURGERY

1. Approach to symptoms and signs:
   a) The neurologic history and examination
   b) Dizziness
   c) Approach to symptoms and signs
   d) Paresthesias
   e) Pain
   f) Headaches
   g) Weakness (UMN vs LMN, NM junction, myopathy)
   h) Movement disorders
   i) Gait and balance disorders
   j) Fatigue
   k) Memory and praxis complaints
   l) Speech disorders
   m) Language disorders
   n) Syncope vs seizure
   o) Encephalopathy, coma, herniation, and brain death

2. Diagnostic Testing:
   a) Lumbar puncture and cerebrospinal fluid evaluation
   b) EMG and NCV
   c) Electroencephalography
   d) Evoked Potentials
e) Nerve and muscle biopsy  
  
f) Autonomic testing  
  
g) MRI, CT, MRA and Cerebral Angiography  
  
h) Molecular genetic testing  
  
i) Neuropsychological testing

3. Neurovascular disorders:
   
   a) Localization in neurovascular disease  
   
   b) Transient ischemic attacks  
   
   c) Stroke  
   
   d) Primary intracerebral hemorrhage  
   
   e) Subarachnoid hemorrhage and saccular aneurysms  
   
   f) Arterovenous malformations  
   
   g) Spinal cord stroke  
   
   h) Stroke in younger adults  
   
   i) Cerebral venous thrombosis  
   
   j) Stroke in pregnancy (including pre-eclampsia and eclampsia)  
   
   k) Neuro-rehabilitation

4. Dementia and amnestic disorders:
   
   a) Overview of dementia (epidemiology, differential diagnosis, diagnostic testing)  
   
   b) Alzheimer’s disease  
   
   c) Multi-infarct dementias  
   
   d) Sub-cortical dementias  
   
   e) Other causes of dementia (NPH, etc)  
   
   f) Transient global amnesia and other amnestic disorders

5. Movement disorders:
   
   a) Parkinson’s disease  
   
   b) Parkinson’s plus syndromes  
   
   c) Hyperkinetic movement disorders  
   
   d) Dystonia  
   
   e) Tourette’s syndrome  
   
   f) Non-resting tremors
g) Wilson’s disease
h) Ataxias
i) Essential myoclonus

6. **Multiple sclerosis and other demyelinating diseases:**
   a) Multiple sclerosis
   b) Acute disseminated encephalomyelitis

7. **Epilepsy:**
   a) Etiology and manifestations
   b) Childhood disorders
   c) Adult seizure disorders
   d) Medical treatment
   e) Status epilepticus
   f) Surgical treatment

8. **Neuro-oncology:**
   a) Epidemiology and pathophysiology
   b) Clinical presentations (altered ms, HA, SZS, hydrocephalus, focal findings)
   c) Gliomas, Meningiomas, Congenital tumors, Skull base tumors, & Other tumors
      (hemangioblastoma, glomus jugulare, carotid body)
   d) Spinal cord tumors.
   e) Metastatic tumors, Meningeal and spinal metastases.
   f) Paraneoplastic neurologic disorders
   g) Complications of radiotherapy and chemotherapy.
   h) Cancer pain

9. **Neuro-otology and other cranial neuropathies:**
   a) Diagnostic testing
   b) Hearing loss, Tinnitus & Vertigo (peripheral vs central)
   c) Benign positional vertigo.
   d) Bell’s palsy and other VII (hemifacial spasm, benign eyelid myokymia)
   e) Disorders of smell and taste.
   f) Facial numbness (supranuclear, brainstem, preganglionic, ganglion, periph, mental)
   g) Disorders of cranial nerve IX and X.
10. Trauma:
   a) Mild head injury and the post concussion syndrome
   b) Moderate and severe head injury.
   c) Subdural and epidural hematomas.
   d) Cranial neuropathies.
   e) Neuro rehabilitation of brain injuries.
   f) Post-traumatic movement disorders.
   g) Spinal cord injury.
   h) Whiplash injuries.
   i) Reflex sympathetic dystrophy and causalgia.

11. Neuromuscular disorders:
   a) Myasthenia gravis and myasthenic syndromes.
   b) ALS
   c) Spinal muscular atrophies
   d) Familial spastic paraplegia
   e) Muscle cramps.
   f) Fasciculations

12. Peripheral neuropathies:
   a) Manifestations of peripheral neuropathies
   b) Guillain-Barre syndrome & Other acute neuropathies
   c) Diabetic neuropathies
   d) CIDP
   e) Prophyrias
   f) Inherited sensorimotor neuropathies.
   g) Inherited predominantly sensory neuropathies.
   h) Inherited metabolic polyneuropathies.
   i) Mononeuritis Multiplex

13. Mononeuropathies and plexopathies:
   a) Brachial and lumbosacral plexopathies.
   b) Thoracic outlet syndrome.
   c) Carpal Tunnel Syndrome and other median neuropathies
d) Ulnar and radial neuropathies & Other upper extremity mononeuropathies.
e) Peroneal, sciatic, and tibial neuropathies & Other lower extremity mononeuropathies
f) Nerve injuries (including iatrogenic)

14. Myopathies:
   a) Manifestations of myopathies.
   b) Muscular dystrophies (Duchenne, limb girdle, GSH, scapuloperonella, myotonic, etc)
   c) Dermatomyositis and polymyositis
d) Inclusion body myositis & Other inflammatory myopathies.
e) Glycogen Storage and lipid metabolism myopathies

15. Infectious disorders:
   a) Bacterial meningitis
   b) Chronic meningitis
c) Encephalitis
d) HIV + HTLV-1
e) Brain and spinal abscess
f) Spirochetes (neurosyphilis and Lyme)
g) Creutzfeldt-Jakob disease
h) Cerebral malaria
i) Neurocysticercosis

16. Neck, back and spinal cord disorders:
   a) Approach to neck and low back disorders
   b) Diagnostic testing for neck and back disorders
c) Radiculopathy and cauda equina syndrome
d) Spondylosis including spondylolytic cervical myelopathy and facet joint pain
e) Treatment of chronic neck and back pain

17. Autoimmune and inflammatory diseases:
   a) Inflammatory spondyloarthropathies
   b) Systemic lupus erythermatosis
c) Sjogren’s syndrome
d) Progressive systemic sclerosis
e) Fibromyalgia
f) Behcet’s disease
g) Sarcoidosis
h) manifestations of the vasculitides

18. Developmental, neurocutaneous and genetic metabolic disorders:
   a) Hydrocephalus.
   b) Neurofibromatosis
c) Tuberous sclerosis and other neurocutaneous disorders.
   d) Chiari malformation and syringomyelia

Suggested Readings
2. Neurology And Neurosurgery Illustrated. Lindsay and Bone
3. Diseases of the Nervous System. R Bannister
5. Pediatric Orthopaedics and Fractures. Sharrard
6. Disorders of Muscle. Dubowitz
M.P.Th. 103: EXERCISE TESTING AND PRESCRIPTION

Scientific Foundations for Exercise Testing and Prescription
- Functional Anatomy
- Biomechanics
- Exercise Physiology
- Physiologic Effects of Aging and Deconditioning

Lifestyle Factors Associated with Health and Disease
- Factors Associated with Increased Risk of Coronary Heart Disease
- General Overview of Pre-Participation Health Screening and Risk Assessment
- Physical Activity Status and Chronic Diseases
- Physical Activity Assessment
- Relationship of Nutrition to Chronic Diseases
- Assessment of Dietary Intake
- The Influence of Emotional Distress On Chronic Illness

Physical Fitness, Clinical, and Diagnostic Assessments
- Body Composition
- Muscular Fitness
- Clinical Exercise Testing Related to Cardiovascular Disease
- Assessment and Limitations Associated with Pulmonary Disease
- Exercise Testing in Patients with Diabetes
- Clinical Exercise Testing in Individuals with Disabilities Due to Neuromuscular Disorders
- Occupational and Functional Assessments
- Diagnostic Procedures for Cardiovascular Disease
- Dysrhythmias and Selected Conduction Defects
- Myocardial Ischemia and Infarction

Exercise Prescription, Exercise Programming and Adaptations to Exercise Training
- Cardiopulmonary Adaptations to Exercise
- Adaptations to Resistance Training
- Principles of Cardiorespiratory Endurance Programming
- Principles of Musculoskeletal Exercise Programming
• Weight Management
• Applied Exercise Programming
• Medical Considerations

Exercise Testing and Training for Individuals with Chronic Disease
• Pathophysiology and Clinical Features of Cardiovascular Diseases
• Treatment of Cardiovascular Disease
• Exercise Training in Patients with Cardiovascular Disease
• Treatment and Rehabilitation of Pulmonary Diseases
• Diabetes Mellitus and Exercise
• Exercise in Patients with End Stage Renal Disease
• Osteoporosis and Exercise
• Arthritis Diseases and Conditions
• Neuromuscular Diseases and Exercise
• Immunological Conditions

Human Behavioral Principles Applied to Physical Activity
• Principles of Health Behavior Change
• Channels for Delivering Behavioral Programs
• Factors Associated with Regular Physical Activity Participation
• Behavioral Strategies to Enhance Physical Activity Participation
• Psychopathology
• Health Counseling Skills

Exercise Program Administration.
• The Exercise Program Professional and Related Staff
• Health and Fitness Program Development and Operation
• Clinical Exercise Program Development and Operations
• Financial Considerations
• Policies and Procedures for Program Safety and Compliance
• Legal Considerations

Prescribed books
2. Exercise training and exercise prescription for special cases. Theoretical basis and clinical application by James A. Skinner, Lippincott Williams and Wilkins
M.P.Th. 104: RESEARCH METHODOLOGY AND BIOSTATISTICS

This course will enable the student to read and critique research articles and understand and apply the principles of research to perform a guided research as part of their course requirement. Students will be provided an understanding of statistical measures used in the analysis and interpretation of research data. Research designs and their implementation will be discussed.

Following are the topics to be included but not limited to:

1. Research Fundamentals
   - Methodological of Theory Evaluating Theory.

2. Research Design
   - Research Validity Internal Validity Construct Validity External Validity Relationships among Types of Validity.
   - Selection and Assignment of Participants Significance of Sampling and Assignment Populations and Samples Probability Sampling Nonprobability Sampling Assignment to Groups Sample Size.
3. Experimental Designs
- Group Designs Randomized Controlled Trials Single-Factor Experimental Designs
  Multiple-Factor Experimental Designs.

4. Nonexperimental Research
- Overview of Nonexperimental Research Description Analysis of Relationships Analysis
  of differences.
- Clinical Case Reports Contributions of Case Reports to Theory and Practice Purposes of
  Case Reports Format of Case Reports.
- Qualitative Research Assumptions of the Qualitative Paradigm Qualitative Designs
  Qualitative Methods.
- Epidemiology Ratios, Proportions, and Rates Screening and Diagnosis Nonexperimental
  Epidemiological Designs.
- Outcomes Research Purpose of Outcomes Research Frameworks for Outcomes Research
- Survey Research Scope of Survey Research Types of Information Types of Items
  Implementation Overview Mailed Surveys Internet Surveys Interview Surveys

5. Measurement
- Research Reliability Designs Validity Designs Responsiveness Design

6. Data Analysis
- Statistical Reasoning Data Set Frequency Distribution Central Tendency Variability
  Normal Distribution Sampling Distribution Significant Difference Errors Power
  Statistical Conclusion Validity.
- Statistical Analysis of Differences: The Basics Distributions for Analysis of Differences
  Assumptions of Tests of Differences Independence or Dependence of Samples Steps in
  the Statistical Testing of Differences Statistical Analysis of Differences.
- Statistical Analysis of Differences: Advanced and Special Techniques Advanced
  ANOVA Techniques Differences Between More Than One Independent Variable
  Analysis of Single-System Designs Survival Analysis Hypothesis Testing with
  Confidence Intervals Power Analysis.
Statistical Analysis of Relationships: Advanced and Special Techniques Reliability Analysis Multiple Regression Logistic Regression Discriminant Analysis Factor Analysis

7. Being a Consumer
- Locating the Literature Types of Information Types of Professional Literature Focused Literature Search Ongoing Literature Search Obtaining Literature Items.
- Synthesizing Bodies of Evidence Reasons to Synthesize the Literature Ways to Synthesize the Literature Preparing for a Systematic Review Synthesizing the Literature Reporting on Systematic Reviews

8. Implementing Research
- Implementing a Research Project Proposal Preparation Human Participants Protection Funding Obtaining Participants Data Collection Data Analysis.
- Publishing and Presenting Research Publication of Research Presentation of Research

Suggested Readings
1. Handbook of Research in Physical Therapy. CE Bork
2. Physical Therapy Research: Principles and Application. E Domholdt
3. Research Methodology for Physical Therapists. C Hicks
M.P.Th. 105: SEMINARS ON CLINICAL ISSUES

These will serve as a platform for students to integrate various components of patient management and debate contentious issues in the efficacy of Physiotherapy techniques. Students will give presentations on topics provided to them.
M.P.Th. 106N: PHYSIOTHERAPY I

THERAPEUTIC PRINCIPLES AND PRACTICE IN NEUROLOGIC PHYSIOTHERAPY

Objectives:

This course provides students with the principles of Physiotherapy management in disorders of the nervous system and the application of these principles in specific disorders. Through lectures, case conferences, journal discussions and class discussion students will be able to set up a treatment programme tailored to the patient’s needs.

Analyze the multifaceted aspects of the clinical problem and appreciate a multifaceted approach to evaluation and treatment. Identify treatment approaches and their appropriate match with clinical problems.

Recognize the role of the Physiotherapist in helping the patient reach his or her optimal level of functional independence within their environment.

Following are the topics to be included but not limited to:

I. Theoretical Foundations for Clinical Practice

1. Foundations for Clinical Practice
2. Movement Development Across the Life Span
5. Psycho-social Aspects of Adaptation and Adjustment during Various Phases of Neurological Disability.
7. Differential Diagnosis Phase 1: Medical Screening.
10. Documentation

II. Management of Clinical Problems

1. Beyond the CNS: Neurovascular Entrapment Syndromes.
2. Neuromuscular Diseases
3. Head Injury
4. Spinal Cord Injury
6. Inflammatory and Infectious Disorders of the Brain.
7. Human Immunodeficiency Virus (HIV) Infection: Living with a Chronic Illness
8. Multiple Sclerosis.
11. Brain Tumors.
12. Movement Dysfunction Associated with Cerebellar Problems
13. Hemiplegia.
14. Aging with Dignity and Chronic Impairments

III. Understanding Motor Performance in Children
1. Evidence-Based Decision-Making in Pediatric Physical Therapy
2. The Child's Development of Functional Movement
3. Motor Control: Developmental Aspects of Motor Control in Skill Acquisition
5. Gait: Development and Analysis
6. Musculoskeletal Development and Adaptation
7. Genomics and Genetic Syndromes Affecting Movement
8. Physical Fitness during Childhood and Adolescence

IV. Management of Neurologic Impairment
1. Developmental Coordination Disorder
2. Children with Motor and Cognitive Impairments
3. Cerebral Palsy
4. Brachial Plexus Injury
6. Brain Injuries: Traumatic Brain Injuries, Near Drowning, and Brain Tumors
7. Myelodysplasia

V. Special Settings and Special Considerations
1. The Environment of Intervention
2. Early Intervention Services
3. The Educational Environment
4. Assistive Technology
5. The Burn Unit
6. The Special Care Nursery
7. Private practice in paediatrics physiotherapy: A quest for independence and success

VI. Neurological Disorders and Applications Issues
1. Disorders of Vision and Visual-Perceptual Dysfunction
2. Electrical Stimulation and EMG
3. Pain Management
4. Pelvic Floor Dysfunction.
5. Orthotics
6. Cardiopulmonary Interactions
7. Impact of Drug Therapies on Neurological Rehabilitation
8. Alternative and Complementary Therapies

SUGGESTED READINGS
1. Neurological Rehabilitation. D. A. Umphred
2. Neurological Physiotherapy: by Edward Susan
5. Orthopaedic Physical Assessment. Magee
MPTh107N: PHYSIOTHERAPY-I (Practical)

THERAPEUTIC PRINCIPLES AND PRACTICE IN NEUROLOGIC PHYSIOTHERAPY

Students will be instructed via demonstrations, hands-on techniques, field visits and case conferences on specific techniques used in management of patients with neurological disorders. Students will draw on their experiences at the clinical postings to formulate a treatment plan for cases presented at the case conference.
M.P.Th. 201: MANAGEMENT AND EDUCATION

This course deals with basic issues of management to assist the practitioner in efficiently addressing issues related to the organization and administration of a Physiotherapy Department.

It provides the student with an introduction to ethical issues facing physiotherapists. Specific topics include documentation. A variety of current issues affecting the physiotherapy profession are addressed in this course. The science of management is presented as it relates to the essential functions of the business of physiotherapy. The education module of this course will provide students information on improving their teaching skills in the classroom and clinical setting. Educational theory is presented. Students develop and present educational units to audiences that may include Bachelor of Physiotherapy students or peers.

Following are the topics to be included but not limited to:

**MANAGEMENT**

3. Introduction to Personal Management - Staffing Recruitment Selection, Performance Appraisal, Collective Bargaining, Discipline, Job Satisfaction
4. Quantitative Methods of Management - Relevance of Statistical And / Or Techniques in Management.
5. Marketing - Market Segmentation, Marketing Research Production Planning Pricing, Channels of Distribution, Promotion, Consumer Behavior, and Licenser

**ADMINISTRATION**

1. Hospital As An Organization - Functions And Types Of Hospitals Selected Clinical Supportive And Ancillary Services Of A Hospital, Emergency Department, Nursing, Physical Medicine & Rehabilitation,
   Clinical Supportive And Ancillary Services Of A Hospital, Emergency Department Nursing Physical Medicine & Rehabilitation, Clinical Laboratory, Pharmacy And Dietary Department
2. Roles Of Physiotherapist, Physiotherapy Director, Physiotherapy Supervisor, Physiotherapy Assistant, Physiotherapy Aide, Occupational Therapist, Home Health Aide, Volunteer.
3. Direct Care and Referral Relationships and Confidentially.

**LEGAL PROFESSIONAL ETHICAL ISSUES**
1. Physiotherapy: Definition and Development.
2. The Implications & Conformation to the Rules of Professional Conduct.
3. Legal Responsibility for Their Actions in the Professional Context and Understanding the Physiotherapist’s Liability And Obligations In The Case Of Medical Legal Action.
4. Code of Ethics
6. Functions of the Relevant Professional Associations Education Body and Trade Union.
7. The Role of the International Health Agencies Such as the World Health Organizations.
8. Standards of Practice for Physiotherapists

**Suggested Readings**
1. Basic Management. Trivedi
3. Hospital Administartion. Sundaran
4. Byelaws of the Delhi Council for Physiotherapy and Occupational Therapy

**EDUCATION**
2. Concept of Teaching and Learning: Meaning And Scope Of Educational Psychology, Meaning And Relationship Between Teaching And Learning, Learning Theories, Dynamics Of Behavior, Individual Differences
5. Planning for Teaching: Bloom’s Taxonomy of Instructional Objectives, Writing Instructional Objectives in Behavioral Terms. Unit Planning and Lesson Planning.
6. Teaching Aides: Types of Teaching Aides, Principles of Selection, Preparation, and Use of Audio-Visual Aides.
8. Guidance And Counseling: Meaning And Concepts Of Guidance And Counseling, Principles, Guidance And Counseling Services For Students And Faculty Members, Faculty Development And Development Of Personnel For P.T. Services

Suggested Readings
2. Philosophical Foundation of Education – Srinibas Bhattacharya
3. Sociological Foundation of Education – Srinibas Bhattacharya
4. Psychological Foundation of Education – Srinibas Bhattacharya
M.P.Th. 202: BIOMECHANICS

Students will be able to identify and apply principles of biomechanics while setting up individualized treatment protocols.

Following are the topics to be included but not limited to:

1. **Fundamental Mechanics**
   
   a) Forces
   b) Moments
   c) Newton's Laws
   d) Composition And Resolution Of Forces
   e) Static Equilibrium
   f) Dynamic Equilibrium
   g) Force Systems
   h) Levers
   i) Pulley Systems
   j) Density & Mass
   k) Segmental Dimensions
   l) Stress And Strain
   m) Modulus of Rigidity and Modulus of Elasticity
   n) Poisson’s Effect
   o) Strain Energy
   p) Static and Cyclic Load Behaviors
   q) Load
   r) Load Sharing and Load Transfer

2. **Kinematics**

   a) Types of Motion
   b) Location of Motion
   c) Magnitude of Motion
   d) Direction of Motion
   e) Angular Motion and Its Various Parameters
   f) Linear Motion and Its Various Parameters
   g) Projectile Motions
3. Kinetics
   a) Definition of Forces
   b) Force Vectors
   c) Naming of Force
   d) Force of Gravity & COG
   e) Stability
   f) Reaction Forces
   g) Equilibrium
   h) Linear Forces System
   i) Friction and Its Various Parameters.
   j) Parallel Force Systems
   k) Concurrent Force Systems
   l) Work Powers & Energy
   m) Moment Arms of Force
   n) Force Components
   o) Equilibrium of Force

4. Muscles Mechanics
   a) Structure & Composition of Muscle
   b) Fiber Length & Cross Section Area
   c) Mechanical Properties
   d) EMG Changes during Fatigue & Contraction.
   e) Changes in Mechanical Properties because of Ageing and Exercised & Immobilization.
   f) Clinical Applications

5. Ligament & Tendon Mechanics
   a) Structure and Composition
   b) Mechanical Properties
   c) Cross Sectional Area Measurements
   d) Muscle Tendon Properties
   e) Temperature Sensitivity
   f) Changes in Mechanical Properties because of Aging, Exercise and Immobilization
   g) Mechanoreceptors
h) Clinical Applications

6. Joint Mechanics
   a) Joint Design
   b) Joint Categories
   c) Joint Functions
   d) Arthrokinematics
   e) Osteokinematics
   f) Kinematic Chairs
   g) Joint Forces, Equilibrium & Distribution of These Forces
   h) Degenerative Changes In Weight Bearing Joints & Compensatory Actions
   i) Joint Stability & Its Mechanisms
   j) Clinical Applications

7. Measurement Instruments
   a) Goniometer
   b) Accelerometer
   c) Photo Optical Devices
   d) Pressure Transducers & Force Plates
   e) Gait Analyzer
   f) Isokinetic Device
   g) EMG
   h) Electrophysiology of Muscle Contraction
   i) Recording
   j) Processing
   k) Relationship between EMG and Biomechanical Variables

8. Mechanical Energy, Work & Power
   a) Definitions
   b) Positive and Negative Work of Muscles
   c) Muscle Mechanical Power
   d) Causes of Inefficient Movement
   e) Co-Contractions
   f) Isometric Contraction Against Gravity Jerky Movement
g) Energy Generation at one Joint and Absorption at another
h) Energy Flow
i) Energy Storage

9. Posture and Gait
   a) Posture-
      i. Standing
      ii. Sitting
   b) Pathokinesiology
   c) Gait Parameter
d) Kinetic
e) Kinematic
f) Time – Space
g) Pathological Gait
h) Running
i) Stair Climbing
j) Changes in Gait Following Various Surgeries /Diseases / Disorders.

10. Orthosis & Prosthesis
   a) Orthosis of Spine
   b) Orthosis of Upper Limb
c) Orthosis of Lower Limb
d) Prescriptions Checkouts & Proper Fittings
e) Biomechanical Principles Governing them
f) Aids Used In Management of Disability

Kinesiology
   1. Arthrology and Arthrokinematics, Kinetics, Pathokinesiology
   a) Shoulder
   b) Elbow
c) Wrist and Hand
d) Hip
e) Knee
f) Ankle and Foot
g) Trunk
h) Respiration

2. Cardiopulmonary Mechanics
   a) Cardiac Mechanics
   b) Pulmonary Mechanics
   c) Vascular Mechanics

Suggested Readings:
1. Biomechanics of Human Movement. D Winter
2. Kinesiology: Application to Pathological Motion. GL Soderberg
3. Brunnstrom’s Clinical Kinesiology. LK Smith, EL Weiss, LD Lehmkuhl
4. Kinesiology.: Scientific Basis of Human Motion. K Luttgens, N Hamilton
M.P.Th. 203: SEMINARS ON CLINICAL ISSUES

These will serve as a platform for students to integrate various components of patient management and debate contentious issues in the efficacy of Physiotherapy techniques. Students will give presentations on topics provided to them.
As part of the requirement for the Master’s degree the student is required to undertake a research study under the guidance of a guide. Issues of musculoskeletal disorders may be studied on patients or normal individuals.
M.P.Th.205N: PHYSIOTHERAPY II: ISSUES IN MOTOR CONTROL AND MOTOR LEARNING

Objectives:
1. Define motor learning and performance;
2. Demonstrate knowledge of selected learning theories related to learning and performing of motor skills
3. Apply theories in developing instructional methods;
4. Classify motor skills;
5. Identify the stages of learning and understand the process involved in learning and performance;
6. Arrange the environment to facilitate learning and performance
7. Read and understand basic research in motor learning

Following are the topics to be included but not limited to:

Aims and Objectives: After a review of the latest theories of motor control, motor learning, and recovery of function, students are provided with a conceptual framework for clinical practice and a practical framework for understanding and examining impairments in patients with neurological deficits. Armed with a solid foundation, students then build a thorough understanding of motor control issues as they relate to posture and balance, mobility, and upper extremity function. For each of these three key areas, the authors discuss normal control processes, age-related issues, abnormal function, and the clinical applications of current research.

1. Theoretical Framework
   a) Motor Control: Issues and Theories
   b) Motor Learning and Recovery of Function
   c) Physiology of Motor Control
   d) Physiological Basis of Motor Learning and Recovery of Function
   e) Constraints on Motor Control: An Overview of Neurologic Impairments
   f) A Conceptual Framework for Clinical Practice

2. Postural Control
   a) Normal Postural Control
   b) Development of Postural Control
   c) Aging and Postural Control
d) Abnormal Postural Control
e) Clinical Management of the Patient with a Postural Control Disorder

3. Mobility Function
   a) Control of Normal Mobility
   b) A Life Span Perspective of Mobility
   c) Abnormal Mobility
d) Clinical Management of the Patient with a Mobility Disorder

4. Reach, Grasp, and Manipulation
   a) Normal Reach, Grasp, and Manipulation
   b) Reach, Grasp, and Manipulation: Changes Across the Life Span
   c) Abnormal Reach, Grasp, and Manipulation
d) Clinical Management of the Patient With Reach, Grasp, and Manipulation Disorders

5. Understanding Motor Performance in Children
   a) Evidence-Based Decision-Making in Pediatric Physical Therapy
   b) The Child's Development of Functional Movement
   c) Motor Control: Developmental Aspects of Motor Control in Skill Acquisition
d) Motor Learning: Theories and Strategies for the Practitioner
e) Gait: Development and Analysis
   f) Musculoskeletal Development and Adaptation
g) Genomics and Genetic Syndromes Affecting Movement
   h) Physical Fitness during Childhood and Adolescence

6. Management of Neurologic Impairment
   a) Developmental Coordination Disorder
   b) Children with Motor and Cognitive Impairments
   c) Cerebral Palsy
d) Brachial Plexus Injury
e) Spinal Cord Injury
   f) Brain Injuries: Traumatic Brain Injuries, Near Drowning, and Brain Tumors
g) Myelodysplasia

7. Special Settings and Special Considerations
   a) The Environment of Intervention
b) Early Intervention Services

c) The Educational Environment

d) Assistive Technology

e) The Burn Unit

f) The Special Care Nursery

g) Private Practice Paediatrics Physiotherapy: A Quest for Independence and Success

**Suggested Readings**

1. Movement Science by Carr and Shepherd


M.P.Th. 206N: PHYSIOTHERAPY-II (PRACTICAL)

Students will be instructed via demonstrations, hands on techniques, field visits and case conferences on specific techniques used in management of patients with sports injuries.
Students will draw on their experiences at the clinical postings to formulate a treatment plan for cases presented at the case conference.