

SYLLABUS OF MPT

PAPER-1

REVIEW OF BASIC MEDICAL SCIENCES

M.P.T. – 1st Year,

Code – M.P. – 101

Max Marks – 100

Min passing marks -40%

Time-3hrs

NOTE: The question paper covering the entire course shall be divided into three sections as follows:

Section A: This will consist of essay type questions with answer to each question up to 8 pages in length. Four questions will be set by the examiner and the candidate will be required to attempt Two. Each question will carry 15 marks, total weight age of the section being 30 marks.

Section B: This will consist of essay type questions with answer to each question up to 5 pages in length. Four questions will be set by the examiner and the candidate will be required to attempt Two. Each question will carry 8 marks, total weight age of the section being 16 marks.

Section C: This will consist of Short answer questions with answer to each question up to two pages in length. Eight questions will be set by the examiner and six will be attempted by the candidate. Each question will carry 4 marks; total weight age of the section shall be 24 marks.

Course Objective

1. Anatomy & Applied anatomy for supportive specification.
2. Normal functional anatomy for Analysis between normal & abnormal
3. Subject support: Diagnosis & related mechanics.
4. Pharmacology: Medical Professional supportive purpose/ action reaction of the medical related to different specialization.
5. Pathology: Basic condition knowledge, their pathological changes & their relevant conditions to support the specialization.
6. Exercise Physiology & Nutrition: Muscle Exercise Physiology, nutrition & diet chart of different conditions.

Unit I: Human Anatomy

Outline of General Anatomy.

1- Introduction to upper limb & lower limb

- a) Bones & Joints
- b) Muscles
- c) Nerves, Roots, Plexus.

- d) Pectoral region, axilla, scapula, arm, forearm, cubital fossa & hand.
- e) Vascular structure.
- f) Thigh, gluteal region, popliteal fossa.
- g) Leg, ankle and foot.

2- Introduction of lungs, heart & thorax anatomy.

3- Introduction of vertebral column.

- a) Cervical, thoracic, lumber, sacral spine.
- b) Anatomy of spinal cord.

4- Introduction of head & neck

- a) Neck : Side of neck
Triangle of Neck
- b) Temporomandibular joint

5- Introduction to brain.

- a) Meanings, CSF
- b) Blood supply of brain & Spinal cord.
- c) Outline of ventricles
- d) Outline of brain stem.
- 6- Introduction to anatomy of reproductive system.
- 7- Neonatal development, millstones, neonatal reflexes etc.

Unit II: Human Physiology

(1) Cardiovascular System.

- a) Structure & Properties of heart
- b) Cardiac Cycle.
- c) The regulation of heart's performance.
- d) Cardiac output.
- e) The arterial blood pressure.
- f) The physiology of vascular system.
- g) Lymphatic circulation.

(2) Muscular System:

- a) Types of muscles, types of muscle contractions, muscle work, motor units, group action of muscles, muscle spindle.
- b) Neuromuscular junction.
- b) Muscle architecture.
- c) Muscle action.

- d) Spasm, spasticity, twitch, muscle fatigue, tetani rigor motis
- e) Nerve & blood supply of muscles etc...

(3) Respiratory System:

- a) Functional anatomy
- b) Ventilation & control of ventilation
- c) Alveolar air
- d) Regulation of the breathing
- e) Pulmonary function test.

(4) Nervous System:

- a) Elementary neuroanatomy
- b) Neurons & Neuralgia
- c) Properties of nerve fibers synapse.
- d) Spinal cord.
- e) Cerebral cortex.
- f) Pyramidal & extra pyramidal system.
- g) The cerebellum.
- h) Automatic nervous system.
- i) Cerebrospinal fluid.
- j) Cranial nerves.

(5) Reproductive System:

- a) Male reproductive system.
- b) Female reproductive system.
- c) Menstrual cycle.
- d) Menopause.
- e) Fertilization & intra-uterine development.
- f) Birth.
- g) Post natal growth & development.

Unit III : Pharmacology

Discussion in details of the following groups of drug. Their effects, uses, side effects and dosage.

1. Drugs used in pain.
2. Local anesthetics
3. Steroids
4. Muscle relaxants.
5. Drug acting upon central nervous systems & autonomic nervous system.
6. Tropicly acting drugs.

Unit IV: Pathology

1. **General Pathology (Cell Injury, Inflammation, repair, immune system)**
2. **Musculoskeletal system.**
 - a) Bones:
 - Hereditary & Metabolic diseases.
(Osteoporosis, Rickets, Osteomalacia, Osteitis fibrosa cystica, Renal Osteodystrophy)
 - Infections:
(Osteomyelitis, tuberculosis)
 - b) Joints:
 - Degenerative joint disease.
 - Bursitis.
 - c) Skeletal muscles
(Muscle atrophy, Myositis, Muscular dystrophy, Myasthenia gravis)
3. **Nervous system**
 - a) Infection (meningitis, encephalitis)
 - b) Vascular diseases (Ischemic encephalopathy, Cerebral infarction, Intracranial hemorrhage)
 - c) Degenerative disease
(Alzheimer's disease, Huntington's disease, Parkinsonism, Motor neuron disease)
 - d) Demyelinating disease
(Multiple sclerosis)
 - e) The peripheral nervous system
(Peripheral neuropathy, acute Idiopathic polyneuropathy, Diabetic neuropathy)

Unit V: Exercise Physiology & Nutrition

Section: A

Introduction: History of Exercise physiology-Early Exercise Physiologists, the Harvard Fatigue Laboratory, The Scandinavian Influence, Contemporary Exercise Physiologists.

- Bioenergetics
- Endurance Training
- Energy Expenditure at rest and during physical activity-

Energy, Work & Power

Measurement of Energy CCSI of Exercise.

Direct Calorimetry, Indirect Calorimetry, Net O₂ cost of Aerobic and Anaerobic exercise, the concept of the MET, Ancillary considerations in Measuring Energy Expenditure, Body size and energy cost. Measuring efficiencies on a bicycle, ergometer and treadmill. Measurement of energy cost for 100M, 400M dash.

Measurement of energy cost using telemetry.

Muscle Physiology: Overview, Mechanism of Muscular Contraction.

Section B:

Respiratory response to Exercise:

Ventilation at rest and during exercise. Ventilation and the anaerobic

Threshold, Alveolar Ventilation and Dead Space, Other Lung volumes and capacities, Oxygen Cost of breathing, second wind, Stitch in side.

Cardiovascular responses to Exercise:

Summary of the cardiovascular systemic physiology covered during previous year.

Cardiovascular aspects of exercise: Control and regulation of heart and circulation at rest and during exercise.

Exercise and Acid Base Balance:

Acid and Bases, Buffers, pH, Respiratory Regulation of pH, Alkali Reserve, The Kidneys and acid base balance, Alkalosis and Acidosis, Acid base balance following heavy exercise.

Hormonal response to exercise:

Growth Hormone (GM), thyroid and Parathyroid hormones. Ant diuretic Hormone (ADM) and Aldosterone, Insulin and Glucagon's, the catecholamine; epinephrine and norepinephrine. The sex hormones. The glucocorticoids (cortisol) and Adreno Corticotrophin Hormone (ACTH), Prostaglandins and Endorphin:

Section C:

Nutrition overview: Fat, Proteins, Carbohydrates, Vitamins, Minerals, Water
Recommended daily allowances (RDAs) of a healthy diet for athletes and other involved in physical activity, Nutritional food pyramid and its use, Primary organizations responsible for

nutritional information, nutritional considerations in rehabilitation including nutrients involved in healing and nutritional risk factors, Common illnesses and Injuries attributed to poor nutrition. Energy and nutritional demands of specific activities and the nutritional demands placed on athletes and other involved in physical activity.

Books Recommended:

Pharmacology and Pharmacotherapeutics, R.S. Satoskar - Popular Publication,
Bombay

PAPER-2
REVIEW OF BASIC THERAPEUTICS

M.P.T. – 1st year
Code – M.P. – 102
Max. Marks = 100
Min passing marks -40%
Time – 3 hrs

NOTE: The question paper covering the entire course shall be divided into three sections as follows:

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Section B: This will consist of essay type questions with answer to each question up to 5 pages in length. Four questions will be set by the examiner and the candidate will be required to attempt Two. Each question will carry 8 marks, total weight age of the section being 16 marks.

Section C: This will consist of Short answer questions with answer to each question up to two pages in length. Eight questions will be set by the examiner and six will be attempted by the candidate. Each question will carry 4 marks, total weight age of the section shall be 24 marks.

Unit –I

1. Definition of physiotherapy, Goals & objectives of Physiotherapy in Clinical Evaluation Phase of management of injured person. (Multidisciplinary Approach)
2. Rehabilitations and modern concepts in sports Physiotherapy.
3. Definition, details of effects and uses of therapeutic Exercises.
 - a) Dynamic Exercises
 - b) Plyometric Exercises
 - c) Isokinetic Exercises
 - d) Manipulative Techniques
 - e) Kinetic Chain Exercise
4. Mobilization
 - a) Factors affecting the joint range of motion prevention of stiffness, methods of joint mobilization.
 - b) Testing for tightness and contracture of soft-tissue structure.
 - c) Techniques of mobilizing the various joints of the body
 - d) Introduction to manual therapy techniques, manual joint therapy, traction, basic principles of manipulation for various disorders of the spine and extremities.

5. Review of the following techniques.
 - a) Assessment techniques like MMT & Goniometry
 - b) Re-education and strengthening.
 - c) Balance and Co-ordination exercise
 - d) Gait analysis and training (both normal & pathological gait)
 - e) Posture
 - f) PNF
 - g) Traction

6. Strengthening

Types of Muscle Contractions and Muscle work, Strength of Muscle Contraction in terms of Motor units, group action of Muscles and its implication in designing an exercise program.

 - a. Cause of Muscle weakness. Prevention of disuse atrophy, Principles of treatment to increase muscle strength and function.
 - b. Techniques of strengthening with respect to regional consideration.
 - c. Various methods of progressive resisted exercise.
 - d. Aquatic therapy

7. Physiotherapy for Enhancing Neuromuscular Control
 - a) Neuromuscular control, methods for improving neuromuscular control, proprioception and kinesthetic sensation following different injuries.
 - b) Principles and application of neuromuscular facilitation techniques including PNF.
 - c) Protective equipment.

8. Methods of conditioning and fitness enhancement

9. Regional Exercise prescription

10.
 - (a) Therapeutic Exercise for Shoulder, elbow, wrist and Hand injuries.
 - (b) Therapeutic Exercise for hip and thigh, Knee, foot and ankle injuries.
 - (c) Therapeutic Exercise for Spinal Problem.

11. Massage

Historical development, definition and classification of massage techniques, Physiological effects of massage, description of the techniques of classical massage. Physiological basis of massage, therapeutic applications and contraindication of massage.

12. Hydrotherapy:

History & introduction, effects of simple baths, raising temperature baths, baths with additives, Aromatic baths, Mineral baths, Physical baths, Hydroelectric baths, stammer baths, whirl pool bath, showers and steam showers, aquatic exercises.

Unit-II

Electro Therapy

1. Principles underlying the application of following modalities with reference to their production, biophysical and therapeutic effects, indications and contraindications and the specific uses in sports physiotherapy.
 - a) Infrared rays, paraffin wax, bath steam bath, moist heat pack fluid therapy, Mud bath and pelloids.
 - b) High frequency current: SWD, MWD, Ultrasound, pulsed electromagnetic energy. Physiological effects, use of Cold therapy in acute phase, rehabilitative phase, preventive phase of athletic injury, Methods of application, indications and contraindications.
2. Principles underlying the application of following modalities with reference to their production, biophysical and therapeutic effects, indications and contraindications and the specific uses in Physiotherapy.
 - a) Low frequency current: Direct current, modified Direct Current, Alternative current, Diadynamic Current, Ionotophoresis TENS, High Voltage, Pulsed Galvanic Stimulation.
 - b) Medium Frequency Current: IFT, Russian Currents, Radiations: LASER Recent Advancement in Electrotherapy (electro therapy in wound management), Electro-diagnosis and its implications to Physiotherapy.

Unit III:

Biomechanics & Pathomechanics

Section A

1. Introduction to kinesiology and Biomechanics.
2. Principle of Biomechanics, Nature and importance of Biomechanics in Physiotherapy.

Section B

3. Introduction to biomechanical analysis of human motion. Analytical tools and techniques-Isokinetic dynamometer, Kinesiological EMG, Electronic goniometer, force platform, video therapy.

Section C

4. Biomechanics of shoulder and shoulder girdle motion, elbow motion, wrist and hand motion & their pathomechanics.
5. Biomechanics of pelvic motion, hip motion, Knee motion, Ankle & Foot motion & pathomechanics.
6. Biomechanics of Spinal motion & Pathomechanics.

Section D

7. Gait analysis, posture & Abnormal Posture & Gait.

Unit IV Bio Engineering

1. Principles of orthotics type, indications, contra indications, Assessment (Check Out), uses and fitting –region wise.
2. Fabrication of simple Splints and self help devices for upper, lower extremity and spine-indications and applications.
3. Principles of prosthetic –type, indications, contraindications, assessment (Check Out), use and fitting –region wise.
4. Preparation, Application & training.

Recommended Books

1. A.G.Sinha, Principle and practices of therapeutic Massage, Jaypee Brothers, New Delhi.
2. William E. Prentice: Therapeutic Modalities in Sports Medicine – Mosby.
3. William E. Prentice: Rehabilitation Techniques – Mosby.
4. O’Sullivan, Schmitz: physical Rehabilitation – Assessment and treatment –F.A. Davis
5. John Low & Reed: Electrotherapy Explained, Butterworth.
6. Meryl I Roth Gersh: Electrotherapy in Rehabilitation, F.A Davis.
7. Joseph Kahn: Principles and Practice of Electrotherapy, Churchill Livingstone.
8. Claytons Electrotherapy 10th Ed. –Sarah & Bazin – W.B. Saunders
9. Harrelson and Andrews: Physical Rehabilitation of Injured Athlete.
10. Nelson and Currier: Clinical Electrotherapy, Prentice Hall.
11. Greenman: Principles of Manual Medicine, William & Wilkins
12. Kuprian: Physical Therapy for Sports , W.B. Saunders
13. Bates: Aquatic Exercise Therapy, W.B. Saunders
14. Michlovitz – Thermal Agents in Rehabilitation – F.A. Davis
15. Lehmann – therapeutic Heat and Cold - Wiliam & Wilkins
16. James G. Hay – The Biomechanics of sports Techniques, Prentice Hall
17. Brunnstrom – Clinical Kinesiology – Scientific Basis of Human Motion 9th Edi, 1997, Brown & Benchmark

18. Luttgens K., Hamilton N.: Kinesiology – Scientific Basis of Human Motion 9th Edi, 1997, Brown & Benchmark
19. Kreighbaum E., Barthels K: Biomechanics _ A Qualitative approach for studying human motion, 2nd edn. 1985, Macmillan.
20. Rasch & Burk: kinesiology and Applied Anatomy, Lee & Fabiger
21. White and Punjabi – Biomechanics of Spine – Lappincott.
22. Norkin & Levangie: Joint Structure and function - A Comprehensive Analysis – F.A. Davis
23. Kapandji: Physiology of Joints Vol I, II & III, W.B. Saunders.
24. Northrip et al: Analysis of sports Motion: Anatomic and Biomechanics perspectives, W.C. Brown Co. IOWA.
25. Leveac B.F.: Basic Biomechanics in Sports and Orthopedic Therapy, C.V. Mosby.
26. De Boer & Groot: Biomechanics of Ports, CRL Press, Florida.
27. Basmajian – Muscle alive – Williams & Wilkins.
28. Nordin & Frankel – Basic Biomechanics of Muscular Skeletal System – Williams & Wilkins.
29. Bartlet – Introduction to Sports biomechanics – F & FN Spon Madras.

PAPER-3

ADVANCED THERAPEUTICS AND DIAGNOSIS

M.P.T. – 1st year
Code – M.P. – 103
Max. Marks = 100
Min passing marks -40%
Time-3hrs

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Unit I :

Manual Therapy: Introduction, History, Basic Classification, Assessment for manipulation, discussion in brief about the concepts of mobilization like Cyriax, Maitland & Mulligan and Butler in mobilization of joints & nerves. Methodology in general with examples, Joints/ nerves (Manipulation studies & work according to their specialization).

Unit II :

Muscle Energy techniques and Positional stretch: The basic concept and application of these techniques.

Unit III :

Myofascial Release: Concept & brief discussion of its application techniques.

Unit IV :

LASERS: Production, types, effects, application, indications & contraindications.

Unit V :

Nerve conduction studies and EMG: Normal & abnormal action potentials, its recording protocols, analysis & apparatus.

Unit VI :

Micro currents: Concept, Indications, Contraindications & Application.

Unit VII :

Biofeed back: Principles, effects, uses and contraindications.

(FOLLOWING ARE ONLY FOR PRACTICAL KNOWLEDGE; NOT FOR THEORY EXAM)

Unit VIII :

Radiology & Diagnostic Studies: Reading and analysis of.

1. X-Ray.

2. Myelography.
3. Cerebral angiography.
4. computer tomography.(CT SCAN)
5. Magnetic resonance imaging (MRI).
6. Angiography.
7. Radionuclide imaging, PET scan.
8. neurophysiology- electro ECG, EMG, NCS (nerve conduction studies)
9. Examination of CSF.
10. Late responses- F response, H-reflex, axon- reflex.
11. Artifacts & technical factors.
12. Evoked potentials- visual, auditory, somatosensory, motor spinal potentials, biofeedback, EEG.
13. Thermal & vibration threshold monitor.
14. EEG.

Their clinical relation with various muscular skeletal disorder and nervous disorders

Unit IX :

Analysis of various laboratory Examination reports and their clinical Co- relation with various muscular skeletal disorders and neurological, cardiothoracic, pediatrics & gynecological disorders.

1. blood serum
2. Urine & stool.
3. CSF.
4. Biopsy.
5. Other test related to specific conditions.

PAPER-4

SKILL ENHANCING STUDIES

(RESEARCH METHODOLOGY, BIOSTATISTICS, EDUCATIONAL TECHNOLOGY & COMPUTERS)

M.P.T. – 1st year
Code – M.P. – 104
Max. Marks = 100
Min passing marks -40%
Time – 3 hrs

Course Objective

1. BIO STATISTICS & COMPUTERS FOR COLLECTING DATA & PROGRAMME FOR PROJECT WORK & FOR PLANNING EFFECTIVE TREATMENT.
2. ETHICS & MEDICOLEGAL ASPECTS FOR CLINICAL PURPOSES.
3. EDUCATIONAL TECHNOLOGY FOR TEACHING & LEARNING PURPOSES.

Unit I:

Research Methodology

Introduction-

Uses of statistical methods & standard deviation.
Methods of collection, classification, tabulation & presentation of data.

Central tendency-

Mean, Median, Mode & standard deviation

Correlation & Regression:-

Karl Pearson's correlation method
Rank correlation method
Regression & correlation.
Sampling & hypothesis testing
Data collection
Types of sampling
Random Sampling
T. Test, Z. Test, Chi square testing.

Unit II:

Physiotherapy Ethics

1. Morals and ethics
2. Ethical issue in physical therapy
3. Rules and regulation of association/ council

Unit III:

Physical Therapy & Law: Medicolegal aspect of physical therapy, liability, negligence and practice, licensure workmen compensation & maintaining the medical register.

Unit IV:

Physiotherapy Department Management.

1. Policies and procedures.
2. Recruitment, interview, probation, salary, hours of working, leaves facilities, retirement, referred policy.
3. Maintenance of records equipments, statistics.
4. Planning, design construction, expansion plan.

Unit V :

Physiotherapy Education Technology

- i) Aims, philosophy and trends and issues:-
 - a) Educational aims.
 - b) Agencies of education.
 - c) Formal and informal education
 - d) Major philosophies of education.
(naturalism, idealism, pragmatism & realism)
 - e) Modern and contemporary philosophies of educations.

Physiotherapy of education in India (past, present and future) current issues and trends in educations.

- ii) Concepts of teaching and learning.
 - i) Theories of teaching.
 - ii) Relationship between teaching and learning.
 - iii) Psychology of education.
 - iv) Dynamics of behavior, motivational process of learning perception, individual differences, intelligence personality.
- iii) Curriculum

- i) Curriculum committee.
 - ii) Development of a curriculum for physiotherapy.
 - iii) Types of Curriculum
 - iv) Placing, courses placement, time allotment
 - v) Correlation of therapy and practice.
 - vi) Hospital and community areas for clinical instructions.
 - vii) Clinical assignments.
- iv) Principles and methods of teaching.
 - i) Strategies of teaching.
 - ii) Planning of teaching.
 - iii) Organization, writing lesson plan.
 - iv) A.V. aids.
 - v) Teaching methods – socialized methods
- v) Measurement and evaluation
 - i) Nature of measurement of Educations, meaning, process, personnel, Standardized, none standardized.
 - ii) Standardized tools, important tests of intelligence, aptitude, instrument, iii) Personality, achievements and status scale.
 - iv) Programme evaluation.
 - v) Cumulative evaluation.
- vi) Guidance and counseling
 - i) Philosophy, principles, concepts, guidance & counseling services.
 - ii) Faculty development and development of personnel for physiotherapy services.

Unit VI:

Computer (Non University Examination)

1. Introduction of software and hardware.
2. M.S. Office, Dos.
3. Application computer in medical sciences.

PAPER-5

PRACTICAL IN THERAPEUTICS

M.P.T. – 1st year
Code – M.P. – 105
Max Marks – 100
Min passing marks -40%
Time-3hrs

Course Objective: Knowledge of basic therapeutics & practical studies of advanced therapeutics applied to different conditions/ relieving of mechanical factors assessment & treatment purpose.

Unit I :

Exercise Therapy: Assessment of joint muscles & nerve.

- a) All types of strengthening techniques.
- b) All type of mobilization techniques.
- c) Soft tissues stretching & mobilization.
- d) Gait analysis & training.
- e) Postural assessment & re education.
- f) Balance & coordination.
- g) Special techniques of exercise therapy.
- h) Traction.
- i) Hydrotherapy.

Unit II :

Electrotherapy.

- a) All types of low & medium frequency currents.
 - Faradic.
 - Galvanic.
 - High voltage current.
 - Didynamic.
 - Russian.
 - Interferential Therapy.
 - TENS.
 - Microcurrents.

- b) All types of high frequency currents & modalities.
 - Short wave diathermy.
 - Microwave diathermy.
 - Ultrasound.

Unit III :

Miscellaneous.

- a) Cryotherapy.
- b) Biofeedback.
- c) UVR.
- d) IRR.
- e) LASER.
- f) Other heat modalities.

Unit IV :

Advanced Manual Therapy

- a) Demonstration of any one of the following manual therapy (according to their specialization field):
 - Cyriax
 - Maitland
 - Mulligan
 - Butler
 - Nerve mobilization.
- b) Outline of practical knowledge of Muscle energy techniques & positional stretch and myofascial release.