SYLLABUS FOR

MASTERS OF PHYSIOTHERAPY (M.P.T)

IN

ORTHOPEDICS

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

## FIRST YEAR

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Medical and Surgical Management of Disorders of the Musculoskeletal System</td>
<td>100</td>
</tr>
<tr>
<td>1.2</td>
<td>Physiotherapy Management in Disorders of the Musculoskeletal System – I</td>
<td>125</td>
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<tr>
<td>1.3</td>
<td>Physiotherapy Management in Disorders of the Musculoskeletal System – II</td>
<td>125</td>
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<tr>
<td>1.4</td>
<td>Physiotherapy Management in Disorders of the Musculoskeletal System – (Lab Hours)</td>
<td>50</td>
</tr>
<tr>
<td>1.5</td>
<td>Research Methodology and Bio-Statistics</td>
<td>100</td>
</tr>
<tr>
<td>1.6</td>
<td>Seminars on Clinical Issues</td>
<td>100</td>
</tr>
</tbody>
</table>

Clinical Practice | 1100

Total | 1700 hours

## SECOND YEAR

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Subject</th>
<th>Hours</th>
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<tbody>
<tr>
<td>2.1</td>
<td>Pedagogy in Physiotherapy Education</td>
<td>100</td>
</tr>
<tr>
<td>2.2</td>
<td>Management, Administration and Ethical Issues</td>
<td>100</td>
</tr>
<tr>
<td>2.3</td>
<td>Bio-mechanics</td>
<td>150</td>
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<tr>
<td>2.4</td>
<td>Bio-mechanics (Lab Hours)</td>
<td>50</td>
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<tr>
<td>2.5</td>
<td>Dissertation</td>
<td>200</td>
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<tr>
<td>2.6</td>
<td>Seminars on Clinical Issues</td>
<td>150</td>
</tr>
</tbody>
</table>

Clinical Practice | 1100

Total | 1850 hours

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MPT (ORTHOPAEDICS)

FIRST YEAR

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

This course provides the student with information on the epidemiology, Pathomechanics, clinical presentation, relevant diagnostic test and medical and surgical management of disorders of the musculoskeletal system. 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:

Epidemiology, Pathomechanics, clinical presentation, relevant diagnostic test and Medical management of disorders of the musculoskeletal system. Surgical Management, indications, contra-indications for surgery, precautions after surgery.

GENERAL ORTHOPAEDICS

Metabolic Disorders of the Bone and Joints.
Infections Disorders of the Bone and Joints.
Congenital Disorders of the Bone and Joints.
Inflammatory Disorders of the Bone and Joints.
Myopathies.
Neurological Disorders.
Bone and Joint Tumours.
Complex Regional Pain Syndromes.

REGIONAL ORTHOPAEDICS

Disorders of Upper Limb
Disorders of Lower Limb
Disorders of the Spine

TRAUMATOLOGY

Trauma of the Upper Limb
Trauma of the Lower Limb
Trauma of the Spine
Trauma of the Peripheral Nerves
This course provides students with the principles of Physiotherapy management in disorders of the musculoskeletal system and the application of these principles in specific disorders. Through lectures, case conference, 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 include but not limited to:

SECTIONS -1 GENERAL PRINCIPLES

P.T. Assessment

Manipulation and Mobilization Techniques

Critical Analysis of Electrotherapeutic Modalities.

Exercise Training Programmes

Various Stretching Techniques

Disability Evaluation.

Assessment and Management of Pain.

Soft Tissue Mobilizations.

Muscle Energy Techniques.

PT in home setting.

SECTION – II PHYSIOTHERAPY MANAGEMENT IN SPECIFIC CONDITIONS

Topics as listed in (M.P.T) 1.1

MPT 1.3 P.T. MANAGEMENT IN DISORDERS OF THE MUSCULOSKELETAL SYSTEM- II
Topics as listed in (M.P.T) 1.1

(MPT) 1.4 PHYSIOTHERAPY MANAGEMENT IN DISORDERS OF THE MUSCULOSKELETAL SYSTEM (LAB HOURS)

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Students will be instructed via demonstration, hands of techniques, field visits and case conferences on specific techniques used in management of patients with musculoskeletal orders. Students will on their experience 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

How are read and critique research.
Introduction to research: framework; levels of measurement; variables.
Basic research concepts; validity and reliability
Design, instrumentation and analysis for qualitative research
Design, instrumentation and analysis for quantitative research
Design, instrumentation and analysis for quasi-experimental research
How to write a research proposal
The use and protection of human and animal subjects.

SECTION – II BIOSTATISTICS

Descriptive and Inferential statistics
Types of data: Qualitative and Quantitative
Frequency distributions
Describing data with Graphs
Describing data with Averages Mode, Median, Mean
Describing variability Variance, Standard deviation, etc.
Normal Distributions
Interpretation of r
Hypothesis testing
T tests

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ANOVA
Probability
Type I and Type II errors
Parametric and Non-Parametric tests
Which tests to use
Basic of computers – Hardware and Software
Basic of Computer Applications – Windows, MS word, Power Point, etc.
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 Department of Orthopaedic Physiotherapy setting to enhance their clinical skills and apply theoretical knowledge gained during teaching sessions.

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MPT (ORTHOPAEDIC)

SECOND YEAR

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

This course will be provided 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
   Issues 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
   Process of curriculum development and factors affecting curriculum
   Development evaluation of 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, Writing Instructional Objectives in Behavioural terms, Unit Planning and Lesson Planning.

6. Teaching Aids
   Types of teaching aides

7. Measurement and evaluation
   Nature of Educational Measurement : Meaning, Process, Types of tests.
   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 and 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 recruitment 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, licenser.

ADMINISTRATION

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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.

3. Director 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 physiotherapist 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.

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MPT 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 lows
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
Direction of Motion
Angular motion and its various parameters
Linear motion and its various parameters.
Projectile motions.

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KINETICS
Definitions of forces
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

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BONE MECHANICS
Structure & composition of bone
Stress
Strain
Modules of rigidity & 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
Mechanisms to prevent fracture present in bone
Fracture of prediction
Behaviour of bone under load
Clinical applications
Failure criteria

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

LIGAMENT & TENDON MECHANICS
Structure and composition
Mechanical properties
Cross sectional area measurements
Muscle tendon properties
Temperature sensitivity

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Changes in mechanical properties because of aging exercise and immobilization
Mechanoreceptors
Clinical applications

**JOINT MECHANICS**
  Joint Design
  Joint categories
  Joint functions
  Arthrokinematics
  Osteokinematics
  Kinematics chairs
  Joint forces, equilibrium & distribution of these forces
  Joint stability & its mechanism
  Articular Cartilage Mechanics
  Clinical applications

**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

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Muscle of mechanical power
Causes of inefficient movement
Co-contraction
Isometric contraction
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.
Degenerative changes in weight bearing joints & compensatory actions.

BIOMECHANICS IN SPORTS CONDITIONS
This course involves application of bio-mechanical principles to sports conditions.

CARDIOPULMONARY MECHANICS
Rheology
Cardiac Mechanics
Pulmonary Mechanics
Rib Cag Movements

GAIT
1. Gait parameter
   ● Kinetic
   ● Kinematic
   ● Time- Space
2. Pathological gait
3. Running
4. Stair climbing
5. Changes in gait following various surgeries/ diseases/ disorders

ORTHOSIS & PROSTHOSIS

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1. Orthosis of spine
2. Orthosis of upper limb
3. Orthosis of lower limb
4. Prescriptions checkouts & proper fittings
5. Bio-mechanical principles governing them
6. Aids used in management of disability.

(M.P.T) 2.4  BIOMECHANICS IN MUSCULOSKELETAL CONDITIONS (LAB HOURS)
This involves application of topics in M.P.T 2.4 via demonstrations, field visits and case presentations.

(M.P.T) 2.5  THESIS (DISEERTATION)
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.

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

CLINICAL PRACTICE

Students will engage in clinical in Physiotherapy Departments in the Orthopaedic setting to enhance their clinical skills and apply theoretical knowledge gaining during teaching sessions.

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