

MD Physical Medicine & Rehabilitation - Curriculum

I. BASIC SCIENCES APPLIED TO PHYSICAL MEDICINE & REHABILITATION.

1. Anatomy (40 hour lectures and demonstrations)
 - a. Muscle – skeletal system – Osteology, Arthrology and Mycology; Functional anatomy, Kinesiology.
 - b. Neuro – Anatomy – Brain, Spinal cord, peripheral nerves, autonomic nervous system.
 - c. Cardio-Vascular system.
 - d. Respiratory system.
 - e. Histology of bones, cartilage, muscles, nerves and skin.
2. Physiology (30 hour lecture - demonstrations)
 - a. Muscle – Ultrastructure and chemical composition contraction, fatigue, changes in denervated muscle.
 - b. Nerve – Properties of peripheral nerve membrane potential and depolarization, nerve impulse, nerve conduction, neuromuscular transmission, motor-unit, electro-physiological basis of electro-diagnosis.
 - c. Central nervous system – Sensations and volition, co-ordination of movement and regulations of posture, special senses, language.
 - d. Autonomic nervous system.
 - e. Cardio-Vascular system.
 - f. Respiratory system – including assessment of pulmonary function.
 - g. Endocrines.
 - h. Renal functions, control of micturition.
 - i. Temperature regulation.
 - j. Physiology of exercises.
3. Biochemistry (10 hours lectures)
 - a. Central metabolism and nutrition.
 - b. Acid-base, balance.
 - c. Calcium and phosphorus metabolism.
4. Physics as applicable to Physical Medicine (30 hours lectures and demonstrations)
 - a. Principles of Statics and Dynamics as applied to human movement: (Bio-mechanic)
 - b. Properties of Physical agents used in Physical Medicine – heat, light, U.V.ray, electricity and ultrasound.
 - c. Fundamentals of electricity – Ohm's law, Units of measurement of Potential difference, current and resistance, storage cell and condensers, heating effect of current, Units of measurements of work, energy, power.
 - d. Thermionic valves and transistors.
 - e. Generation of AC and DC: 'Low' and 'High' frequency currents.
 - f. Differential amplifier and its bio-application
 - g. Visual and Audio storage of display systems.

- h. Maintenance of electro-medical equipment.
5. Pathology (35 hours of lectures and lecture-demonstrations)
- a. Degenerations, circulatory disturbances, inflammation and repair.
 - b. Infections of bones and joints, Rheumatoid arthritis and allied disorders (in detail).
 - c. Neuropathology, Trauma to central nervous system.
 - d. Cardiovascular diseases with emphasis in congenital heart diseases, valvular heart diseases, Ischemic heart diseases, Hypertension, and peripheral vascular disorders.
 - e. Respiratory diseases with special emphasis on infections restrictive and obstructive disorders.
 - f. Diseases of the Kidney and urinary tract.
 - g. Major endocrine disorders and obesity.
 - h. Nutritional deficiencies.
 - i. Diseases of muscles.
 - j. Genetic disorders.

II CLINICAL PHYSICAL MEDICINE & REHABILITATION (160 HOURS)

1. History and scope of the specialty, definitions and terminology.
2. Treatment modalities used in Physical Medicine – generation properties and detailed clinical use of each.
 - a. Heat – General Physiological properties and mode of action as a treatment agent .
General indications and contra indications:
Forms of heat therapy – superficial and deep heat instrumentation and detailed description of various forms of superficial and deep heating including treatment techniques. Emphasis will be given to infrared, Hydrocollator Paraffin wax bath, convection heating devises, Ultrashort-wave diathermy (High frequency current) Microwave diathermy and ultrasonic therapy.
 - b. “Cold” - as a therapeutic agent.
 - c. Ultraviolet radiation – Physiological properties of U.V.R. Mode of application in clinical use with indications, contraindications and side effects.
 - d. Therapeutic electricity – Low “voltage” currents, low and high “Frequency” currents.
3. Diagnostic applications of physical agents.
4. Clinical use of massage, manipulation, stretching and traction.
5. General principles of therapeutic exercises (for muscle strength, endurance, power, motor reeducation, co-ordination and joint mobility) maintenance of “Physical fitness” through therapeutic exercises.
6. Hydrotherapy
7. Analysis of gait – kinetic and kinematic: normal and pathological gaits.
8. Energy costs of functional activities in health and diseases experimental and clinical use of ergometry in Physical Medicine.
9. Electrodiagnosis and electromyography.

- a. Application of electrophysiological testing of muscles and nerves for diagnostic and prognostic purposes.
10. Application of different Physical modalities in Medical, Surgical and Gynaecological disorders.
11. Prescription of Physical modalities, exercises therapy and other supportive measures.
12. Disability evaluation.
13. Principles of occupational therapy – including training in activities of daily living for rehabilitation; “Self-help” devices.
14. Rehabilitation management of causes with various system disorders.
 - (a) Neuromuscular and skeletal disabilities – with particular emphasis on strokes, post-polio paralysis, cerebral palsy, spinal cord injuries, muscular dystrophies, arthritis and joint deformities, postural problems and amputees.
 - (b) Cardio-Vascular disabilities.
 - (c) Pulmonary disorders.
 - (d) Urological problems.
 - (e) Cancer.
15. Prosthetics and Orthotics.
 - (a) General definitions - Evolution of the field with emphasis on the Indian scene.
 - (b) Indications for amputations – classical amputations – Influence of prosthetic technology on amputation techniques – Ideal stump – Stump complications and their management.
 - (c) Recent advances in amputation surgery and Prosthetic science- Myo-electric control for prostheses.
 - (d) Clinical examination of the amputees; and prescription on prosthesis.
 - (e) Types of lower extremity prostheses – Bio-mechanical considerations – knee and feet mechanics – Alignment and fit.
 - (f) Type of upper extremity prostheses – functional consideration cosmetic consideration.
 - (g) Bracing – Indications and preliminary considerations on preorthotic preparation and postorthotic training.
 - (h) Types of common braces and corrective shoes- prescription criteria and check-out procedures in fitting lower extremity, upper extremity and spinal orthoses.
 - (i) Common materials used in prosthetics and Orthotics.
 - (j) Equipments needed for prosthetic and orthotic manufactures – Organisation of prosthetic-orthotic workshop.
16. Psycho-Social and Psychiatric problems in rehabilitation, and their management.
17. Principles of Rehabilitation nursing.
18. Principles of management of communication impairments.
19. Special principles in the rehabilitation management of children.
20. Management of the geriatric patient.
21. Rehabilitation management of the injured “industry” worker.
22. Orientation on the Social-economic and vocational aspects of rehabilitation.

- a. Principles of vocational guidance, training and placement.
 - b. Social integration of the disabled.
 - c. Elimination of architectural barriers for the handicapped in relation to housing, transportation and employment.
 - d. Mobilizing community resources for rehabilitation and role of voluntary agencies.
23. Principles of the “team approach” towards rehabilitation members of the “Team” and the role of each.
24. Organisation and administration of Rehabilitation facilities.
- a. Teaching hospitals.
 - b. Large general hospitals.
 - c. Community centers.

III. ‘MAJOR’ ALLIED DISCIPLINES:

- A. Medicine including neurology and Rheumatology (80 hours)
 - a. General metabolic and endocrine disorders.
 - b. Common infectious diseases prevalent in India.
 - c. Disorders of nutrition.
 - d. Degenerative diseases and special problems in the elderly.
 - e. Common Cardio-vascular diseases.
 - f. Common respiratory diseases.
 - g. Rheumatic and allied diseases including classification, etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis and management.
 - h. Genetics.
 - i. Essentials of “Sports Medicine”.
 - j. Neurological disorders.
 - i. Congenital disorders of the nervous system.
 - ii. Heredofamilial, degenerative and demyelinating disease.
 - iii. Progressive disorders.
 - iv. Language disorders.
 - v. Epilepsy.
 - vi. Cerebrovascular accident.
 - vii. Paraplegia and tetraplegia.
 - viii. Autonomic disturbances.
 - ix. Disorders of peripheral nerves.
 - x. Assessment of intelligence – Mental retardation.
- B. Surgery including Orthopaedic Surgery (60 hours)
 - a. Shock and its management
 - b. Management of burns
 - c. Wound infections and their management
 - d. Pressure source etiology and management including prevention.
 - e. Principles of emergency resuscitation.
 - f. Common Orthopaedic injuries including sports injuries and Principles of their management..
 - g. Diseases of bones and joints (congenital, infective, metabolic, degenerative and neoplastic).

h. Orthopaedic problems resulting from neuromuscular diseases - pathogenesis, clinical picture, diagnosis and principles of management including surgical techniques.

1. Amputation surgery.

C. Community medicine (20 hours)

- a. Identification of community needs for health services, including rehabilitation services; utilization of the epidemiological approach and statistical methodology.
- b. Principles of comprehensive health care; integrating rehabilitation practices with general health services (candidates are expected to acquire clinical practice through rural and urban health units).
- c. Preventive rehabilitation approach in medical care at the grass root intermediate community levels.
- d. Immunization practices.
- e. Health education practices.

IV. “Minor” Allied Disciplines.

A. Paediatrics (20 hours)

- a. Normal growth and development.
 - i. Prenatal
 - ii. Neonatal to adolescence (gross motor, fine motor reflex maturation, cognitive, social and personality)
- b. Developmental delay and mental subnormality.
- c. Behavioral disorders and their relationship to organic diseases.
- d. Planning educational programmes for “handicapped” children.
- e. Common congenital and hereditary disorders of children.
- f. Common childhood diseases (including of poliomyelitis, cerebral palsy meningitis, rheumatic fever, and neoplasma)

B. Psychiatry and clinical Psychology (20 hours)

- a. Intelligence and personality assessment.
- b. Behavioral disturbances due to organic brain damage.
- c. Overt psychopathologic reactions – neurotic:
Psychotic or Sociopath states (Latter including addiction, alcoholism and sexual disturbances)
- d. Emotional disturbances – anxiety, depression.
- e. Psychological responses to illness and disability.

C. Cardiology (10 hours)

- a. Common disorders of the Cardio-vascular system with particular emphasis on the congenital rheumatic, hypertensive, and ischaemic diseases.
- b. Assessment and classification of functional status of the heart and work capacity – Application of data for rehabilitation – recent advances.

D. Chest diseases (10 hours)

Allergic, infective, neoplastic obstructive and restrictive disorders of the respiratory system.

E. Radiology and Cancer (15 hours)

- a. Interpretation of radiological findings on common diseases.
- b. Common diagnostic radiological procedures.

- c. Contrast studies and their significance.
- d. Principles of Nuclear medicine.
- F. Neurosurgery (10hours)
 - a. Management of trauma to the central nervous system.
 - b. Congenital, infective, and neoplastic diseases of pathogenesis, diagnosis and management.
 - c. Peripheral nerve injuries.
- G. Plastic Surgery (7 hours)
 - a. Methods and techniques of skin grafting.
 - b. Principles reconstructive surgery for correction of deformities.
 - c. Surgical treatment of decubitus ulcers.
- H. Urology (6 hours)
 - a. Urological investigation and management of the neurogenic bladder.
 - b. Upper and lower urinary tract infections – aetiology, diagnosis and treatment.
 - c. Management of the “urostomy” patient.
- I. E.N.T.
 - a. Common ENT disorders, including speech problems and hearing impairments and their management.
- J. Obstetrics & Gynaecology (6 hours)
 - a. Mechanism of labour.
 - b. Pelvic infections.
 - c. Urogenital prolapse.
 - d. Role of exercise therapy in obstetrics & Gynaecology Practice.

CLINICAL TRAINING

Clinical work and practical training minimum of 1599 hours.

1. 4 months should be spent in Surgery and Allied speciality.
2. 4 months in General Medicine and Allied Speciality.
3. 16 months in Physical Medicine & Rehabilitation.

RULES AND REGULATIONS FOR MD DEGREE COURSE IN PHYSICAL MEDICINE & REHABILITATION (Based on the Post graduate committee recommendations)

i. Nomenclature

The nomenclature for the degree course should be MD (Physical medicine & Rehabilitation)

ii. Eligibility condition for admission to the course:

The eligibility condition for admission to the MD (Physical Medicine & Rehabilitation) course shall be the same as recommended by the council for admission to the various post-graduate Degree/Diploma courses.

iii. Academic qualifications & Teaching Experience for teachers in the subject:-

The academic qualifications for teachers for Department of Physical Medicine & Rehabilitation as prescribed by the Council in its “Teachers” eligibility qualification (1974/1977) be amended as under:-

Professor - MD (Physical Medicine & Rehabilitation)

OR

Diploma in Physical Medicine

OR

Certificate of American Board of Physical Medicine & Rehabilitation

OR

MD (General Medicine) MS (General Surgery)

MS (Orthopaedics)

OR

Equivalent qualification as approved by the Medicine Council.

Lecturer - do-

Tutor/Registrar/Resident – M.B.B.S.

Demonstrator.

The teaching experience for the various posts of teachers of Physical Medicine & Rehabilitation shall be as recommended by the Council.

iv. Recognition as a post-Graduate teacher in the subject.

A post-graduate teacher in the subject shall possess requisite post-graduate qualification for appointment as a teacher in the Department of Physical Medicine & Rehabilitation and three years experience in the teaching and practice of Physical Medicine & Rehabilitation to under graduate/Para medical/ Physiotherapist/ Allied personnel.

v. An examiner in the subject shall possess two years experience as a Post-Graduate teacher in the subject.

Fifty per cent of examiners may be drawn from teachers in allied subjects such as General Medicine, General Surgery, Orthopaedics, having experience in the subject of Physical Medicine & Rehabilitation.

N.E. All these provisions will be reviewed after 5 years.

vi. Facilities required in Institute/Medical College for starting post-graduate degree in the subject.

The facilities as given in the App. A may serve as a model, for starting the degree course.

The Institute/Medical College should have the facilities either in the Department of Physical Medicine & Rehabilitation or in other institutions/Department where collaboration for training can be arranged (Encl. Appl. "A").

vii. Syllabus for the course

The proposed syllabus for the M.D. (Physical Medicine & Rehabilitation) degree course is given as per Appendix "B" enclosed.

viii. Examination

The examination for the course should conform to recommendation of the Council regarding MD/MS degree courses:-

There shall be 4 theory papers as under:-

Paper I Basic Sciences as applied to Physical Medicine & Rehabilitation.

Paper II P & O

Paper III Rehabilitation Medicine.

Paper IV Recent advances (Developments in the last 10 years)

At least 50% of examiners should be external examiners.

(APPENDIX – 'A')

1. Physical Medicine Clinic

Daily O.P.D. Clinic conducted within the teaching hospital complex having direct referral and "to and fro" patient flow with all other clinical departments (Medicine, Surgery and all specialities). The clinic should provide for the psychiatric assessment, prescription of therapy and periodic review come follow-up of patients needing rehabilitation medical services.

2. Rehabilitation Ward

Inpatient floor space and beds earmarked specifically for the rehabilitation programme. The bed-strength should not be less than 30 (thirty).

3. Physiotherapy services:

This shall cater to both out-patients, and shall work hand in hand with the Physical Medicine Clinic. The service should be equipped with instruments and facilities for treatment, utilizing physical agents such as heat, ultraviolet radiation water and electricity, and also for application of various therapeutic exercise measures in a scientific manner. The service has to be staged with well trained physiotherapists who shall work under medical direction and control.

4. Occupational Therapy Services:-

This again shall serve both out-patient and inpatients, and work very closely with the Physical medicine Clinic. It should have equipment and facilities for providing supportive and functional occupational therapy for children and adults.(It may preferably , be also capable of assisting the disabled in prevocational assessment thus providing a bridge to any vocational rehabilitation programme conducted by state/ or voluntary agencies). The service shall be staffed with well trained occupational therapists working under medical direction and control).

5. Rehabilitation nursing service:

Staffed by qualified nurses, competent in the nursing care of handicapped patients, assisting them in self-care and activities of daily living.

6. Electrodiagnostic Laboratory:-

Equipped for basic E.M.G., S-D curve and nerve conduction studies.

7. Prosthetic-Orthotic Unit

Equipped and staffed for the fabrication and fitting of artificial limbs, calipers, corrective shoes, splints and other appliances needed for the physically handicapped.

8. Medical Social Work for Rehabilitation

9. Access to facility providing for the Psychological assessment and patient counseling, available within the Medical Centre complex of the sponsoring institution.

10. "Access to an available "Speech and hearing" center, functioning within the medical center complex of the sponsoring institution".

Scheme of Examination

M.D Degree examination in Physical Medicine shall consist of thesis, written papers (Theory), Practical/ Clinical and Viva voce.

Thesis Work : Every candidate shall submit a thesis. Acceptance of thesis shall be a precondition for the candidate to appear for the final examination.

EXAMINATION PATTERN for MD PHYSICAL MEDICINE AND REHABILITATION

There shall be 4 theory papers as Under:-

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|------------------|--|
| Paper I | Basic Sciences as applied to Physical Medicine and Rehabilitation. |
| Pare II | Physical medicine and Rehabilitation including its application to Medicine and Medical Specialties including Pediatrics. |
| Paper III | Physical Medicine and Rehabilitation application to Surgery and surgical specialties |
| Paper IV | Recent advances in Physical Medicine and Rehabilitation including its Technological applications. |

Practical

Clinical examination

Long case – 1- 45 minutes

Short case – 2- 20 minutes

Viva voce

100 Marks

50 Marks each

100 Marks

MODEL QUESTION PAPERS

Paper I – BASIC SCIENCES AS APPLIED TO PHYSICAL MEDICINE AND REHABILITATION

Time : Three Hours.

Maximum: 100

Answer all questions

1. Describe the anatomy of Gastrocnemius muscle. Discuss the effects of paralysis of gastrocnemius muscle on gait cycle. (20 Marks)
2. Write briefly on any eight :-
 - 1) Facet joints of spine.
 - 2) "F" wave.
 - 3) R A Factor
 - 4) Osteomalacia
 - 5) Latissimus dorsi
 - 6) Neurogenic bladder
 - 7) Interferential Therapy
 - 8) Chiari Malformation
 - 9) Spirometer(8 x 10 = 80 Marks)

Paper II - PHYSICAL MEDICINE AND REHABILITATION including ITS APPLICATION TO MEDICINE AND MEDICAL SPECIALTIES including PEDIATRICS.

**Time: Three Hours.
Marks**

Maximum: 100

Answer all questions

1. Discuss the total rehabilitation management of a person with right sided hemiplegia with trunkal imbalance, aphasia and uninhibited neurogenic bladder following anterior cerebral artery thrombosis.
(20 Marks)
2. Write briefly on any eight.
 - a. Zero polio vaccination.
 - b. Werding Hoffman's disease.
 - c. Tonic neck righting reflex.
 - d. Pulmonary rehabilitation in COPD.
 - e. Cardiac conditioning exercises in persons function.
 - f. Bed side assessment of respiratory function.
 - g. Psychiatric management of trigeminal neuralgia.
 - h. Fibrositis syndrome.
 - i. Juvenile rheumatoid arthritis.(8 x 10 = 80 Marks)

Papre III -PHYSICAL MEDICINE AND REHABILITATION including ITS APPLICATION TO SURGERY AND SURGICAL SPECIALTIES.

Time : Three Hours

Maximum : 100 Marks

1. How will you manage a person reporting with claudication pain of right leg refractory to drug therapy?
2. Write briefly on any right.
 - a. Role of CT/ MRI in spinal pain.
 - b. Knee disarticulation and artificial limb fitting.
 - c. Neuropathic ulcer.
 - d. Supraspinatous tendonitis.
 - e. TAO
 - f. Neurovascular injury at wrist
 - g. Shoulder hand syndrome.

- h. Phantom limb
- i. Pseudo angina

= 80 Marks)

(8 x 10

Paper IV – RECENT ADVANCES IN PHYSICAL MEDICINE AND REHABILITATION including its TECHNOLOGICAL APPLICATIONS

**Time: Three Hours
Marks**

Maximum:100

Answer all questions

1. Discuss the recent developments in myoelectric prosthesis also providing sensory feedback. (20 Marks)
2. Write briefly on any eight.

- a. Community rehabilitation
- b. Ability index
- c. Post polio syndrome
- d. Subperiosteal resorption of pubic symphysis.
- e. Piriformis syndrome
- f. Jitter phenomena
- g. Unstable motor unit potential
- h. Thought, Learning and memory
- i. Artificial intelligence. (8 x 10 = 80 Marks)