THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

No. 69, ANNA SALAI, GUINDY, CHENNAI – 600 032.

M.D. / M.S.

POST GRADUATE DEGREE COURSES

SYLLABUS AND CURRICULUM

2021 - 2022

M.D. PHYSICAL MEDICINE & REHABILITATION

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI

M.D. PHYSICAL MEDICINE & REHABILITATION

GOAL :

The **goal** of this programme is to standardize Physical Medicine and Rehabilitation (PM&R) teaching at the Post Graduate level throughout the country so that it will benefit in achieving uniformity in postgraduate as well as undergraduate medical teaching.

World Health Organization estimated that 10 percent of the population is differently abled. According to UN Development Program (UNDP) 80 percent of the differently abled people live in developing countries. Population growth, increasing number of older people, increase in vehicular traffic, expansion of industry, mechanization of agriculture along with social-economic backwardness will magnify the problem in future.

Physical Medicine and Rehabilitation, also called physiatry, is an important branch of medical sciences emphasizing the prevention, diagnosis and treatment of disorders, particularly those of the neuro-musculo-skeletal, cardiovascular,and pulmonary systems, that may produce temporary or permanent activity limitation, disability, or participation restriction. Physical Medicine and Rehabilitation is an independent clinical discipline. It has a vast scope as it provides integrated comprehensive care in the diagnosis, treatment and rehabilitation management of neurological, musculo-skeletal, cardio-pulmonary disabilities from acquired or congenital conditions presenting at any stage in life from pediatric to geriatric phases. This specialty focuses on the restoration of function of people to the highest possible level, through a multi-disciplinary team approach, making use of diagnostic and therapeutic armamentarium including education and counseling, prescription of medicines, therapeutic exercises, equipments (mobility aids, orthotic- prosthetic appliances, assistive technology, physical agents and modalities, etc.), injections, surgical interventions for correction of deformities etc. in an institution-based (out-patient and inpatient wards/ICUs/Nursing Homes/Old-Age Homes etc.), out-reach (Camps, Mobile Units), or community-based settings (CBR), based on the evaluation of the individual under consideration. It is also involved in disability prevention, evaluationand certification, besides development, monitoring and supervision of a rehabilitation plan and conducting research and development.

OBJECTIVES:

The objective of post graduate training is to enable the candidate to acquire sufficient theoretical knowledge, develop clinical skills and competence, and provide medical care with an attitude of compassion and sensitivity**.**

The overall objective is to impart a thorough and comprehensive training to a medical graduate so that at the end of this training he/she becomes a knowledgeable, skilled, and competent Physical Medicine and Rehabilitation specialist, capable of discharging his/her duties as expected under different settings, in an ethical manner.

He/she should be able to investigate, diagnose, evaluate, certify, treat and rehabilitate a person who is suffering from a limitation in function, disability, or restriction in participation. He should also be able to prescribe, monitor and lead the execution of rehabilitation plan through an integrated, multi-disciplinary team involving various medical, nursing, paramedical or allied health professionals. He/she should be able to interpret reports and plan research, teach medical and paramedical personnel, educate the person with disability, family, rehab team members and community, and be well versed with recent advances, administrative, financial, ethical and legal aspects related to the specialty.

COMPONENTS OF POST GRADUATE CURRICULUM

Upon completion of the training and successfully qualifying in the MD (Physical Medicineand Rehabilitation) examinations he/she should be able to demonstrate:

A. Theoretical knowledge: He/she should have adequate knowledge of

1. The basic medical sciences such as Anatomy, Physiology, Biochemistry, Pathology, Microbiology Pharmacology and other disciplines related to Physical Medicine and Rehabilitation
2. Factors which may disturb structure or function and result in disability
3. Diagnosis, pathogenesis, prevention, treatment and rehabilitation of neuromusculoskeletal and other system disorders
4. Orthotics and prosthetics including fitting and manufacturing
5. Indications and complications of drugs used in Physical Medicine and Rehabilitation

B. Practical and clinical skills:

1. Understand and develop competence in executing common diagnostic, therapeuticand surgical procedures employed in diagnosis, investigations and management of conditions encountered in Physical Medicine and Rehabilitation.
2. He/she should be able to practice and handle independently most of the day to day problems as encountered in Physical Medicine and Rehabilitation in a safe, effective and ethical manner.
3. He/she should be able to plan a comprehensive rehabilitation service independently.
4. He/she should be able to demonstrate understanding of the design and fabrication and have competence in prescription and check out of orthoses and prostheses, theprinciples, prescription and supervision of physiotherapy, occupational therapy and psycho-socio-vocational counselling.
5. He/she should be able to practice rehabilitation medicine at the door step of community. He should be familiar with the common problems occurring in the urban, semi-urban, and rural areas and deal with them effectively, should be able to organize, conduct, and supervise surveys in rural, urban and industrial communities and in specified groups of population; organise and conduct camps for disability prevention and rehabilitation of disabled persons, and guide rehabilitation workers at the community level for rehabilitation of persons with disabilities.

C. Attitudes and Communication skills: The post graduate trainee must be able to communicate effectively with patients, families as well as with members of the treating team and other specialists involved in the care of the patients. The candidate should conduct professional responsibilities with integrity, adhering to the ethical principles,respecting the autonomy and privacy of the patient. He should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion. He should maintain proper etiquette in dealings with patients, relatives and other health personnel and be able to respect the rights of the patient including the right to information and second opinion. The candidate should recognize one's professional limitation, seek advice when necessary and accept advice graciously. Thus he should be able to provide compassionate, appropriate and effective patient care.

D. Writing Thesis and Training in Research and Teaching Methodology: The post graduate candidate should be able to recognise a research topic, state the objectives in terms of what is expected to be achieved in the end, plan a rational approach with full awareness of the statistical validity. The methodology should be statistically valid, ethically sound and technically accurate.The data should be collected and recorded diligently, without bias and analysed scientifically. Heshould be able to interpret the data in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what remains to be done, draw conclusions which should be reached by logical deduction and he should be able to assess evidence both as to its reliability and its relevance. He should be able to write a thesis in accordance with the prescribed instructions, and be familiar with the ethical aspects of research. Students should compulsorily attend the research Methodology workshop conducted by the University within first six months of the M.D course.

E. Medical ethics/ Bioethics and Medicolegal aspects: The postgraduatetrainee must demonstrate knowledge of biomedical, epidemiological and sociobehavioral issues relevant to the patient care. He should have skills in preparing medicolegal reports. Students are encouraged to attend workshops/CME's on Bioethics conducted by the University and other reputed Institutions. Medical ethics, Bioethics, moral and legal issues are part and parcel of the curriculum and syllabus.

F. Teaching and Training: He/she should be able to plan educational programs in Physical Medicine and Rehabilitation in association with his senior colleagues and be familiar with the modern methods of teaching and evaluation. He should be able to teach medical students, residents, other health professionals and persons with disabilities and their family members and hold clinical demonstrations for them; discuss a seminar or a symposium and critically discuss it and methodicallysummarise published articles.

SYLLABUS

The course contents for MD in Physical Medicine and Rehabilitation is divided into four broad sections, covering four theory papers. However, certain degree of overlapping may occur among different sections. The content would include the following:

Section A

Basic Sciences and Basic Concepts as applied to Physical Medicine and Rehabilitation

	Knowledge	Attitude	Skills/Evaluation
1.Basic Anatomy and Physiology of the Musculoskeletal Urogenital, Cardio-pulmonary and Nervous Systems, Biomechanics, Biophysics	1. Describe the anatomy of muscles that govern the joints of the body. 2. Discuss the biomechanics and kinesiology of various joints of the body. 3. Review the basic cell physiology, biophysics, action potential, muscle contraction, neuromuscular transmission 4. Principles of exercise physiology and energy expenditure. 5. Outline autonomic nervous system functions. Explain the structure and function of bladder, bowel and its control and mechanism of deglutition. 6. Describe the blood supply of heart. Discuss the cardiac cycle, basic principles of conduction systems, ECG, maintenance of blood pressure. 7. Review physiology of blood, plasma, coagulation, blood groups, erythropoiesis, iron metabolism. 8. Review the fluid compartments of the body and mechanisms of dyselectrolytaemia. 9. Discuss anatomy of the lung and bronchopulmonary segments. Understand mechanics of respiration including pulmonary function tests. 10. Discuss structure and function of brain and spinal cord, the major pathways and blood supply. Recall physiology of consciousness, temperature regulation, maintenance of muscle tone, posture. Anatomy and functions of the vestibular system. Understand CSF and its flow and mechanism of coning. 11. Anatomy and functions of kidneys 12. Anatomy and functions of skin 13. Biophysics of physical agent modalities used in PMR- Heat, Light, Electromagnetic Spectrum, Electricity and Sound, LASER		1. Manual muscle charting 2. Goniometry 3. Musculoskeletal examination 4. Assessment of muscle tone 5. Understanding of dermatomes and myotomes 6. Interpret nerve conduction studies 7. Bedside evaluation of respiratory system, and interpret pulmonary function tests 8. Bedside evaluation of the cardiovascular system and interpret ECG, stress ECG and ECHO findings and results of cardiac enzyme evaluation 9. Interpret coagulation profile 10. Assessment of swallowing, bladder and bowel at bed side. 11. Perform indwelling urethral and suprapubic catheterization, Ryles tube insertion and change of tracheostomy 12. CNS Examination- Higher mental functions, cranial nerves, sensory motor testing, cerebellar functions, evaluation of autonomic function.

2.Basics of biochemical aspects of Metabolism, Hormones, Vitamins and Minerals	1. Explain the metabolism of calcium, Vitamin D, PTH, Calcitonin, physiology of bone remodelling 2. Review glucose metabolism and its regulations, actions of insulin. 3. Causes of obesity, metabolic syndrome, inborn errors of metabolism 4. Review structure and functions of endocrine system including pituitary, adrenal, thyroid and endocrine pancreas. Chemistry of steroids 5. Immunity and Immunoglobulins		1. Interpret results with respect to calcium, glucose and fat metabolism, evaluation of bone mineral density. 2. Interpret liver function test, kidney function test, serum electrolytes,endocrine function tests, metabolic profile and biomarkers.
3.Basic Pathology and Microbiology of diseases and disabilities	1. CNS: Meningitis, encephalitis, pyogenic abscess, tuberculosis, poliomyelitis, stroke,vasculitis, epilepsies, neurodegenerative disorders, ataxias, multiple sclerosis, demyelinating illness, transverse myelitis, tumours, nutritional and metabolic disorders, craniovertebral junction anomalies, neural tube defects,hydrocephalus 2. Disorders of muscle and nerve: Peripheral nerve injuries, neuropathies,hereditary sensory neuropathy, GuillenBarre syndrome, myopathy 3. CVS: Ischemic heart disease, Rheumatic heart disease, hypertension,atherosclerosis, cardiomyopathy, congenital heart disease, cardiac failureand shock 4. Kidneys- acute and chronicglomerulonephritis, nephrolithiasis, hydronephrosis, acute and chronic renal failure, nephrotic syndrome, metabolic and vasculitic nephropathy. 5. Pulmonary: Restrictive and obstructivelung diseases, ARDS, Tuberculosis, Pleural diseases, Pneumonia, Lung abscess, Occupational lung diseases, Pulmonary embolism, Tumors		1. Clinical skills to diagnose all these diseases mentioned 2. Skills to interpret pathological reports, culture reports, and imaging findings related to these conditions

	6. Bone and joints: Congenital disorders including CDH&CTEV, Infections, Degenerative disorders, Avascular necrosis, Epiphyseal dysplasias, Bone tumours, Metabolic bone disease, Fractures-Types, complications, stages of healing, common principles of management. 7. Review Rheumatological diseases, Categorise different types of joint diseases and principles of treatment 8. Immunological diseases including HIV 9. Endocrine system: dysfunction of pituitary, adrenals, thyroid, pancreas 10. Gastrointestinal system: Pepticulcers, malabsorbtion syndrome, ulcerative colitis 11. Hematological: Dyscrasias, leukaemias, multiple myeloma, deep vein thrombosis, Hemophilia and othercoagulation disorders		
4.Basic principles of Pharmacology as applied to the conditions encountered inPhysical Medicine and Rehabilitation.	Review the pharmacology of i. Antibiotics ii. Antituberculous drugs iii. Analgesics iv. Steroids v. Anti rheumatic medications and biological agents vi. Oral hypoglycemic agents and Insulin vii. Medications for Osteoporosis viii. Statins ix. Bronchodilators x. Anticoagulants and antiplatelet agents		Be familiar with drug dosages, indications and contraindications, interactions and routes ofadministration

.	Review the pharmacology of xi. Anti Parkinsonian agents xii. Antispasticity drugs and Botulinum toxin xiii. Cognitive stimulants xiv. Anticonvulsants xv. Drugs for bladder and bowel dysfunction xvi. Drugs acting on neuromuscular junction xvii. Drugs for erectile dysfunction xviii. Antidepressants , sedatives, anti-psychotics xix. Vitamins, mineral supplements andAntioxidants xx. Hormones Vaccines and Immunoglobins		Be familiar with drug dosages, indications and contraindications, interactions and routes of administration
5. Genetics	Patterns of inheritance		

6.Philosophy, history, scope and need of Physical Medicine and Rehabilitation.	Understanding the principles of rehabilitation, recall history and evolution of this specialty after major world wars.		

7.Basic concepts in Physical Medicine and Rehabilitation	Incorporating the clinical situation within social, psychological, vocational and cultural contexts. Describe the spectrum of disease, diagnosis and disability with respect to attitudinal and architectural barriers. Define Rehabilitation team. Recognize and incorporate the role and responsibilities of allied health professionals, including physiotherapy, occupational therapy, speech therapy, prosthetics & orthotics, psychology, social work.		Get a physiatric evaluation Plan rehabilitation in the context of the real environment. To be able the organize, lead and function in a multi-disciplinary team.
8.Principles of evaluation and rehabilitation management of social problems.	Describe the impact of disability beyond the affected individual and dynamics of disability on the family, colleagues and community and society. Recognize the concepts of restoration of independence, interdependency, respect and dignity		To analyze the various socio-economic factors influencing a person with disability. To plan clinical management with due regard to dependency, interdependency, economic status and medical co-morbidities. To form an inter-disciplinary team for evaluation and planning community based rehabilitation. To be able to guide persons with disability regarding access to disability benefits and government schemes

9.Principles of evaluation and rehabilitation management of vocational problems.	Outline the purpose of vocation and the principles of restoration of identity and dignity by integrating into the society productively. Understand the economic impact of the disability for the individual and beyond.		Assessment of the multiple factors influencing functional independence and return to education or work. Be able to advise regarding sheltered workshops, self-help groups, home based programs, transitional employment .
10.Organisation and administration of Physical Medicine and Rehabilitation Services including community based rehabilitation	Describe infrastructure, clinical services and personnel required with suitable links to primary, secondary and tertiary centers in order to provide seamless service for patients who need rehabilitation. Concept of CBR Advantages over Institution based Rehabilitation Organisation and implementation of CBR Linking CBR with primary, secondary and tertiary centres		To create an organogram for a department of Physical Medicine and Rehabilitation along with optimal proportional utilization of funds and personnel. Identify local resources Train volunteers to identify, intervene appropriately and refer when required
11. Disability process Impairment, disability, International Classification of function.	Define and discuss with suitable examples, the concepts of impairment, disability, handicap and integrate with ICF and various levels of prevention		To apply ICF classification to an individual, thereby estimating the restriction to activity and participation.

	Explain the concept of ICF. Calculate the spectrum of physical capabilities.		
12.Disability Prevention			Institute effective ways to prevent disabilities and minimize complications following a disabling event or injury.
13.Epidemiology of Disability	Categorize the spectrum of disability in India and compare with developed nations. State the proportion of physical, mental, visual, auditory and communication disabilities. Determine the changes in trend of causes of disability from infections to lifestyle related, geriatric disabilities due to advances in life expectancy. Recognize the problems related to perinatal health and disabilities from cerebral palsy.		To apply the relevant knowledge of epidemiology of various conditions causing disability in India and worldwide so as to determine suitable strategies to limit the extent of physical, mental, visual, auditory and communication disabilities.
SECTION B Principles and Practice of Physical Medicine and Rehabilitation- Diagnostic Modalities, Physiotherapy, Occupational Therapy, Prosthetics and Orthotics, and Rehabilitation Management of Musculoskeletal conditions			

1.Basic principles of diagnostic modalities as applied to Physical Medicine and Rehabilitation	Diagnostic imaging- Xrays, CT Scan, MRI, Musculoskeletal ultrasound Electrodiagnostic testing Cystometrogram Endoscopic procedures including cystoscopy and laryngoscopy Gait analysis of common movement disorders Pulmonary function tests		Apply skills in using diagnostic modalities to evaluate conditions and complications of degenerative, overuse and inflammatory joint diseases, musculo-skeletal trauma, lung diseases, acquired brain injury, stroke, cerebral palsy, spinal cord injury, demyelinating disorders
2.Gait Analysis	Understand the biomechanics and temporal parameters of normal human locomotion, different phases of gait cycle, determinants of normal gait, components of gait analysis, energy expenditure to identify common pathological gaits		Clinically identify and describe various phases of normal gait cycle. Describe common gait deviations in stroke, neuropathies, myopathies, spinal cord injury, amputation, cerebral palsy Be able to plan appropriate interventions
3.Electrodiagnostic Medicine	Review action potential generation and mechanisms of normal and abnormal wave forms from nerve and muscle. Recognize abnormal patterns of nerve and muscle potentialsin common conditions including anterior horn cell diseases, radiculopathies and plexopathies, neuropathies,nerve injuries, myopathies a nd neuromuscular junction disorders. Categorize different types of nerve injuries and prognosticate recovery.		To perform sensory and motor nerve conduction tests, elicit F-wave and H-reflex as part of electrodiagnostic evaluation. To plan and perform electromyographic (EMG) evaluation based on clinical findings and arrive at a diagnosis To interpret findings of tests like somato-sensory evoked potentials, auditory and visual evoked potentials, to prognosticate recovery To demonstrate proper care of electro-diagnostic equipment.

4.Outcome Measures in Physical Medicine and Rehabilitation	Identify and implement common outcome measures in rehabilitation medicine. Summarize essential principles of quality improvement		To use various outcome measures relevant to underlying condition thereby aiding both subjective and objective assessment. Assessment of ADL, IADL Disease and injury specific scales used in Acquired brain injury, Stroke, Arthritis, Parkinson's disease, Spinal cord injury, Amputations, Hemophilia, and Pediatric disabilities etc. Scales to assess hand function, pain and affective disorders
5.Therapeutic Exercises	Describe effect of exercises on muscle physiology- strength, endurance, flexibility, and coordination. Evaluate different energy systems in the body Cardiovascular responses to physical exercise and effect of training. Pelvic floor and Antenatal exercises .		Assess range of motion, muscle strength, and tone. To plan and prescribe specific therapeutic exercises in due consideration of multiple factors. Determine contra-indications to specific exercises and to communicate the same with a multi-disciplinary team and the care givers Design exercise programme for cardio respiratory endurance
6.Physical Agents/Modalities	Review the physiological benefits of different types of physical modalities of heating and cryotherapy. Distinguish various modalities, principles, methods of application,indications and define precautions and contraindications.	Patient education on the scope and limitations of modalities.	To prescribe physical modalities - heat and cold appropriately
7.Manipulation, Traction, Massage	Recall the principles and biomechanics of different types of manipulation, traction, muscle energy techniques. State indications, precautions and contraindications to these measures	Patient education on the scope and limitations of manipulation	To prescribe manipulative therapies, stating the precautions to be taken.

8.Electrical Stimulation	Describe the types of current used in electrical stimulation Outline the principles behind the use of neuromuscular electrical stimulation. Describe the types and methods of electrical stimulation. To recall the precautions, indications and contra-indications for the use of electrical stimulation. Explain the various theories of pain control and modulation by transcutaneous electrical nerve stimulation (TENS) Discuss the principles and practice of Funct ional Electrical stimulation.	Patient education regarding the scope and limitations of these measures.	Evaluate clinically to determine likely candidates to benefit from electrical stimulation. Prescription of neuromuscular electrical stimulation in appropriate clinical setting Application of FES in appropriate clinical contexts
9.Principles of Occupational Therapy Rationale of ADL In various conditions	Evaluation of occupational and functional performance, access to home, community and workplace. Understand the principles of interventions for physical retraining, cognitive training and sensory re education	Understand these issues in the social and cultural contexts with sensitivity and compassion.	Apply common scales to assess function in disability Understand the principles of common therapeutic approaches like Rood approach, Bobath neuro developmental approach, Brunnstrom technique, proprioceptive neuromuscular facilitation and use of biofeedback to enhance performance in neuromuscular rehabilitation. Prescription of orthoses and self help devices to improve functional outcomes.
10. Integrative Medicine and Physical Medicine and Rehabilitation.	List common complementary and alternative medicine systems, outline the categories of alternate medical systems including chiropractic, osteopathic medicine, meditation, art therapy, music therapy, dance therapy and movement therapies like Tai Chi, yoga, energy therapy, acupuncture, acupressure, reflexology. common biological supplements.	Patient education and counseling regarding limitations and scope of these systems	Appraise and discuss the scope and limitation of these complementary second line therapies with the patient.

11.Upper limb Orthosis	Describe the materials used in the fabrication of upper limb orthosis Classify upper limb orthosis Recall the principles of static and dynamic orthosis used in upper limb Describe the biomechanical principles involved in upper extremity deformity correction with orthoses with specific reference to conditions like arthritis, contractures and paralysis and fractures	Respecting emotions, anxieties and ensuring autonomy and dignity during evaluation and prescription of orthosis	Clinical evaluation to determine the need for orthotic intervention. Prescribe orthosis selecting appropriate components and materials Check out orthosis
12.Lower limb orthotics	Describe the materials used in the fabrication of orthosis Biomechanical principles in prescription Classify lower limb orthoses Indications of different types of orthoses Parts of shoes and modifications	Respecting autonomy and privacy during prescription of orthosis	Clinical evaluation to determine the need for orthotic intervention. Prescribe and check out appropriate orthotic appliances
13. Spinal orthoses	Describe materials used in fabrication of spinal orthosis Biomechanical principles in prescription of spinal orthosis Classify common spinal orthosis Indications, precautions and contra indications for spinal orthosis	Education regarding role, limitations and application of orthosis	Prescribe appropriate spinal orthosis to prevent further instability in the spine and facilitate healing, reduce progression of an existing spinal deformity. Check out spine orthosis

14. Upper limb prosthetics and amputee rehabilitation	Describe etiology, incidence and prevalence, morbidity of upper limb amputations Recall levels of upper limb amputation Summarize the surgical principles of amputation at various levels. Explain pre-prosthetic management and post-operative care. Categorize components of upper limb prosthesis Principles governing prescription of upper limb prosthesis Goal setting for prosthetic training.	Respecting emotions, anxieties and ensuring autonomy, privacy and dignity	Wound care and prescription of temporary prosthesis following amputation. To prescribe prosthesis for individuals with upper limb amputation at various levels in due consideration of medical co-morbidities, age, expected functional outcome. Prescription of prosthesis in a child with acquired amputation or congenital limb deficiency.
15. Lower limb prosthetics and amputee rehabilitation.	Different levels of amputation of lower limb, advantages of different levels. Post-operative management following amputation surgery. Preprosthetic training, role of immediate post operative prosthetic fitting and advantage of temporary prosthesis Categorize the components of lower limb prosthesis. Principles governing prescription of lower limb prosthesis Outline the recreational activities possible and be	Patient education. Suggest different options and cost effective solutions.	To assist performing lower limb amputation at various levels. To prescribe appropriate prosthesis Organise and lead an amputee clinic To perform prosthetic check-out and analyze residual limb along with gait deviations. To interpret causes and management of residual limb pain and phantom limb pain. Management of complications Prescription of prosthesis in a child with congenital limb

	familiar with the energy expenditure involved. Classify and describe common congenital limb deficiencies and the measures involved in its rehabilitation.		deficiency or acquired amputation.
16. Mobility aids, wheelchairs and seating systems.	Describe the components of a manual and powered wheelchair and its basic dimensions. Outline the body measurements taken for wheelchair prescription and factors to be considered for proper seating, pressure relief and positioning. Outline the different aids for mobility and its advantages	Respecting the privacy and autonomy of the patient.	Prescription of a manual / motorized wheelchair after a proper clinical assessment: Prescription of devices like cane, crutches or walker after assessment.
17. Low back pain and Neck pain.	Review the anatomy and biomechanics of the Lumbosacral spine and cervical spine. Causes & source of lower lumbar pain and neck pain with differential diagnosis. Outline the investigations for neck and backpain. Role of therapeutic exercises and physical modalities in management of low back pain and neck pain. Evaluation and management of back pain in pregnancy Describe the technique of interventional procedures available in management of low back pain and neck pain. Indications for surgical management of low back pain and neck pain.	Patient education. Provide reassurance, counseling and follow up.	Clinically assess trunk balance, strength, mobility, spinal deformity and neurological deficits. Recognise underlying pathological processes causing back/neck pain including infections and neoplasms Determine the appropriate radiological imaging for these conditions. Prescribe therapeutic exercises and physical modalities, and orthosis for low back and neck pain. Pharmacological management Interventional spinal management –Epidural and caudal injections, Radiofrequency ablation

18.Musculos-keletal injuries	Discuss the common fractures and its complications and sequele Management of common traumatic conditions to the upper and lower limbs.	Addressing apprehensions. Explain simple biomechanics ,overuse, ergonomics of the problems contextually and the solutions available.	To diagnose common musculoskeletal injuries by clinical history, examination and investigation. Prescription of orthosis to facilitate tissue repair and prevent deformity in common musculoskeletal conditions. Prescription of therapeutic exercise and physical modalities in common musculoskeletal injuries. Application of splints and casts to immobilize the extremity in acute musculoskeletal trauma. Pharmacological management of pain and spasm in musculoskeletal trauma: acute and chronic.
19.Sports Medicine	Understand the principles of conditioning, training, over-training syndrome and altitude training. Outline the biomechanics of common sports. Role of pre-participant examination for sports events. Performance enhancing drugs and its demerits. Benefits of exercise and common sports injuries.	Explain biomechanics of problems and suitable solutions and options of treatment.	Clinically examine and investigate for common sports related injuries in the acute, sub acute and chronic settings. Interpret imaging findings as well as manage these conditions appropriately.
20.Holistic Rehabilitation of persons suffering from: i.Rheumatic and Degenerative joint diseases	Description of etio-pathogenesis of inflammatory and non-inflammatory arthritis Role of radiological investigation, metabolic profile, serum biomarkers and immunological investigations Medical and surgical management of inflammatory and non-inflammatory arthritis. To enumerate the mechanism of action, indications and contra indications for biologicals in inflammatory arthritis. Discuss the physical modalities - mode, timing, duration, technique of application in non	Patient education and family counseling in the long term management respecting patients emotions, anxieties.	Clinically assess the small and large joints for range of motion, synovitis and deformity. Identify the findings on diagnostic imaging. To aspirate synovial fluid from the joints (with USG guidance wherever required) and interpret analysis To be familiar with use of classification criteria to diagnose rheumatological diseases Plan pharmacological management in inflammatory and non inflammatory arthritis. To be able to do Therapeutic

	inflammatory and inflammatory arthritis. Review the different orthoses and exercise program in arthritis.		injections To assess functional status by the use of appropriate outcome measures. Prescribe an exercise program and orthosis in case of arthritis.
ii.Spinal deformity	Biomechanics of spine and causes of spinal deformities. Medical and surgical management. Role of orthotics. Role of therapeutic exercises Congenital vertebral anomalies and management.	Counseling related to diagnosis, complications and long term treatment plan and follow up.	Perform clinical tests to assess type and degree of curve in spinal deformities, respiratory function, limb length discrepancy. Serial assessment (clinical and radiological) to determine the degree of curve progression and plan the management. Identify radiological features in spinal deformities and vertebral anomalies Application of spinal brace. and plan management.
iii.Upper and Lower limb pain syndromes	Discuss common causes of upper and lower limb pain. Evaluate to identify source of pain and assess severity of pain Pharmacological management of neuropathic pain. To elaborate role of conservative and surgical management to manage pain	Patient education and counseling ergonomics benefits and limitations of interventions.	Previously outlined in musculoskeletal conditions. To use musculoskeletal ultrasound for diagnosis Performing therapeutic injections of joints and soft tissues- intraarticular, periarticular and trigger point injections Use of ultrasonographic guidance to aid in the above joint injections.

iv.Osteoporosis	Recall vitamin D, calcium and PTH metabolism Explain causes and types of osteoporosis Evaluation of osteoporosis Pharmacological and non pharmacological management.	Patient education and counseling on nutrition, posture ergonomics benefits and limitations of interventions.	To investigate so as to establish etiology in osteoporosis including plain radiography, DEXA and markers of bone turnover. Identify features suggestive of osteoporosis on a plan radiograph. Interpret DEXA scan with due reference to age and sex. Pharmacological management and follow up of osteoporosis Prescription of orthosis with appropriate modifications Planning spinal exercises.
v.Burns	Classification of burns To discuss the acute complications and sequele of superficial partial thickness and full thickness burns Assess the concomitant injuries like inhalational, electrical, nutritional components of the trauma. Discuss the strategies for preventing scars, contractures and its management.	Sensitivity and attitude of caring. Providing pain relief and emotional support, respecting privacy and dignity.	Plan prevention and management of complications following different degrees of burns, assess concomitant injuries Prescribe appropriate splints and supports to prevent deformities Prescribe pressure garments to manage hypertrophic scars To be able to work as part of a burn rehabilitation team. Plan and perform simple soft tissue release, skin graft for deformity correction.
vi.Obesity and life style diseases	Describe methods to measure obesity and categorization based on body mass index. Diagnostic criteria of metabolic syndrome.	Patient counseling, education on treatment options and monitoring. Advice on benefits of life-style modification.	To investigate the metabolic status and interpret the results. To prescribe appropriate pharmacological and non pharmacological methods in metabolic syndrome.

21.Rehabilitation of persons after fractures, and arthroplasty	Describe biomechanics of various joints and the relevant anatomy. To discuss indications, types and technique of arthroplasty. To recall the indications and technique of plaster cast application. To discuss the classification of fractures and management of complications.		To interpret imaging findings post arthroplasty and prescribe a therapeutic exercise program considering the type and site of arthroplasty, duration following arthroplasty and associated co-morbidities. To apply plaster cast following proper precautions in conditions with fracture
22.Rehabilitative surgeries	Discuss the etiopathogenesis of deformity / contracture in poliomyelitis, CTEV, muscular dystrophy and cerebral palsy and outline principles of management Description of pre-operative preparation, steps involved in surgical correction and post-operative care. Describe the surgical options for management of spasticity. Indication, side effects, adverse effects, surgical technique for intra thecal baclofen pump. Recall the principles of surgery in amputation at various levels. Describe how to choose residual limb length and technique of surgery. Indications and technique for revision of residual limb. Technique of fractional lengthening or tendon transfers in upper and lower extremity. To recall techniques of excision and closure for pressure ulcers	Patient education family counseling on scope and limitations of these interventions.	Planning pre-operative investigations. To perform surgeries and plan appropriate post operative care for the conditions mentioned.

Section C

Principles and Practice of Rehabilitation management of Neurological, Cardiopulmonary, Pediatric, Geriatric , O&G , and other disorders

	KNOWLEDGE	ATTITUDE	**SKILLS**
1.Spasticity	Understand the mechanism involved in pathogenesis of spasticity. To outline the non pharmacological management of spasticity. Discuss the pharmaco-dynamics of common anti-spastic drugs, nerve blocks, motor point blocks, Baclofen pump, role of surgical intervention in spasticity management. Role of intra-vesicalbotulinum toxin in management of detrusor over activity.	Patient education and family counseling about treatment options in the socio-economic context.	Assess the extent and grade of spasticity. Administer Botulinum toxin injection using appropriate technique with due consideration of its indications, route, site of injection, side-effects and dosing interval. To perform neurolysis with phenol, tone inhibiting cast and soft tissue surgery for management of spasticity.
2.Speech and Language Dysfunction	Understand different types of aphasia. Outline the evaluation and management of aphasia including speech therapy and alternate augmentative communication methods.	Patient education and family discussions regarding available treatment options.	Assess extent and type of language dysfunction; suggest appropriate interventions.
3.Swallowing disorders	Pathophysiology of common swallowing disorders Evaluation of swallowing dysfunction Common methods in treatment of dysphagia Strategies to prevent aspiration pneumonia. Indications for PEG and PEJ and its merits and demerits	Patient counseling and family discussions in the cultural and socio economic context.	To perform bed-side test for assessment of swallowing. To interpret findings on barium swallow assessment. To prescribe investigations to establish an etiology including video or endoscopic assessment. To suggest appropriate measures for reduction of dysphagia and aspiration.

4.Bladder dysfunction	Describe evaluation and classification of neurogenic bladder dysfunction. Describe the management of neuropathic bladder. Outline the acute and chronic complications of neuropathic bladder.	Counseling patient and family regarding the long term care needs.	Evaluation of neurogenic bladder. To perform ultrasonography of kidneys and bladder, cystometrogram and cystocopy. Classify neurogenic bladder based on above findings and plan management - conservative and surgical (suprapubiccystostomy and cystolitholapaxy).
5.Bowel dysfunction	Describe the common symptoms and complications of neurogenic bowel. Discuss the evaluation and management options for bowel dysfunction.	Counseling patient and family regarding the long term care needs.	Evaluation of neurogenic bowel and its causes. To perform proctoscopy to evaluate the bowel and prescribe appropriate solutions.
6.Sexuality and disability	Understand the types of sexual dysfunction, its evaluation and treatment.	Counseling and discuss management options, ensuring privacy and dignity.	Be familiar with ALLOW, PLLISSIT and BETTER models for facilitating discussion on sexuality as well as fertility. Prescription of medications to enhance sexual function. Use of common assistive devices to facilitate erection or ejaculation and intra-cavernosal injections To familiarize with assisted fertilization, pregnancy and delivery following spinal cord injury
7. Pressure ulcers and chronic wounds	Etiopathogenesis of chronic wounds and pressure ulcers Systemic and local evaluation of a patient with neuropathic joints and chronic ulcers Staging of pressure ulcers Conservative and surgical management of pressure sore Management of diabetic foot		Evaluate the cause for chronic ulcers and neuropathic foot Conservative management of ulcers Plan and perform common surgical procedures like STSG, direct closure and local rotation flap for chronic ulcers

8.Spinal Cord Injury	Describe etiology and pathogenesis in spinal cord injury. Classification of spinal cord injury and the various spinal cord injury syndromes Biomechanics of the spine and the relation of mode of trauma to type of injury. Assess instability of the spine following injury. Principles of acute management-surgical and conservative Describe acute and chronic complications following spinal cord injury. Mechanism of autonomic dysreflexia and outline algorithm to manage the same To recall etiopathogenesis and staging of pressure ulcers. To describe features of neurogenic bladder and it's types and management Recall the pathophysiology of neurogenic bowel, types and management To outline the neuronal pathway involved in sexual function and management of sexual dysfunction following spinal cord injury. Discuss rehabilitation management of a patient with spinal cord injury To discuss the recent advances including role of stem cells in its repair	Communication with patient and family with sensitivity and compassion. Be aware of the anxieties and apprehension Develop communication skills on breaking bad news. Organize long term treatment plans with active involvement of the team members.	Clinical examinationand determining neurological level of injury using AIS To identify clinical syndromes following spinal cord injury. To recognize clinical signs of autonomic dysreflexia, evaluate for its cause, plan appropriate treatment and prevention Evaluation of neurogenic bladder: To perform ultrasonography of kidneys and bladder, cystometrogram and cystoscopy Classify neurogenic bladder based on above findings and plan management - conservative and surgical Evaluation of neurogenic bowel and its management. Management of pressure ulcers, including surgical debridement,skin grafts, direct excision and closure of pressure ulcer, flap closure of pressure ulcer and pressure relief techniques. Prescribe and check out appropriate orthosis, wheelchair with suitable modifications, special seating. Evaluation of cause of spasticity and management using drugs, nerve blocks and common surgical procedures for spasticity and contractures. Recognise late complications like syringomyelia and osteoporosis Management of neuropathic pain Psychosocial and vocational rehabilitation

9.Traumatic Brain Injury	Recall the pathophysiology associated with traumatic brain injury and scope of neuro-plasticity in recovery of function. Outline the evaluation and treatment following acute TBI, management of moderate and severe TBI, vegetative state and coma. Describe the post TBI complications. Pharmacotherapy and interventions for acute and chronic TBI sequelae Biomarkers and imaging for prognostication following TBI. Discuss the outcome measures for traumatic brain injury	To counsel care-givers in long term care and prognosis respecting their emotions in the cultural and social context.	Assess patients with brain injury and investigate to plan suitable goals relevant to the TBI sequelae. Recognise and manage complications arising as a result of the TBI. Assessment of cognition and cognitive rehabilitation strategies Evaluation and management of neurobehavioural symptoms following TBI
10.Stroke	Recall risk factors of stroke and pathology of different types of stroke. Review the vascular segments and anatomical basis of different stroke syndromes Discuss investigations and early interventions following stroke. Rehabilitation and management of complications. Evaluation of young stroke	To counsel care-givers in long term care and prognosis respecting their emotions in the cultural and social context.	Determine the risk factors and drug therapy to modify the risk. Therapeutic approach for stroke in upper and lower limbs Orthotic support Spasticity management with botulinum toxin or phenol injection or tone inhibiting cast Constraint induced movement therapy Alternate augmentative communication methods Treatment of co-morbidities. Scope and limitation of FES to aid function Be able to set suitable goals contextually and organize treatment plan with the team. Be familiar with outcome tools of use in stroke rehabilitation.

11.Parkinson's disease, Multiple sclerosis, Ataxia, Neurodegenerative disorders	Understand the pathophysiology of common neuro degenerative disorders including Parkinson's disease, motor neuron disease, multiple sclerosis, hereditary ataxia, dementias. Recall diagnostic criteria of conditions like Parkinson's disease, multiple sclerosis etc. Discuss pharmacodynamics of medications used in these conditions and basis of deep brain stimulation. Outline rehabilitation management of these conditions	Counseling and discussions on course of disease and limitations of treatment	Clinical evaluation and interpretation of investigations including imaging and electro diagnosis to establish the diagnosis Management and planning long term care. Prescribe, monitor and titrate medications for these disorders.
12.Plexopathies and Neuropathies	Classify nerve injuries. Outline its etiology and investigations to establish the diagnosis Recall the management following nerve / plexus injury – conservative and surgical. Indications for use of various orthosis following nerve injury. To outline findings in neuropathic conditions on electrodiagnosis. Describe foot complications following peripheral neuropathy.	Patient education, counseling regarding cause, management and prognosis.	Clinical evaluation, electrodiagnostic testing, and diagnostic imaging. Prescribe orthoses following nerve injury – both static and dynamic. Therapeutic exercise prescription following nerve injury, planning activity modification and methods to improve functional status. Prevent and treat foot complications (including ulcers and Charcot joint). Be familiar in techniques to offload the joints in case of peripheral neuropathy.
13.Poliomyelitis and its sequelae	To discuss the etio-pathogenesis and epidemiology of poliomyelitis. To recall methods of prevention employed in India. Outline the pathogenesis of deformities in poliomyelitis and its management. To describe the diagnostic criteria of post-polio syndrome.	Counsel regarding post-polio syndrome addressing apprehensions and discuss scope and limit of interventions.	Evaluation to establish diagnosis of poliomyelitis. Conservative or surgical management for correction of deformity including casting, skeletal traction, surgical release and common tendon transfers. Prescription of orthosis in a patient with post polio residual paralysis

14. Hansens disease and its sequelae	To discuss the etio-pathogenesis and epidemiology of Hansens disease. Outline the pathogenesis of hand and foot deformities in Hansens disease and its management.	Patient education, counseling regarding cause, management and prognosis.	Early clinical diagnosis and management. Management of neuropathic ulcers and deformities, prescribe orthosis
15.Diseases of Muscles	Recall the various clinical features differentiating various myopathies and dystrophies. To outline the co-morbidities associated with myopathies or dystrophies. To discuss findings of various investigations including metabolic studies, electro diagnostic studies, muscle biopsy, genetic analysis and histopathology. Outline principles of management	Counsel about etiology, limitations in management and prognosis with sensitivity and compassion.	To obtain clinical history followed by a detailed clinical examination thereby framing a clinical diagnosis. To investigate appropriately so as to establish the etiology. Prescription of pharmacological agents, therapeutic exercise and orthoses after due consideration of the diagnosis and clinical co-morbidities.
16.Cerebral Palsy	Recall the etiology and risk factors associated with cerebral palsy. Outline the classification of CP. Discuss the clinical features, diagnosis, pattern of involvement, investigations and management in CP. Enumerate the non neurological complications. Discuss the scope and benefits of early intervention and different therapy approaches for CP Common antispastic medications, Botulinum toxin and phenol injections, intra-thecal baclofen. Soft tissue surgery in upper and lower limbs to improve function. Principles of orthopedic management	Family counseling and discuss the spectrum of management options with its merits and limitations.	Assess the type of cerebral palsy, extent of involvement, motor control, cognition, soft tissue contractures and deformity at each joint. Interpret gait analysis for children with cerebral palsy. Management of spasticity Perform soft tissue release for contractures Prescribe appropriate orthotic devices and mobility aids, assistive devices, augmentative communication aids, wheelchair and special seating system to enhance function and community integration. Evaluate and manage behavioural problems in cerebral palsy Assessment for special education and sociovocational integration

17.Neural tube defects like meningomyelocele and hydrocephalus	Outline the clinical classification of spinal dysraphism Discuss the management of meningomyelocele and its long term complications.	Counseling patient and family regarding the long term care needs within the cultural, social and economic contexts.	Clinical assessment and management of meningomyelocele, addressing the mobility, bladder, bowel, sexual problems. Recognize complications including hydrocephalus, trophic ulcers and tethered cord syndrome. Prescribe appropriate appliances for mobility, independence and vocational rehabilitation.
18.Rehabilitation of children with Autism Spectrum Disorders, learning disabilities, multiple disabilities, mental retardation	Understand normal development and learning. General principles and scales of normal development. Contemporary theories of normal learning and appropriate interventions to enhance attention, memory, cognition and learning.	Family counseling,spectrum of management options with its merits and limitations. Acknowledge the role of team work in enhancing outcome.	Plan rehabilitation strategies in a child with multiple disabilities. To consider environmental modifications to address barrier to community integration Provide mobility devices and address seating issues Address language dysfunction and use of communication aids as appropriate Evaluate psychological status and organise social and family support. Explore special school facilities.
19.Geriatric Rehabilitation	Recall the biology of ageing Outline the common problems encountered by the elderly-evaluation and management. Recognize features of dementia, depression, normal pressure hydrocephalus in the elderly. Evaluate the risk of falls and its prevention and management of falls in the elderly.	Counsel family and care givers onoutcome, benefits and limitations of interventions, respecting autonomy and ensuring dignity.	Systematic and methodical approach to problems encountered by geriatric population. Evaluate metabolic, neurological, musculo-skeletal problems, cardio-pulmonary problems and suggest remedial measures. Describe suitable assistive devices available for elderly Evaluate dementia, pseudo-dementia, Alzheimer's. Prevention and management of complications like falls, fractures, memory and visual disturbances.

20.Visual Rehabilitation 21.Auditory Rehabilitation	Outline common ocular disorders causing visual impairment and recognize features of cortical blindness, hemianopsia, hemi-inattention Management of visual problems- Mention the common low vision aids and assistive technology for visual impairment. Mention the common causes of hearing impairment and the role of assistive devices in its management.	Patient education and family discussions regarding available treatment options.	Detect common visual and auditory disabilities and suggest relevant interventions including low vision aids.
22.Vestibular Rehabilitation 23.Psychological problems or mental illness	Recall the anatomy of the vestibular system and outline etiology and the types of vestibular dysfunction. To discuss management in vestibular dysfunction.	Discussions of long term plans with attitude of care and compassion.	To clinically assess the vestibular system and localize the pathology. To suggest rehabilitation for the vestibular dysfunction. Determine the extent of psychological issues and social support system available. Be able to address depression and anxieties associated with disability.
24.Cardiovascular Disease	Discuss the risk factors for the coronary artery disease and cardiac evaluation before exercise prescription. Understand the concept of MET Outline methods of cardiac stress testing and mention the factors associated with poor stress tolerance. Discuss the changes in physiology following exercise and aerobic training. To recall the pharmacodynamics of drugs like anti-arrthymics, anti-hypertensives, anti-anginals and vasodilators	Patient and care givers education regarding risk factors for cardio-vascular disease and role of diet, exercise and drugs with the care givers. Explain prognosis.	Clinical assessment to predict maximum heart rate and exercise tolerance. Interpret electrocardiogram. To investigate for risk factors of cardiovascular disease. Risk assessment prior to exercise prescription in cardio-vascular disease. Prescription of aerobic training to enhance cardiac endurance. To consider various co-morbidities and plan rehabilitation following coronary artery disease, myocardial infarction, post coronary artery by-pass grafting, cardiac transplantation.

25.Pulmonary Disease	Mention the mechanism of ventilation and perfusion and role of arterial blood gas analysis. Mention common lung capacities and lung volumes and its characteristics in different pulmonary disorders. Recall the pulmonary physiology and role of vO2 max. Role of exercises for chronic obstructive pulmonary disease, bronchial asthma, myopathies, spinal cord injury Understand the principles of postural drainage and different methods of chest physiotherapy Types of respiratory failure Benefits of continuous positive airway pressure and mechanical ventilation Indications, complications and postoperative management following thoracotomy .	Counsel the family and patients regarding benefit of respiratory exercises and precautions to improve the pulmonary endurance.	To investigate and interpret arterial blood gas analysis, pulmonary function tests, ventilation-perfusion ratio To be familiar with findings of pulmonary disease on contrast or non-contrast tomography. To prescribe drugs and therapeutic exercises in COPD and asthma. To diagnose various types of pneumonia by clinical examination and interpret the findings on radiological imaging followed by initiation of timely management. Prescription of exercises to facilitate airway clearance and improve pulmonary endurance in patients with neurological disabilities
26.Chronic Pain	Discuss the principles of pain management. To discuss the etiology of chronic pain eg. Neuropathic pain and phantom pain Proposed theories to describe the mechanism. Outline the biopsychosocial management of chronic pain-pharmacological and non pharmacological Recall emerging methods for control of chronic pain.	To discuss the mechanism and management options for chronic pain	To manage chronic pain comprehensively. To plan appropriate investigations so as to establish etiology of chronic pain. To consider dose, duration, route, side effects and contraindications prior to pharmacological prescription for chronic pain. Prescribe therapeutic exercises, physical modalities, electrical stimulation with due consideration of indications. To consider interventions for management of intractable chronic pain when required.

27. Cancer 28.HIV/AIDS 29.Organ Transplantation	Describe the common impairments caused by tumour and by the treatment of tumours, complications of radiotherapy and chemotherapy, Principles of lymphedema management Management of secondary deposits in spine Precautions during cancer rehabilitation. Identification and management of Paraneoplastic syndromes Management of cancer pain and palliative care To recall diagnostic criteria of acquired immunodeficiency syndrome and pharmaco-dynamics of anti-retrovirals. Recognize the common neuromuscular complications following organ transplantation and metabolic effects of immuno-suppressive agents.	To discuss the care, pain management options, with sensitivity respecting their autonomy.	To be familiar with cancer pain and its treatment including the WHO ladder for pain management. To be conversant with the basic pillars of bio-medical ethics like autonomy, beneficence, non-malificience and justice. To maintain professionalism with compassion during management. Plan rehabilitation goals, inter-disciplinary team and suggest suitable strategies in the context of co-morbidities and structural and functional limitations.
30.Emergencies in Physical Medicine and Rehabilitation	Recognize and take appropriate steps for the medical emergencies like falls and fractures, deep venous thrombosis, acute pulmonary embolism, anaphylaxis or drug allergy, postural hypotension, autonomic dysreflexia, myocardial infarction, status epilepticus, dyselectrolytemia, cerebrovascular accident, status asthmaticus, septic shock syndrome, aspiration atelectasis, hydrocephalus and hypoxia.	Counseling the family regarding the magnitude and gravity of the condition.	Respond swiftly and assess situation and prioritize the possible interventions. Algorithm for management of Cardio respiratory arrest and anaphylactic shock. Clinical assessment and investigation aimed at finding causes of autonomic dysreflexiaalong with appropriate clinical management. To institute early management for the listed conditions.
31.ICU	Early recognition and management of critical illness neuropathy		Plan rehabilitation goals with interdisciplinary team and suggest strategies in the context of comorbidities

Section D

Recent Advances in Physical Medicine and Rehabilitation, Legislation, Research Methodology, Disability Evaluation, Ethical Issues in Rehabilitation

1.Recent Advances in Physical Medicine and Rehabilitation	Keep abreast with the latest advances in the field of Physical Medicine and Rehabilitation		Be familiar with the recent literature , scientific journals and attend conferences and workshops.
2.Evidence-based Medicine	Apply evidence-based guidelines and high quality published literature to advance clinical practice. Understand the levels of evidence and basic statistical methods to analyze / evaluate a scientific publication.	Demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge	Able to search the medical literature and use critical analytical skills on publications. Interpret the information and apply relevant knowledge to clinical practice. Able to plan, organize, write, perform a scientifically sound, statistically robust study with ethical and legal standing. To interpret and analyze scientific publications relevant to Physical Medicine and Rehabilitation.
3.Computers in PMR and Assistive Technology related to Physical Medicine and Rehabilitation.	Discuss the devices to augment functional abilities and meet felt need of patients with disability. Enumerate the different assistive technology for communication disorders, mobility impairment of upper and lower limbs, visual and hearing impairment Outline the principles of selecting appropriate assistive technology.	Patient education on use of technology in social, cultural and economic contexts, addressing apprehension	Prescription of various assistive devices to improve communication, vision, hearing, functional status and mobility with due consideration of medical, psychological, environmental and socio-economic factors.
4.Legislation in relation to disability	Know the legal rights of the disabled and discuss the salient features of Rights of Persons with Disability Act and Persons With Disability Act (PWD)		Discuss the legal provisions and benefit schemes applicable to a person with a disability.

5.Schemes and Benefits for persons with disabilities	Understand the schemes and benefits for the person with disabilities offered by the Govt. of India.		Home visits to fully understand community integration issues.
6.Barrier-free Environment	Outline the architectural barriers encountered by the disabled and simple measures to address this		
7.Research Methodology	Sampling and sample size Randomization Tests of significance		Be familiar with sample size calculation Should be able to interpret scientific data statistically Be familiar with different tests to analyse data
8.Impairment Rating and Disability Evaluation.	Principles of disability evaluation		Elicit clinical history and perform a detailed clinical examination, followed by review of investigations to evaluate the degree of impairment, disability and handicap in an individual with regards to various factors. To determine extent of loco-motor disability in accordance with the national guidelines To determine vocational ability following a detailed clinical assessment.
9. Ethical Aspects in Rehabilitation	Understand the principles of ethics and their application to rehabilitation		Be able to apply ethics to real issues through case scenarios Understand procedures to analyse ethical dilemmas in rehabilitation

LEARNING METHODS

A. Theoretical training:

The students pursuing post-graduation in Physical Medicine and Rehabilitation would be expected to engage in self-study. Theoretical knowledge would be imparted to the candidates through the following:

1. **Symposia/Seminars:** The post-graduate student would be required to presenttopics to the group of teachers and students. A free discussion would be encouraged during these sessions. The candidate should be able to deliver lectures
   to undergraduates and hold clinical demonstrations for them.
2. **Lectures:** Formal teaching lectures by the faculty.
3. **Journal Club**: This should be a regular activity. The candidate would be assigned /allowed to choose an article from amongst the recent publications from the list of recommended journals, present, summarise, and discuss the published article critically. The contributions made by the article in further enhancing the scientific knowledge and limitations should be highlighted.

B. Practical and Clinical Training:

1. **Case discussions:** The student would be attached to a faculty member to be able to pick up methods of history taking and examination in rehabilitation practice. During this period the student would also be oriented to the common problems that present in the OPD or Wards/ICUs or are encountered in the community. The student would be supervised by Senior Residents and Faculty members.
2. **Bedside teaching:** The student would work up cases and present the cases once aweek; learn management of cases by discussion with the senior residents and faculty of the department. He/she would be trained in management of in-patients including performing certain procedures such as debridement, Plaster cast application, traction, catheterization, intubation etc.

3. **Rehabilitative Surgery:** The student would be provided with an opportunity, as far as possible, to observe, learn, assist and once proficient, perform rehabilitative surgical operations such as for correction of deformities in polio, cerebral palsy, amputation, clubfoot, pressure sore etc. including post-operative care with the assistance of the Senior Residents and/or under the direct supervision of a faculty member.

4. The student would also be oriented to the various sections in a comprehensive rehabilitation set up (such as occupational therapy, orthotics-prosthetics, physiotherapy, social works, clinical psychology, vocational guidance/counseling, educational institution and Non-Governmental Organization in the disability sector etc.) and be well informed about the various equipments and methods used there, and the scope, role and responsibilities of different members of a rehabilitation team.

C. Training in Research Methodology

The student would carry out the research project and write a thesis. Thesis topic would be finalized by the student in consultation with the Guide and Co-Guides, as per the norms duly approved by the Ethics Committee of the Institution. He would also be given exposure to partake in the research projects going on to learn their planning, methodology and execution to learn various aspects of research.

D. Teaching Skills

The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

E. Continuing Medical Education Programmes (CME): At least two CME programmes should be attended by each student in 3 years.

F. Conferences: The student should attend courses, conferences and seminars relevant to the speciality.

G. Attending clinical grand rounds / clinic-pathological conference The post graduate students are encouraged to attend lectures and grand rounds of other clinical and basic science departments of the hospital.

H.Paper/poster presentation: A post graduate student of a post graduate degree course in broad specialities/super specialities would be encouraged to present one poster presentation and to read one paper at a national/state conference. He is also encouraged to have one research paper published/accepted for publication/sent for publication during the period of his postgraduate studies.

I. Log Book: A logbook should be maintained recording the duration of posting, the period of absence, if any, skills performed, and remarks if any by the teacher/faculty member. The logbook should also record journal clubs, seminars attended and partaken as well as undergraduate teaching activities the post graduate student has participated and should be signed by the faculty in charge.

J. Department should encourage e-learning activities.

STRUCTURED TRAINING PROGRAM

Post graduate education is a process by which an undergraduate medical doctor is transformed into a highly skilled and competent specialist with adequate knowledge, judgement and appropriate attitude to ensure highest level of care to the patients. The post graduates are expected to engage in self-study. It is physically, emotionally, and intellectually demanding and requires consistent and concentrated effort by the candidate. The skills, knowledge and attitude are imparted to the trainee through interaction with faculty and patients and they gain expertise to perform with greater independence. By the end of the training program, the trainee will be able to perform all medical, diagnostic and surgical procedures essential for the condition and context. The faculty provide the guidance, support and environment and serves as a role model for the trainee as he / she acquires the ability to enter into independent practice of medicine and professional growth. A faculty must ensure availability of adequate resources and actively participate in organized clinical discussions, journal clubs, ward rounds, seminars to foster scholarship for the postgraduate trainee.

The course will be conducted at the Department of Physical Medicine & Rehabilitation of the Medical College. During their tenure the Post-Graduate would be posted in the Department of PMR and he/she may also be posted in various other departments related to Rehabilitation for their clinical training for the duration.

The teaching sessions in the department shall include the following:

Formal lecture	Once a week
Journal club	Once a week
Seminar/ Symposium	Once a week
Case discussions	Once a week
Bed side teaching	Daily
Disabilities evaluation & prosthetic and orthotic check out clinic	Once a week

The students are encouraged to attend accredited scientific meetings (CME, symposia,and conferences)

List of peripheral departments where the candidate may be posted for training

1. Rheumatology	3weeks
2. Cardiology	1 week
3. Neurology/ Neuro Surgery	8 weeks
4. Orthopaedics including Sports injuries	4 weeks
5. Hand surgery and Rehabilitation	2 weeks
6. Leprosy & Dermatology	2 weeks
7. Diabetology and foot care	2 weeks
8. Pulmonary Medicine	1 week
9. Community Medicine	2 weeks
10. Urology	2 weeks
11. Geriatrics	2 weeks
12. ICU	2 weeks
13. Psychiatry	3 weeks
14. Plastic surgery	3 weeks

During the 2nd year, the students are encouraged to undergo special postings for learning new advanced techniques / procedure / skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

ASSESSMENT

Evaluation of the candidates in both theory and practical aspects will help the candidate inimprovement of his/her knowledge, skills and attitude.

FORMATIVE ASSESSMENT i.e. assessment during the training

Formative assessment should be continual and the student to be assessed periodically as per the following categories :

Not satisfactory Satisfactory More than satisfactory

1. Medical Knowledge

2. Patient Care including documentation

3. Procedural/ Surgical Skills

4. Professionalism

5. Ethical Behavior

6. Self Directed Learning

7. Participation in Departmental Learning/Teaching activities

8. Thesis / Research work

9. Log Book Maintenance

10. Journal Club

11. External and Outreach Activities

12. Participation and presentation during Conference/CME

13. Publications

Remarks:*: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SUMMATIVE ASSESSMENT ie., at the end of training

DISSERTATION AND UNIVERSITY JOURNAL OF MEDICAL SCIENCES

As per the 49th SAB Resolution under Point No. 2 and in the 52nd SAB it was reiterated regarding the topic for dissertation

The topic for the dissertation should be registered and sent to the University after Ethics Committee approval before 31st of December of the first Post Graduate Year. Only one change of topic with proper justification from the Head of the Department is permitted before 31st March of the first Post Graduate Year. The change of dissertation title will not be permitted after 31st March of the First Post Graduate Year. This modification in regulation will be scrupulously followed from the academic year 2015-16 admission onwards.

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016)clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

As per MCI Clause 14 (4)(a), thesis shall be submitted atleast 6 Months before the Theory and Clinical/Practical Examination.

A candidate shall be allowed to appear for the Theory and Practical/Clinical Examination only after the acceptance of the Thesis by the Examiners.

The periodical evaluation of dissertation/log book should be done by the guide / HOD once in every six months. The HOD should ensure about the submission of dissertation within the stipulated time.

Regarding submission of articles to the University Journal of Medical Sciences for all the PG Degree/Diploma courses, it is mandatory that the students have to submit at-least one research paper. Case Reports are not considered as Research Paper

THEORY EXAMINATION

There shall be four papers each of three hours duration

Paper 1	Basic Sciences and Basic Concepts as applied to Physical Medicine and Rehabilitation
Paper 2	Principles and Practice of Physical Medicine; and Rehabilitation Management of Musculoskeletal Conditions
Paper 3	Principles and Practice of Rehabilitation Management of Neurological, Cardio-Pulmonary and other Conditions
Paper 4	Legislation, Recent Advances as applied to Physical Medicine and Rehabilitation

PAPER I

Write Notes on :

1. Anatomy 4 x 5 = 20
2. Physiology 4 x 5 = 20
3. Bio Chemistry 3 x 5 = 15
4. Pharmacology 3 x 5 = 15
5. Pathology 3 x 5 = 15
6. Microbiology 3 x 5 = 15

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100 marks

PAPER II, III & IV

Elaborate on 2 x 15 = 30

Write Notes on 10 x 7 = 70

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100 marks

CLINICAL/ PRACTICAL EXAMINATION:

LONG CASE (1 X100 MARKS)	100 MARKS
SHORT CASE (3 X 25 MARKS)	75 MARKS
OSCE (5 SPOTTERS / SPECIMENS X 5 MARKSEACH)	25 MARKS
TOTAL	200 MARKS(A)
VIVA AND COMPETENCY ASSESSMENT	80 MARKS(B)
Surgical Instruments	
X-rays, US Scan, CT Scan, MRI, Recent Advances	
Physical Medicine Equipments	
Prosthetics and Orthotics and Disability Evaluation	
LOG BOOK	20 MARKS(C)
AGGREGATE (CLINICAL + VIVA) TOTAL	300 MARKS (A+B+C)
MINIMUM REQUIRED FOR PASS (50%)	150 MARKS
DISSERTATION	APPROVED/ NOT APPROVED

System of marking/evaluation and weightage given to each area shall be as follows: -

I. One Long Case, 100 marks

	Item	**Marks**
i)	Written Work (including history, examination, summary & provisional diagnosis)	10
ii)	Presentation Style	20
iii)	Elicitation of signs or maneuvers	20
iv)	Discussion	
	Differential Diagnosis	10
	Investigations	10
	Management	20
v)	Attitudes	10

II. Short Cases, Three Cases, 25 marks each case. 25X3=75

	Item	Marks
i)	Written Work	5
ii)	Diagnosis	5
iii)	Elicitation of signs (two signs)	5
iv)	Differential diagnosis and management	5
v)	Attitudes	5

III. OSCE 5 Spotters X 5 marks each= 25 Marks

	Item	Marks
i.	Xrays/ MRI	5
ii.	Prosthetics and Orthotics	5
iii.	CMG/EMG/Gait Analysis /Other lab reports	5
iv.	Surgical Instruments	5
v.	Rehab Appliance/ Equipment	5

IV. VIVA including Competency Assessment: (60+20=80marks)60 marks Viva, 20 marks competency assessment

VIVA VOCE

	Item	Marks
i.	Physical Medicine Equipments	15
ii.	X-rays, US Scan, CT Scan, MRI	15
iii.	Surgical Instruments	15
iv.	Prosthetics and Orthotics and Disability Evaluation	15
	Total	**60**

COMPETENCY ASSESSMENT:

OVERALL:

1. a) Communication / commitment / Contribution / Compassion towards patients and Innovation - 5 Marks

b) Implementation of newly learnt techniques/ Skills

2. Number of cases presented in Clinical Meetings/ Journal clubs/seminars - 5 marks

3. Number of Posters/Papers presented in Conferences /Publications and Research Projects - 5 marks

4. No. of Medals / Certificates won in the conference /Quiz competitions and other academic meetings with details. - 5 marks

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Total 20 Marks

COMPETENCY ASSESSMENT SCHEDULE IS AS FOLLOWS

Year of study	Period				Total Max.20 marks
I year	Upto Dec	10 marks	Upto June	10 marks	20 Marks
II year	Upto Dec	10 marks	Upto June	10 marks	20 Marks
III year	Upto Oct	10 marks	Upto Feb	10 marks	20 Marks
	AVERAGE				20 Marks

V. LOG BOOK: 20 marks

The Post Graduates students shall maintain a record (Log) book of the work carried out bythem and the training Programme undergone during the period of training.

Periodic review of Log book and Dissertation have to be done in the Department byguide/HOD once in every 6 months.

Reference Books:

1. Braddom RL *Physical Medicine & Rehabilitation*, Saunders (latest edition)
2. DeLisa JA. *Rehabilitation Medicine: Principles and Practice*. Lippincott (latestedition)
3. Rusk HA. *Rehabilitation Medicine*. CV Mosby (latest edition)
4. Solomon L. *Apley's System of Orthopaedics and Fractures*. Arnold London (latestedition)
5. Vernon W Lin. *Spinal Cord Medicine- Principles and Practice*. Demos
6. *Introduction to Psychology*, Clifford T. Morgan, Richard A. King, Tata McGraw HillEdition
7. *Behavioral Medicine- A guide for clinical Practice* , Mitchell D.Feldman, John F. Christensen
8. *Physiological Basis of Rehabilitation Medicine*,(Downey and Darling's) Erwin G. Gonzalez
9. *Clinical evaluation and diagnostic tests for Neuromuscular disorders*, Tulio E.Bertorini
10. *Electrodiagnosis in diseases of nerve and muscle: Principles and practice*, JunKimura
11. *Essentials of ExercisePhysiology*, William D. Mc Ardle
12. *Fundamentals of Pain Medicine*, J.D. Hoppenfeld
13. *Kinesiology: The mechanics and pathomechanics of human movement,* Carol A.Oatis
14. *Movement disorders: A Clinical and therapeutic approach,*Shyamal K Das
15. *Muscles testing and function with posture and pain*, Florence Peterson Kendall, Elizabeth Kendall McCreary
16. *Rheumatology Principles and practice*, AshitSyngle, SD Deodhar
17. *Hutchison's Paediatrics*, Krishna M Goel, Devendra K Gupta
18. *Atlas of Musculoskeletal Ultrasound*, PK Srivastava
19. *Atlas of nerve conduction studies and electromyography,* A. Arturo Leis, Michael P. Schenk

20. *Neurological rehabilitation*, Richard Greenwood, Michael P.Barnes

21. *Occupational therapy for physical dysfunction*, Catherine A. Trombly

22. *Clayton's Electrotherapy,* Shiela Kitchen

23. ISCOS, *The textbook on comprehensive management of Spinal Cord Injuries*, DrH S Chhabra

24. *Joint structure and function: A Comprehensive analysis,* Cynthia C. Norkin

25. *Tidy's Physiotherapy,* Stuart Porter

26. *Brain's diseases of nervous system,* Michael Donaghy

27. *Dejong's : The neurological examination,* William W. Campbell

28. *Disabled Village Children,* David Werner

29. *Nothing about us without us: Developing innovative technologies For, By, and with disabled persons,* David Werner

30. Helander E, Mendis P, Nelson G, Goerdt A, *Training in the Community for Peoplewith Disabilities* WHO, Geneva, 1989.

31. *Atlas of Orthoses and Assistive Devices*, John D. Hsu

32. *Atlas of Amputations and Limb deficiencies,* Douglas G. Smith

**** Note : The editions are as applicable and the latest editionsshall be the part of the syllabi.**

Journals:

1. Archives of Physical Medicine & Rehabilitation
2. American Journal of Physical Medicine & Rehabilitation
3. Journal of Rehabilitation Research and Development
4. PM & R journal
5. Disability and Rehabilitation
6. Clinical Rehabilitation
7. Neuro Rehabilitation
8. Physical Medicine & Rehabilitation Clinics of North America
9. Orthopaedics Clinics of North America

10. Stroke
11. Spinal Cord
12. Arthritis and Rheumatism
13. Journal of Prosthetics Orthotics International
14. Physical Therapy
15. American Journal of Occupational Therapy
16. Neurology India
17. Indian Journal of Orthopaedics (IJO)
18. Indian Journal of Physical Medicine & Rehabilitation (IJPMR)
19. National Medical Journal of India (NMJI)

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