SYLLABUS FOR

MASTERS OF PHYSIOTHERAPY (M.P.T)

IN

NEUROLOGY

posted by Dr.C.S.Ram, I.T.S College of Physiotherapy, Ghaziabad
## M.P.T (NEUROLOGY)

### FIRST YEAR

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subject</th>
<th>Hours</th>
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<tr>
<td>1.1</td>
<td>Medical and Surgical Management of Disorders of the Nervous system.</td>
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<td>1.2</td>
<td>Physiotherapy Management in Disorders of the Nervous system – I</td>
<td>125</td>
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<td>1.3</td>
<td>Physiotherapy Management in Disorders of the Nervous system - II</td>
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<td>1.4</td>
<td>Physiotherapy Management in Disorders of the Nervous system – (Lab Hours)</td>
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<td>Research Methodology and Bio-Statistics</td>
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<td>1.6</td>
<td>Seminars on Clinical Issues</td>
<td>100</td>
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<th>Total Hours</th>
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### SECOND YEAR

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<td>2.1</td>
<td>Pedagogy in Physiotherapy Education</td>
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<td>2.2</td>
<td>Management, Administration and Ethical Issues</td>
<td>75</td>
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<td>2.3</td>
<td>Bio-mechanics</td>
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<td>2.3A</td>
<td>Bio-mechanics (Lab Hours)</td>
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<td>2.4</td>
<td>Dissertation</td>
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<td>Seminars on Clinical Issues</td>
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M.P.T (NEUROLOGY)

FIRST YEAR

M.P.T 1.1 MEDICAL AND SURGICAL MANAGEMENT OF DISORDERS OF THE NERVOUS SYSTEM

This course provides the student with information on the epidemiology, Pathomachincs, clinical presentation, relevant diagnostic test and medical and surgical management of disorders of the Nervous system.
Students will be able to use this information in planning and tailoring effective, specific, safe Physiotherapy treatment programmes.

NEUROLOGY
Following are the topics to be included but not limited to:
Epidemiology, Pathomechanics, clinical presentation, relevant diagnostic test and medical management of disorders of the Nervous system.
1. Congenital and hereditary disorders.
2. Disorders of cerebral circulation
3. Head injury
4. Infections disorders
5. Disorders of spinal cord and cauda equine
6. Disorders of Peripheral Nerves
7. Disorders of Muscle
8. Cerebellar disorders
9. RSD, Epilepsy, Dementia, Alzheimer’s
10. Disorders of the Vestibular system
11. Extrapyramidal disorders etc.

NEURO SURGERY
Surgical Management of the above conditions, indications, contra-indications for surgery, precautions after Surgery. Also included:
General Principles
Tumours
Intracranial abscess
Hydrocephalus
Stereotactics surgery

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(M.P.T) 1.2 PHYSIOTHERAPY MANAGEMENT IN DISORDERS OF THE NERVOUS SYSTEM- 1

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 discussions students will be able to set up a treatment programme tailored to the patient’s needs.
Following are the topics to be included but not limited to:

SECTION – 1 GENERAL PRINCIPLES
1. Development of a child
2. Neuro development techniques
3. Principles and technique of MRP
4. Principles and technique of PNF
5. Motor control and learning
6. Balance and coordination
7. Assessment and management of pain
8. Group exercises
9. P.T. in home setting
10. Bio-feed back
12. Disability evaluation.

MPT 1.3 P.T. MANAGEMENT IN DISORDERS OF THE NERVOUS

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SYSTEM-II
Assessment and management of condition Topics as listed in (M.P.T) 1.1

(M.P.T) 1.4 PHYSIOTHERAPY MANAGEMENT IN DISORDERS OF THE NERVOUS SYSTEM (LAB HOURS)

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

(M.P.T) 1.5 RESEARCH METHODOLOGY AND BIOSTATISTICS

Students will be provided an understanding of statistical measures used in the analysis and interpretation of research data. Information on research designs and their implementation will be provided.
This course will be the students to read critique research articles and understand and apply the principles of research to perform a guided research as part of their course requirement following are the topics to be included but not limited to:

SECTION -1 RESEARCH METHODOLOGY
1. How are read and critique research
2. Introduction to research: framework; levels of measurement; variables
3. Basic research concepts; validity and reliability
4. Design, instrumentation and analysis for qualitative research
5. Design, instrumentation and analysis for quantitative research
6. Design, instrumentation and analysis for quasi-experimental research
7. How to write a research proposal
8. The use and protection of Human and Animal Subjects.

SECTION- II BIOSTATISTICS
1. Descriptive and inferential statistics
2. Types of data: Qualitative and Quantative
3. Frequency distributions
4. Describing data with Graphs
5. Describing data with Averages Mode, Median, Mean
6. Describing variability Variance, Standard deviation, etc.

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7. Normal Distributions
8. Interpretation of r
9. Hypothesis testing
10. T tests
11. ANOVA
12. Probability
13. Type I and Type II errors
14. Parametric and Non-Parametric tests
15. Which tests to use
16. Basic of computers – Hardware and Software
17. Basic of computer Applications – Windows, MS Word, Power Point, etc.
18. Simple statistical analysis using available software.

(M.P.T) 1.6 SEMINARS ON CLINICAL ISSUES

These will serve as a platform for students to integrate components of patient management. Students will give presentations on topics provide to them.

CLINICAL PRACTICE
Students will engage in clinical practice in physiotherapy Department in the neurological setting to enhance their clinical skills and apply theoretical knowledge gained during teaching sessions.

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M.P.T (NEUROLOGY)

SECOND YEAR

(M.P.T) 2.1 PEDAGOGY OF PHYSIOTHERAPY EDUCATION

This course will be provide students information on improving their teaching skills in the classroom and clinical setting.

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

1. **Philosophy of educational and Emerging Issues in Education**
   - Meaning, Functions and Aims of Education
   - Formal, informal and Non-formal Education.
   - Agencies of Education
   - Current Issues and trends in Higher Education
   - Issue of quality in Higher education, autonomy and accountability, privatization, professional development of teachers, education of persons with disabilities.
   - Need for Education Philosophy
   - Some major philosophies, Idealism Naturalism, Pragmatism and their Implications for Education.

2. **Concept of Teaching and Learning**
   - Meaning scope of Educational Psychology
   - Meaning and Relationship between Teaching and Learning
   - Learning Theories
   - Dynamics of Behaviour
   - Individual Differences

3. **Curriculum**
   - Meaning and concept
   - Basis of curriculum Formulation Development
   - Framing Objectives for Curriculum

4. **Method and Techniques of Teaching**
   - Lecture, Demonstration,
   - Discussion, Seminar, Assignment, Project and Case Study

5. **Planning for Teaching**
   - Bloom’s Taxonomy of Instructional Objectives, in Behavioural terms, Unit planning and Lesson Planning.

6. **Teaching Aids**
   - Types of teaching Aides
   - Principles of Selection, Preparation and Use of Audio – Visual aids.

7. **Measurement and Evaluation**
   - Construction of an Achievement test and analysis Standardized Test.
   - Introduction of some Standardized tools, important tests of Intelligence, Aptitude, Personality.

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Continuous and Comprehensive Evaluation.

8 Guidance and Counseling
Meaning and Concepts of Guidance and Counseling
Principles
Guidance and Counseling Services of Students and Faculty members
Faculty Development and Development of Personnel for P.T. Services

9 Clinical Education
Awareness and Guidance to the Common people about Health & Diseases and
Available professional Services.
Patient Education
Education of the Practitioners

(M.P.T) 2.2 MANAGEMENT, ADMINISTRATION AND ETHICAL ISSUES
This course deals with issues of management to assist the practitioner in efficiently
addressing issues related to the organization and administration of a Physiotherapy
Department following are the topics to be included but limited to:

MANAGEMENT
1. Functions of management,
2. Evaluation of management through scientific management theory,
   Classical theory
   System approach
   Contingency approach
3. Management process
   Planning, Organization, direction, controlling decision making
4. Introduction of personnel management
   Staffing recruiting selection, performance appraisal, collective bargaining,
   discipline, job satisfaction.
5. Quantitative methods of management
   Relevance of statistical and/or techniques in management
6. Marketing
   Market segmentation, marketing research production planning pricing, channels
   of distribution, promotion, consumer behaviour, licensor.
7. Total quality management
   Basis of quality management- acid for quality control quality assurance program
   in hospitals, medical audit, and international quality system.

ADMINISTRATION
1. Hospital as an organization
   Functions and types of hospitals selected clinical supportive 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 dept.
2. Roles of Physiotherapist, Physiotherapy Director, Physiotherapy Supervisor,
   Physiotherapy assistant, Physiotherapy aide, Occupational Therapist, Home
   health side, Volunteer.

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1. Directed care and referral relationship and confidentially.

LEGAL PROFESSIONAL ETHICAL ISSUES
1. Physical therapy: Definition and development
2. The implications & confirmation to the rules of professional conduct.
3. Legal responsibility for their actions in the professional context and understanding the physiotherapy liability and obligations in the case of medical legal action.
5. Functions of the relevant professional associations education body and trade union.
6. The role of the international health agencies such as the world health organizations.
7. Standards of practice for physical therapies.

M.P.T 2.3 BIOMECHANICS
Students will be able to identify and apply principles of bio-mechanics while setting up individualized treatment protocols.

FUNDAMENTAL MECHANICS
Forces
Moments
Newton’s laws
Composition and resolution of forces
Static equilibrium
Dynamic equilibrium
Force systems
Levers
Pulley Systems
Density & Mass
Segmental dimensions

KINEMATICS
Types of Motion
Location of Motion
Magnitude of Motion
Director of Motion
Angular motion and its various parameters
Linear motion and its various parameters
Projectile motions

KINETICS
Definitions of forces

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Force vectors
Naming of Force
Force of gravity & Cog
Stability
Reaction forces
Equilibrium
Linear forces system
Friction and its various parameters
Parallel force system
Concurrent force systems
Work powers & energy
Moment arms of force
Force components
Equilibrium of force

**FLUID MECHANICS**
Various laws governing the flow of fluids
Various laws governing the volume of fluids
Various laws governing the pressure of fluids
Various laws governing the energy of fluids
Various parameters explaining the flow
Various parameters describing the fluids
Clinical applications

**BONE MECHANICS**
Structure & composition of bone
Stress
Strain
Modulus of rigidity of modular of elasticity
Poisson’s effect
Strain energy
Static & cyclic load behaviours
Load
Mechanical properties of trabecular bone
Mechanical properties of cortical bone
Bone remodeling
Response of the bone to aging & exercise & immobilization
Mechanism to prevent fracture present in bone
Fracture of prediction
Behavior of bone under load
Clinical applications
Failure criteria

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MUSCLES MECHANICS
Structure & composition of muscle
Fiber length & cross section area
Mechanical properties
EMG changes during fatigue & contraction
Changes in mechanical properties because of ageing and exercised & immobilization
Clinical applications

LIGAMENT & TENDON MECHANICS
Structure and composition
Mechanical properties
Cross section area measurements
Muscle tendon properties

BIOMECHANICS IN NERVOUS CONDITION
This course involves application of bio-mechanical principal to Nervous conditions

MEASUREMENT INSTRUMENTS
Goniometer
Accelerometer
Photo optical devices
Pressure transducers and force plates
Gait analyzer
Isokinetic device

EMG
Electro physiology of muscle contraction
Recording
Processing
Relationship between EMG and bio-mechanical variables.

MECHANICAL ENERGY, WORK AND POWER
Definitions
Positive and Negative work of muscle
Muscle of mechanical power
Causes of inefficient movement
Co-contraction
Isometric contraction

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Energy generation at one joint and absorption at another
Energy flow
Energy storage

ERGONOMICS

APPLICATION OF BONE AND JOINT MECHANICS
Load sharing & load transfer
Prosthetic design criteria
Bio-mechanical analysis of implants internal fixations
Regenerative change in weight bearing joints & compensatory actions

GAIT
Gait parameter
Kinetic
Kinematic
Time-Space
Pathological gait
Running
Stair climbing
Changes in gait following various surgeries/ diseases/ disorders

ORTHOSIS & PROSTHOSIS
Orthosis of spine
Orthosis of upper limb
Orthosis of lower limb
Prescriptions checkouts & proper fittings
Bio-mechanical principal governing them
Aids used in management of disability

NEURODYNAMICS

(M.P.T) 2.4 (A) BIOMECHANICS IN NEUROLOGICAL CONDITION (LABOURS)
This involves application of topics in M.P.T 2.4 via demonstrations, field visits and case presentations

(M.P.T) 2.5 THESIS (DESERTATION)
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 Neurological disorders may be studied on patients or normal individuals.

(M.P.T) 2.6 SEMINARS ON CLINICAL ISSUES
These will serve a platform for students to integrate various components of patient management. Students will give presentations on topics provided to him.

CLINICAL PRACTICE
Student will engage in clinical in Physiotherapy Departments in the neurology setting to enhance their clinical skills and apply theoretical knowledge gaining during sessions.

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