

**BHAGWANT UNIVERSITY
AJMER**

FACULTY OF MEDICAL SCIENCES

**MPT(NEURO)
SYLLABUS**

		FACULTY OF MEDICAL SCIENCES								
SYLLABUS -I YEAR	I SEM									
S.No	SUBJECT CODE	SUBJECTS	Teaching Periods			Credits	Evaluation Scheme			
			L	T	P		Internal	External	Total	
		MPT(Neuro) - I Sem								
1	01MPN101	Research Methodology & Biostatistics	6	0	0	6	40	60	100	
2	01MPN102	Physiotherapy Ethics , Education & Management	6	0	0	6	40	60	100	
3	01MPN103	Basic Sciences I (Biomechanics, Pathomechanics & Ergonomics)	6	0	0	6	40	60	100	
4	01MPN201	Clinical Training-1	0	0	6	3	40	60	100	
5	01MPN301	Discipline & Co-Curricular Activities	0	0	4	1		100	100	
		MPT(Neuro)-II SEM								
1	02MPN101	Basic Sciences II for Neurological Sciences	6	0	0	6	40	60	100	
2	02MPN102	Physical & Functional Diagnosis I for Neurological Sciences	6	0	0	6	40	60	100	
3	02MPN103	Advanced Physiotherapeutics I for Neurological Sciences	6	0	0	6	40	60	100	
4	02MPN201	Clinical Training-2	0	0	6	3	40	60	100	
5	02MPN301	Discipline & Co-Curricular Activities	0	0	4	1		100	100	

S.No	SUBJECT CODE	SUBJECTS	Teaching Periods			Credits	Evaluation Scheme		
		MPT(Neuro)-III Sem	L	T	P		Internal	External	Total
1	03MPN101	Physical & Functional Diagnosis II for Neurological Sciences	6	0	0	6	40	60	100
2	03MPN102	Advanced Physiotherapeutics II for Neurological Sciences	6	0	0	6	40	60	100
3	03MPN103	Exercise Physiology & Nutrition	6	0	0	6	40	60	100
4	03MPN201	Clinical Training-3	0	0	6	3	40	60	100
5	03MPN301	Discipline & Co-Curricular Activities	0	0	4	1		100	100
		MPT(Neuro)-IV Sem							
1	04MPN101	Dissertation	6	0	0	6	40	60	100
2	04MPN102	Seminar of Clinical Issues	6	0	0	6	40	60	100
3	04MPN201	Clinical Practice -4	0	0	6	3	40	60	100
4	04MPN301	Discipline & Co-Curricular Activities	0	0	4	1		100	100

MPT(Neuro) -I Sem 01MPN101 Research Methodology & BioStatistics

Course Objectives:

- Communicate the results of statistical analyses accurately and effectively

Learning outcomes

- Select from, use and interpret results of, descriptive statistical methods effectively;
- Demonstrate an understanding of the central concepts of modern statistical theory and their probabilistic foundation;
- Select from, use, and interpret results of, the principal methods of statistical inference and design;

1	INTRODUCTION TO RESEARCH	
1.1	Meaning, Objective and Motivation in research.	
1.2	The importance of Research in Physiotherapy.	
1.3	Physiotherapist as a consumer and contributor to research.	
1.4	Research ethics.	
2	RESEARCH DESIGN	
2.1	Research problems - Statement of purpose and objectives.	
2.2	Principles of research design.	
2.3	Research Paradigm – Quantitative paradigm and Qualitative paradigm, various types of research designs.	
2.4	Research validity – Internal validity and External validity.	
2.5	Sampling – Population and samples, sampling rationale, Types, Calculation of sample size.	
3	LITERATURE REVIEW	
3.1	Purpose and use of literature review.	
3.2	Use of internet in literature review.	
3.3	Use of electronic databases like PEDRO, CINAHL etc.	
4	HYPOTHESIS	
	What is hypothesis? , Types of Hypothesis, Testing of hypothesis, Measuring the power of hypothesis, Tests of hypothesis, Limitations of the tests of hypothesis.	

5	MEASUREMENT	
5.1	Validity: definition and various types of measurement validity including face validity, construct validity, content validity, criterion-related validity.	
5.2	Sensitivity and Specificity of a measurement.	
5.3	Reliability and its types including inter and intra rater reliability, test-retest reliability.	
6	DATA COLLECTION & ANALYSIS	
6.1	Collection of primary data: Various types of quantitative and qualitative data collection methods: Biophysical and physiologic Measures, Observation, Self-reports, Interviews, Questionnaires and Scales.	
6.2	Collection of Secondary data: Meta-Analysis and systematic reviews.	
6.3	Statistics in research, Statistical reasoning, Types of analysis.	
7	CRITIQUING PUBLISHED RESEARCH	
7.1	Need & Guidelines for critiquing research.	
7.2	Criteria for good research.	

8	IMPLEMENTING RESEARCH	
8.1	Preparation of a Research project.	
8.2	Presentation and publication of research.	
9	INTRODUCTION TO STATISTICS	
	Definition, characteristics of statistics, importance of the study of statistics and branches of statistics, Statistics and health science including physiotherapy, Descriptive and inferential statistics.	
10	EXPLORATORY TOOLS FOR UNVARIED DATA	
10.1	Types of variables- Quantitative and qualitative variables.	
10.2	Simple plot for Continuous variables- dot plots, stem plots, histograms and interpreting plots.	
10.3	Measure of Central Tendency: Mean, Median, Mode and Standard deviation, Quartiles, Percentiles.	
10.4	Frequency tables.	
10.5	Various types of graphs.	
10.6	Statistics in MS EXCEL and other softwares.	
11	PROBABILITIES AND PROPORTION	
11.1	Introduction	
11.2	Discrete random variables – Binomial distribution, Poisson distribution.	
11.3	Continuous random variables – Normal distribution.	
12	SAMPLING	
12.1	Parameters and estimates.	
12.2	Sampling distribution of sample proportions.	
12.3	Sampling designs errors.	
12.4	Tests of significance & Confidence intervals	
13	TABLE OF COUNTS	
13.1	One dimensional tables-chi square test and its distribution.	
13.2	Two way table of counts.	
14	ANALYSIS OF VARIANCE & COVARIANCE	
14.1	What is ANOVA? Basic principle of ANOVA, ANOVA technique.	
14.2	Analysis of Co variance (ANACOVA).	
15	CORRELATION AND REGRESSION	
15.1	Introduction.	
15.2	Relationship modeling.	
15.3	Interference for simple linear model.	
15.4	Correlation and association, Rank correlation.	

TEXTBOOKS:

1. Rehabilitation research – Elizabeth Domholt.
2. Research for physiotherapist-Carolin hicks
3. Methods in Bio-Statistics, by B.K. Mahajan,6 Ed. 1997:

REFERENCE BOOKS:

1. Darlene – Documenting functional outcomes in physical therapy.
2. Diana-Research for health professionals.
3. Elements of Health Statistics: Rao.N.S.N.
4. An introduction of Biostatistics: Sunder Rao. P.S.S.
5. Research in Physical Therapy- Christoper E.Bork
6. Nursing Research: Principles and methods- Denis E.Polit

01MPN102 Physiotherapy Ethics, Education & Management

Course objectives:

- There is no content in the course, only topics. The content that is created by individuals' blog posts becomes additional resources for other course participants.

Learning Outcomes:

- There are different ways of knowing and of being, and this course tries to acknowledge that diversity.
- Knowledge is developed within individuals through personally meaningful activity with others i.e. it is socially constructed.
- Success in this course is not determined by how much you can memorise but in how well you engage with others.

1	PHYSIOTHERAPY VALUES & ETHICS	
1.1	P.T Values and Ethics	
1.1.1	Rules of Professional Conduct.	
1.1.2	Concept of Morality, Ethics and Legality.	
1.1.3	Rules of Professional conduct, Medico Legal and Moral Implications.	
1.1.4	Communication skills, Client interest and Satisfaction.	
1.1.5	Inter Disciplinary Relation, Co-partnership, Mutual Respect, Confidence and Communication, Responsibilities of the Physiotherapists, Status of Physiotherapist in Health Care.	
1.1.6	Role of Professional in Socio Personal and Socio Economical conditions.	
1.2	Ethics of various organizations	
1.2.1	Need of Council Act for regulation of Professional Practice, Self-Regulatory role of Professional Association.	
1.2.2	Constitution and Functions of IAP.	
1.2.3	World Confederation of Physical therapists(WCPT)	
1.3	P.T. Law and Legal Concepts	
1.3.1	Medico legal aspects of physical therapy, liability, informed consent negligence, malpractice, licensure, consumer protection act.	
1.3.2	Law of disability & discrimination, Confidentially of the Patient's status.	
2	PHYSIOTHERAPY EDUCATION	
2.1	Concept of Teaching and Learning	

2.1.1	Meaning and scope of Educational Psychology.	
2.1.2	Meaning and Relationship between teaching and learning.	
2.1.3	Learning Theories.	
2.1.4	Dynamics of behavior.	
2.1.5	Individual Meaning and concept.	
2.2	Curriculum	
2.2.1	Basis of curriculum formulation.	
2.2.2	Framing objectives for curriculum.	
2.2.3	Process of curriculum development and factors involved.	
2.2.4	Evaluation of curriculum differences.	
2.2.5	Curriculum planning – Integrated teaching, Problem based learning, Evidence based medicine.	
2.2.6	Skill development- Clinical skills, Communication skills, Counseling skills.	
2.3	Principles and Methods of Teaching	
2.3.1	Bloom's taxonomy of instructional objectives.	
2.3.2	Writing instructional objectives in behavioral terms.	
2.3.3	Unit planning, Lesson planning.	
2.3.4	Lecture, Demonstration Discussion, Seminar, Assignment.	
2.3.5	Types of teaching aids.	
2.3.6	Principles of selection, preparation and use of audio-visual aides.	
2.4	Measurement and Evaluation	
2.4.1	Nature of educational measurement: meaning, process, types of tests.	
2.4.2	Construction of an achievement test and its analysis.	
2.4.3	Standardized test.	
2.4.4	Introduction of some standardized tools, important tests of intelligence.	
2.4.5	Aptitude and personality.	
2.4.6	Continuous and comprehensive evaluation.	
2.5	Guidance and counseling and Awareness Programme	
2.5.1	Meaning & concepts of guidance and counseling.	
2.5.2	Principles of guidance and counseling.	
2.5.3	Awareness and guidance to the common people about health and diseases.	
3	PHYSIOTHERAPY MANAGEMENT	
3.1	Introduction	

3.1.1	Introduction, Evolution of management, Functions of management.
3.1.2	Management process – planning, organization, direction, controlling .Decision-making.
3.1.3	Quantitative methods of management: relevance of statistical and/ or techniques in management.
3.2	Personal Management
3.2.1	Staffing Recruitment selection.
3.2.2	Performance analysis and appraisal, Collective bargaining.
3.2.3	Job satisfaction Discipline.
3.3	Marketing
3.3.1	Market segmentation, Channels of distribution.
3.3.2	Promotion, Consumer behavior, marketing research production, planning.
3.3.3	Pricing licenser.
3.4	Total Quality Management
3.4.1	Basis of quality management, quality assurance program in hospitals.
3.4.2	Medical audit and international quality system.
3.5	Hospital Management
3.5.1	Introduction: Branches of administration, Nature and scope of administration, How to be an effective administrator, Planning hospital administration as part of a
3.6	Physiotherapy profession and staff roles
3.6.1	Physiotherapy: Definition and Development.

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Developing a Pedagogy of Teacher education: Understanding teaching and learning about teaching.
2. Hospital administration and human resource management by R.C.Goyal, 4th edition.

REFERENCE BOOKS:

1. Physical Therapy Ethics by Donald L.Gabard, Mike W.Martin, F.A. Davis, 2003.
2. Physical Therapy Administration & Management by Hickik Robert J

M P T(Neuro) Semester I
01MPN103 – Basic Sciences I (Biomechanics, Pathomechanics & Ergonomics)

Course Objectives:

- Apply knowledge of the underlying principles and concepts of Exercise and Sport Science. Including the core areas of: Human Physiology, Anatomy, Functional Anatomy, Exercise Physiology, Biomechanics, Motor Learning and Control, Exercise Metabolism and Nutrition, and Psychology .

Learning Outcomes:

- Utilise core instrumentation and equipment for the monitoring and assessment of exercise clients .
- Review, analyse and interpret information, and independently generate conclusions

DETAILED SYLLABUS:

1	INTRODUCTION	
1.1	Forces, Equilibrium, Levers: laws & mechanical advantage.	
1.2	Applied mechanics in the evaluation procedures.	
1.3	Material properties of bones and connective tissue, viscoelasticity, creep and stress relaxation, rate dependent properties, stress and strain curves.	
2	SKELETAL CONSIDERATION OF MOVEMENT	
2.1	Functions of skeletal system.	
2.2	Types of bones.	
2.3	Biomechanical Characteristics of bones: Bone tissue, architecture of bone, strength and stiffness of bone, Types of load, Bony articulations, Types of joints in detail.	
3	NEURO - MUSCULAR CONSIDERATION OF MOVEMENT	
3.1	Basic nerve structure, Motor unit, Receptors & Synapse, Reflex movement & Volitional movement, Reciprocal innervation & Inhibition.	
3.2	Structure and function of muscle, physical properties of muscle, muscle attachment, functional characteristics of muscles, muscle fiber potential, mechanical components in the muscle.	
3.3	Muscle action and factors influencing muscle force.	
3.4	Action potential, Evoke potential, Kinetic potential, Torque, Power, Strength & Endurance.	
4	KINETICS & KINEMATICS	

4.1	Biomechanics of joints of extremities.
4.2	Biomechanics of Thoracic cage, Biomechanics of Respiration & Circulation.
4.3	Biomechanics of upper and lower spine with respective girdle.
4.4	Kinetics / Kinematics of extremity & spinal joints including jogging, running, climbing up and down & A.D.L.
4.5	Methods of kinetic and kinematic Investigations.
4.6	Kinetics and kinematic analysis of normal gait.
5	PATHOMECHANICS
5.1	Regional dysfunctions: Muscle dysfunctions, Joint dysfunctions, Nerve dysfunctions.
5.2	Pathological posture & Pathological gait.
6	ERGONOMICS
6.1	Work capacity analysis role of physiotherapy industrial setup, job site disability, pre-employment screening, workers functional capacity assessment, work hardening Programme industrial therapy.

6.2 Postural examination, job task analysis, educational programme for prevention of injury adult education, documentation, analysis of functional hazards related to Environment / Industry.

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Joint structure and function- Cynthia Norkins, 4th Edition, Jaypee Publication.
2. Pathomechanics - Steindler

REFERENCE BOOKS:

1. Biomechanical basis of human movement, Joseph Hamill & Kathleen M.Knutzen, 3rd Edition, LWW Publications.
2. Bio-mechanics of Musculoskeletal System by Nigg, 2nd Edition, John Wiley Publication.
3. Kinesiology by K Wells, 6th Edition; Saunders Publication.
4. Clinical kinesiology – Brunnstorm, 5th Edition, Jaypee Publication.

SECOND SEMESTER

M P T (Neuro) - Semester II
02MPN101 – Basic Sciences II for
Neurological Sciences

Course Objectives:

- Recognize symptoms that may signify neurologic disease (including disturbances of consciousness, cognition, language, vision, hearing, equilibrium, motor function, somatic sensation, and autonomic function)

Learning Objectives:

- Demonstrate awareness of the use and interpretation of common tests used in diagnosing neurologic disease
- Apply the principles underlying a systematic approach to the management of common neurologic diseases (including the recognition and management of situations that are potential emergencies)
- Integrate basic science information (neurophysiology, neuroanatomy, neuropharmacology, and neuropathology) to clinical correlates.
- Describe key aspect of brain, spinal cord, peripheral nerves and muscle diseases clinical, pharmacologic, anatomical, pathology, causes, prognosis and management

DETAILED SYLLABUS:

1	NEURO ANATOMY	
1.1	CEREBRAL CORTEX: Its hemispheres: Medial view, Inferior view, Supero lateral view, Basal ganglia, Thalamus , Anatomical organization, Blood brain barrier Blood supply of brain, CSF formation and flow in the ventricular system, Embryological development, Applied aspects.	
1.2	CEREBELLUM: Hemispheres, Connection with other parts of nervous system, Applied aspects.	
1.3	BRAINSTEM: Structures in detail, Connection with other parts of nervous system, Applied aspects.	
1.4	SPINAL CORD: Its connection and formation of tracts in detail, Vertebral column, Intervertebral discs, Dermatome, Myotomes, Applied aspects.	
1.5	SPECIAL SENSES	
1.6	AUTONOMIC NERVOUS SYSTEM: Parasympathetic system, Sympathetic system, Applied aspects.	
2	NEURO PHYSIOLOGY	

2.1	CEREBRAL CONTROL : Functional organization of brain ,Synaptic transmission Ascending and Descending motor pathways, Basis of muscle tone, posture, complex movement and locomotion, Applied aspects.
2.2	CEREBELLAR CONTROL: Afferent and Efferent pathways, Applied aspects.
2.3	NERVE AND MUSCLE PHYSIOLOGY: Nerve fibers and its transmission, Muscle fibers and classification, Impulse generation and transmission, Applied aspects.
2.4	MISCELLANEOUS: Pain pathways and physiology of pain, Memory and learning.

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Human Anatomy by B.D. Chaurasia, Vol. 1,2nd edition; CBS publications.
2. Textbook of Anatomy by Inderbir Singh; 4th edition; Jaypee Publications.
3. Guyton : Textbook of physiology
4. Chatterjee: Textbook of physiology.

REFERENCE BOOKS:

1. Principles of anatomy and physiology by Tortora; 8th edition; Harper & Row Pub.
2. Cunningham's Manual of Practical Anatomy; 15th edition, Vol: 1, 2, 3; Oxford Pub.
3. Clinical Anatomy for Medical Students by Richard Snell, 6th edition, Lippin Cott, Williams & Wilkins.
4. Anatomy & Physiology by Ross & Wilson's, 8th edition, Churchill Livingston.
5. Robert: Fundamentals of sensory physiology.
6. Melzack and Wall: Text book of pain.

M P T (Neuro) - Semester II
02MPN102 – Physical & Functions I
Diagnosis I for Neurological Sciences

Course Objectives:

- Integration of neurological of the five major physical assessment components into didactic and clinical patient care, as measured by written test performance, clinical evaluation, and clinical writing requirements.

Learning outcomes:

- Identification of the components of a subjective neurological health history utilizing critical thinking, and therapeutic communication to support rapid focused assessment leading to accurate collaborative care.
- Recognize normal and abnormal physical assessment findings of the patient with neurological deficits.

DETAILED SYLLABUS:

1	GENERAL ASSESSMENT	
1.1	History specific to certain conditions with emphasis on demographic variations.	
1.2	Observatory findings related to OPD, IPD & ICU assessments.	
2	HIGHER MENTAL FUNCTION ASSESSMENT	
2.1	Perceptual & Cognitive assessment.	
2.2	Glasgow coma scale, Children's coma scale, Edinburgh-2 coma scale, blessed dementia rating scale: information-concentration-memory test; dementia scales etc.	
3		
3.1	Physiology of pain.	
3.2	McGill Pain Questionnaire, Numerical Rating Scale, Brief Pain Inventory Scale (NRS-11, NRS-101); Visual Analog Scale; Premature Infant Pain Profile; Neonatal/Infant Pain Scale, Faces Pain Scale, Pain Quality Assessment Scale.	
4	SENSORY ASSESSMENT	
4.1	Superficial, deep and cortical sensation assessment.	
4.2	Cranial nerve testing.	
5	MOTOR ASSESSMENT	
5.1	Spasticity assessment scales.	
5.2	Reflex testing.	
5.3	Voluntary control assessment scales.	
5.4	Manual muscle testing scales.	
5.5	Motor Club Assessment , River Mead Motor Assessment ,Motricity Index, Trunk Control Test , Motor Assessment Scale	
6	COORDINATION ASSESSMENT	

6.1	Age-related changes.
6.2	Prerequisites of assessment.
6.3	Equilibrium tests.
6.4	Non-equilibrium tests.
6.5	Minnesota Manual Dexterity test, Perdue Pegboard test.
7	BALANCE ASSESSMENT
7.1	Static balance tests.
7.2	Dynamic balance tests.
7.3	Berg balance scale, Timed up and go test, Functional reach test, Multidirectional reach test, Romberg test, Tinetti Performance Oriented Mobility Assessment, Balance Efficacy Scale.
8	POSTURE AND GAIT ASSESSMENT
8.1	Observational gait analysis.
8.2	Functional Ambulation Profile.
9	FUNCTIONAL ASSESSMENT
9.1	Classification: NAGI, ICIDH, ICIDH – 2, ICF.
9.2	Functional Independence Measure (FIM), Wee FIM, Functional Assessment Measure.
9.3	Barthel ADL index , Katz ADL index , SF-36, Nottingham ten point ADL index & extended ADL index ,Rivermaid ADL scale,Northwick park index of independence in ADL Kenny self-care evaluation , Frenchay activity index , Modified Elderly Mobility Scale (MEMS)
10	ELECTRO DIAGNOSIS
10.1	Nerve conduction study instrumentation and interpretation.
10.2	Needle EMG and Surface EMG instrumentation and interpretation.
10.3	Electrical study of reflexes- H Reflex, Axon Reflex, F- response, Blink reflex, Jaw jerk, Tonic vibration reflex.
10.4	Repetitive nerve stimulation.
10.5	Evoked potentials(SSEP, MEP, BAERA, VER).

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Physical rehabilitation by Susan B, O' Sullivan, Thomas J. Schmitz.
2. Electrodiagnosis in disease of nerve and muscles by Kimuraj J, F A Davis, Philadelphia.

REFERENCE BOOKS:

1. Neurological Rehabilitation: Taly, A.B.
2. Stroke Therapy: Fisher, Marc.
3. Proprioceptive Neuromuscular Facilitation Knott M & Voss, Harper & Row.
4. Clinical neurophysiology: U.K.Misra, J.Kalita.

5. Motor control Theory and practice: Shumway-cook & Anne.
6. Neurological Rehabilitation: Umphred, Darcy, A.
7. Bickerstaff's neurological examination in clinical practice.
8. Neurological differential diagnosis – John Patten.

M P T (Neuro) - Semester II
02MPN103 – Advanced Physiotherapeutics I For
Neurological Sciences

Course Objectives:

- Integration of neurological of the five major physical assessment components into didactic and clinical patient care, as measured by written test performance, clinical evaluation, and clinical writing requirements

Learning outcomes:

- Identification of the components of a subjective neurological health history utilizing critical thinking, and therapeutic communication to support rapid focused assessment leading to accurate collaborative care.
- Recognize normal and abnormal physical assessment findings of the patient with neurological deficits.

DETAILED SYLLABUS:

1	PRINCIPLES OF TREATMENT	
1.1	Motor Control Theories: Historical perspective, principles, clinical implication and limitations.	
1.2	Traditional and Contemporary theories: Reflex and Hierarchical Theory, Motor Program Theory and Systems Theory & Dynamic Action Theory (Dynamic Systems theory)	
1.3	Motor Learning <ul style="list-style-type: none"> • Theories: Adam’s closed loop theory and Schmidt’s open loop theory • Feedback and Practice 	
1.4	Brain Plasticity: Current Concepts, Mechanisms and Clinical implications.	
2	CEREBRO VASCULAR ACCIDENT (STROKE)	
2.1	Pathophysiology & Medical management.	
2.2	Impairments (Motor, Sensory, Cognitive and Psychosocial), Course and Prognosis.	
2.3	Interventions: Different approaches, their advantages and disadvantages.	
2.4	New treatment approaches with evidence based practice.	
3	HEAD INJURY	
3.1	Occurrence, Pathophysiology & Medical management.	
3.2	PT management based on impairments.	
3.3	Unconsciousness Management.	
3.4	Recent trends in the treatment with evidence.	
4	SPINAL CORD INJURY	

4.1	Pathophysiology and classification.
4.2	ICU management.
4.3	Acute medical management: Based on level of injury.
4.4	Rehabilitation phase: PT interventions for primary & secondary impairment, Orthotic prescriptions, Job and Community perspectives.
4.5	Recent trends: Treadmill training, Minimizing energy expenditure, Ambulation training, Chronic care for secondary complications.
5	DISORDERS OF PERIPHERAL NERVES
5.1	Etiology, Classification and Prognosis.
5.2	Medical and Surgical Management.
5.3	PT interventions: Acute, Subacute, Chronic.
5.4	Orthotic prescription.
5.5	Recent trends: Surgical repair, EMG Biofeedback, Muscle re-education techniques.
6	DEGENERATIVE DISEASES
6.1	Pathophysiology, Disease progression & Classification of: Alzheimer's disease, Parkinson's disease, Dementia, Amyotrophic lateral sclerosis, Multiple sclerosis, Friedrich's ataxia, Huntington's disease, Muscular dystrophy, Spinal muscular atrophy
6.2	Medical management.
6.3	PT interventions.
6.4	Treatment modifications at different stages of the disease.
7	INFECTIOUS DISORDERS
7.1	Pathophysiology: Meningitis, Encephalitis, Brain abscess, Polio, Leprosy, Neurosyphilis, Tuberculosis, Rabies, AIDS, Sydenham's chorea, Guillain-Barre Syndrome, Acute disseminated encephalomyelitis.
7.2	Medical management.
7.3	Sequelae of the impairments: Primary and Secondary.
7.4	PT Management: Acute care with secondary complications, Functional modifications
7.5	Recent trends: Wheelchair prescriptions, Orthotic management, Energy conservation and relaxation techniques.
8	BRAIN TUMORS
8.1	Classification, Progress, signs & symptoms of the tumor.
8.2	Medical & Surgical management.
8.3	PT Interventions: Preventive, Restorative, Supportive, Palliative.
8.4	Recent trends with evidence.

TEXTBOOKS:

1. Carr & Shepherd – Neurological rehabilitation: optimizing motor performance

2. Motor control Theory and practice: Anne Shumway-cook
3. Neurological Rehabilitation: Umphred, Darcy, A.
4. Motor learning and performance: a situation based approach: Richard R.Schmidtz
5. Physical rehabilitation by Susan B, O' Sullivan, Thomas J. Schmitz.

REFERENCE BOOKS:

1. Functional neuro rehabilitation: Berner, Julie.
2. Stroke Therapy: Fisher, Marc.
3. Patricia Davies – Right in the middle (trunk activity in hemi).

THIRD SEMESTER

M P T (Neuro) - Semester III
03MPN101: Physical & Functional Diagnosis II for Neurological Sciences

Course Objectives:

- Complete a pertinent physical examination for the evaluation of a neurological condition on at least 2-3 patients per week. The student should demonstrate the ability to perform this pertinent physical examination while being observed by at least one attending or resident.

Learning Outcomes:

- The student should know how to differentiate a neurological examination.
- The student should be able to explain each part of the physical examination of the Neurological Exam and why it is being performed and what abnormalities are being sought.

DETAILED SYLLABUS:

1	NEURODEVELOPMENTAL ASSESSMENT	
1.1	Theories of neuromotor development.	
1.2	Factors affecting development.	
1.3	Scales: Bayley scales of infant development (BSID-II), Bruiniks-Ozeretsky Test of Motor Proficiency(BOTMP),Test of Gross Motor Development (TGMD), Peabody Developmental Motor Scales (PDMS),Gross Motor Function Measure(GMFM), Gross Motor Function Classification System(GMFCS).	
2	OROMOTOR ASSESSMENT	
2.1	Assessment of head and neck.	
2.2	Upper body posture.	
2.3	Scales: For adult patient, Oral motor feeding rating scale, Neonatal Oral Motor Assessment Scale	
3	NEONATAL ASSESSMENT	
3.1	Identifying high risk infants, Hypoxic Ischemic Encephalopathy staging.	
3.2	Scales: APGAR, Brazelton Neonatal Behavioral Assessment Scale, INFANIB, Alberta infant motor scale, Test of Infant Motor Performance	
4	VESTIBULAR ASSESSMENT	
4.1	Neuropathology of different diseases: Benign Paroxysmal Postural Vertigo, Vertigo, Dizziness, Visual disturbances.	
4.2	Site of lesion testing: Computerized dynamic posturography, Vestibular evoked myogenic potentials, Dynamic visual acuity tests, Gaze stabilization test, Sensory organization test, Auto head rotation test, Rotary chair test.	
5	ELECTRODIAGNOSIS	
	EMG-NCV interpretation for various adult neurological disorders.	
6	RADIOLOGY	
	Application of various diagnostic tools in neurological disorders: CT Scan MRI, X-ray, Carotid angiography, Myelography, Muscle and Nerve biopsy, CSF examination, EEG.	

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Physical rehabilitation by Susan B, O' Sullivan, Thomas J. Schmitz.
2. Electrodiagnosis in disease of nerve and muscles by Kimuraj J, F A Davis, Philadelphia.
3. Neurological differential diagnosis – John Patten.

REFERENCE BOOKS:

1. Neurological Rehabilitation: Taly, A.B.
2. Stroke Therapy: Fisher, Marc.
3. Proprioceptive Neuromuscular Facilitation Knott M & Voss, Harper & Row.
4. Neuro rehabilitation by Farber, W.B. Saunders.
5. Clinical neurophysiology: U.K.Misra, J.Kalita.
6. Motor control Theory and practice: Shumway-cook & Anne.
7. Neurological Rehabilitation: Umphred, Darcy, A.
8. Bickerstaff's neurological examination in clinical practice.

M P T (Neuro) - Semester III
03MPN102 – Advanced Physiotherapeutics II for Neurological Sciences

Course Objectives:

- Demonstrate awareness of the use and interpretation of common tests used in diagnosing neurologic disease

Learning Objectives:

- Recognize symptoms that may signify neurologic disease (including disturbances of consciousness, cognition, language, vision, hearing, equilibrium, motor function, somatic sensation, and autonomic function)

DETAILED SYLLABUS:

1	MOVEMENT DISORDERS	
1.1	Pathophysiology: Adult & Pediatric.	
1.2	Medical management.	
1.3	Various types of movement disorders, Course and Prognosis.	
1.4	Interventions: Different approaches, their advantages and disadvantages.	
1.5	New treatment approaches with evidence based practice.	
2	VESTIBULAR DISORDERS	
2.1	Occurrence and Pathophysiology: Related to ear, Related to brain.	
2.2	Medical & Surgical management.	
2.3	PT management based on impairments.	
2.4	Recent trends in the treatment with evidence.	
3	CEREBRAL PALSY	
3.1	Normal sensorimotor development.	
3.2	Theories of motor development: Reflex maturation and Dynamic systems perspective.	
3.3	Pathophysiology & classification.	
3.4	NICU management: Early intervention, Kangaroo mother care, Positioning & management of congenital deformities.	
3.5	Medical & Surgical management.	
3.6	PT Intervention: Neurodevelopmental therapy, Sensory integration approach, Task oriented approach and functional training, Oromotor therapy, Aerobic Fitness, , Orthotic & wheelchair Prescription, Community & Special education rehabilitation, Modification in ADLs, Secondary impairments.	
3.7	Recent trends with evidence for various physiotherapy treatment approaches.	
4	CONGENITAL DISORDERS	

4.1	Etiology, Classification and Prognosis: Hydrocephalous, Spina bifida, Syringomyelia, Arnold-Chiari malformation, Dandy-Walker syndrome.
4.2	Medical and Surgical Management.
4.3	PT interventions: Acute, Subacute, Chronic.
4.4	Orthotic prescription.
4.5	Recent trends with evidence.
5	COGNITIVE & PERCEPTUAL DISORDERS
5.1	Pathophysiology, progression & Classification of: ADHD, Mental retardation, Autism, Fetal alcohol syndrome, Developmental coordination disorder, Sensory integration dysfunction.
5.2	Medical management.
5.3	PT interventions: Sensory integration therapy, Play therapy.
5.4	Treatment modifications at different stages of the rehabilitation.
6	GENETIC DISORDERS
6.1	Pathophysiology: Down syndrome, Fragile X syndrome, PraderWilli syndrome, Cirdu chat syndrome, Neurofibromatosis, Tuberous sclerosis, Turner's syndrome, Angel man syndrome, Klinefelter syndrome.
6.2	Medical management.
6.3	Sequelae of the impairments: Primary and Secondary.
6.4	PT Management.

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Neurological Rehabilitation: Umphred, Darcy, A.
2. Motor control Theory and practice: Shumway-cook & Anne.
3. Physical rehabilitation by Susan B, O' Sullivan, Thomas J. Schmitz.

REFERENCE BOOKS:

1. Functional neuro rehabilitation: Berner, Julie.
2. Patricia Davies – Right in the middle (trunk activity in hemi).
3. Patricia Davies – Steps to follow (comprehensive treatment for hemi).
4. Carr & Shepherd – Neurological rehabilitation: optimizing motor performance.
5. Sydney Sunderland – Nerves and nerve injuries.

M P T (Neuro) - Semester III
03MPN103 – Exercise Physiology & Nutrition

Course Objectives:

- Explain the interplay between different organ systems and how organs and cells interact to maintain biological equilibria in the face of a variable and changing environment.

Learning Outcomes:

- Describe the structure of major human organs and explain their role in the maintenance of healthy individuals.
- Explain physiological processes accurately and concisely in journal-style format and orally, using relevant scientific terminology and nomenclature.

DETAILED SYLLABUS:

1	PRINCIPLES OF EXERCISE PHYSIOLOGY	
1.1	Role of Aerobic and Anaerobic mechanism during exercises.	
1.2	Acute effects of High, Burst and Short duration exercises.	
1.3	Acute effect of Steady level exercise on following parameters – Blood flow, Heart rate, Blood Pressure, Pulse Rate, Respiration Rate, Acid Base Balance, Body Temperature, Fluid-Electrolyte Balance and Substrate Utilization.	
1.4	Aging and physiologic function, physical activity in the different types of population.	
1.5	Clinical exercise physiology for cancer, cardiovascular and pulmonary rehabilitation.	
2	EXERCISE TESTING AND PLANNING	

2.1	Definition of exercise testing, the need for exercise testing, clinical assessment of exercise tolerance, factors affecting exercise tolerance, diagnostic use of exercise testing, indications of exercise testing, exclusion criteria, Clinical values of exercise testing.
2.2	Objective assessment of exercise- related symptoms. Muscles fatigue and weakness, dyspnea, exertional chest pain, Applications in cardiac disorders, coronary artery disease, congenital heart disease, valvular disease, pulmonary vascular disease, peripheral vascular disease.
2.3	Low Level Exercise Testing: Purpose, Contra - indications, Termination points.
2.4	Maximal Exercise Testing: Purpose, Guidelines, Exercise test protocols, Contraindications and Precautions, Criteria for termination of test, Prognostic implications from exercise testing.
2.5	Exercise electrocardiogram. The normal ECG. Normal response disease, changes associated with coronary disease. Changes in the ST segment and T waves, Effects of drugs, cardiac arrhythmias in exercise, abnormalities of conduction, the ECG in athletes.
2.6	Approaches to clinical exercise testing, master step test, the balke protocol, the Bruce protocol, Scandinavian protocol, triangular protocol, walking protocol, Wingate test, maximal oxygen uptake, the stage I test, stage 2,3 and 4 tests, indications and contraindications to exercise testing.
2.7	Exercise tolerance test or stress test METS and their use in evaluation.
3	EXERCISE PRESCRIPTION & TRAINING
3.1	Introduction to exercise prescription, the individual approach, the aerobic session, frequency, time, mode of exercise, rate of progression, musculoskeletal conditioning, static stretching, systems of muscular strength and endurance training, Recommendation based on maximal exercise test results, interpretation of maximal exercise test results.
3.2	Conditioning effects of various levels of Sub-Maximal Exercises. Considerations of age and sex in exercise and training.
3.3	Exercise prescription for health and fitness with special emphasis to cardiovascular disease, Obesity and Diabetes, Fatigue – Types, Relevance with Exercise Tolerance tests & Training.
3.4	Principles of health promotion for Growing Children, Healthy Adults, Pregnant/Lactating females, Elderly, Sports person.
3.5	Special aids to exercise training and performance.
4	COMPONENTS OF NUTRITION

4.1	CARBOHYDRATES : Types, RDA data, Glycemic index, Sources of Fats, saturated, unsaturated fats, recommended intake, importance of fat in diet, fats in health and disease.
4.2	PROTEIN: Types EAA, function, assessing quality of proteins, selecting incomplete proteins, RDA sources.
4.3	VITAMINS AND MINERALS: Types, functions, sources, and minerals - calcium, Phosphorus, iron, magnesium, sodium, potassium, and chloride. Trace elements - sources and functions.
4.4	Nutritional status in India, RDA by ICMR, basic five food groups, Principles of Menu planning, Nutritional deficiencies- protein calorie malnutrition, effects of nutrition on teeth, role of fluoride.
4.5	Diet – for Growing Age, Pregnancy, Lactation, Acute Illness, Convalescent Period, High level of Physical Activity, Aging & Sports, Obesity – prescription of Diet & its modification.
4.6	Role of nutrient inhibitors, Effect of Food toxins and non-nutritive foods, Food contamination and spread of diseases.
4.7	Types of diet – veg/non-veg. Advantages and disadvantages of the same, Food processing, methods of food preparation.
5	ENERGY TRANSFER/DELIVERY SYSTEM
5.1	Introduction to energy transfer, energy transfer in the body-phosphate bond energy, energy released from food, energy transfer in exercise.
5.2	Systems of energy delivered and utilization:
5.2.1	Cardiovascular system: cardiovascular regulation, integration and functional capacity.
5.2.2	Pulmonary System: Dynamics of pulmonary ventilation, regulation of pulmonary ventilation, pulmonary ventilation during exercise, acid-base regulation.
5.2.3	Endocrine system: organization, acute and chronic response to exercise.
5.2.4	Role of Musculoskeletal system & Nervous System
6	ENERGY EXPENDITURE
6.1	Expenditure during rest, confinement during illness and various levels of Physical
6.2	Exercises, factors influencing energy uptake and substrate utilization. Measurement of Human energy expenditure, individual differences and measurement of energy capacities.
6.3	Energy expenditure during walking, jogging, running and swimming.
7	MEASUREMENT AND ASSESSMENT
7.1	Body composition assessment, physique, performance, and physical activity, over-weight, obesity and weight control.
7.2	Lab Investigations - blood glucose, lipid profile, electrolytes, hemoglobin.

RECOMMENDED STUDY MATERIAL:

TEXTBOOKS:

1. Katch: Exercise physiology, energy nutrition and human performance.
2. Scott K Powers: Theory and application to fitness and performance.

REFERENCE BOOKS:

1. Axen: Illustrated principles of exercise physiology.
2. Frank: Exercise physiology for health care professionals.
3. Tudor Hale: Exercise physiology – a thematic approach.
4. George Brooks: Exercise physiology –Human Bioenergetics and its application .

MPT(Neuro) –IV Sem

CLINICAL TRAINING

Clinical training comprises all of the formal and practical "real-life" learning experiences provided for students to apply classroom knowledge and skills in the clinical environment. Experiences would include those of short and long duration (eg, part-time, full-time, internships) and those that provide a variety of learning experiences (eg, rotations on different units within the same practice setting, rotations between different practice settings within the same health care system) to include comprehensive care of patients across the life span and related activities.

Each student will be under the supervision of a clinical supervisor at the clinical education site who directly instructs and supervises students during their clinical learning experiences. Clinical supervisors are responsible for facilitating clinical learning experiences and assessing students' performance in cognitive, psychomotor, and affective domains as related to graduate-level clinical practice and academic and clinical performance expectations.

Clinical supervisors will evaluate each student twice during clinical training (mid-term and final) using a standard evaluation tool. The students will provide feedback to facilitate ongoing improvements in the support offered by the institute to the clinical facilities and their educators.

The students will start their clinical training from the 1st semester and it will go on upto fourth semester. In each semester, they will be posted for a minimum of Four months in the departments related to their courses being learned in respective semesters. The student will be formally evaluated at the end of semester through Vivavoce examinations by internal and external examiners.

DISSERTATION I

INTRODUCTION:

The dissertation is aimed to train a postgraduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions. Every candidate pursuing MPT degree course is required to carry out work on a selected research project under the guidance of a recognized postgraduate teacher. The result of such a work shall be submitted in the form of dissertation.

Course Work:

Submission of dissertation proposal to the dissertation proposal approval committee

Content of a proposal:

The proposal shall include the following sections.

- 1. Introduction:** This should give a short overview of the problem, issues, or topic to be studied and reasons why it is an important problem to study. Often, it includes some historical background of the problem.
- 2. Statement of the problem:** This is a more complete discussion of the problem of the dissertation. The major questions, hypotheses, or statements should be included with a possible list of secondary questions if appropriate. This section is an extended discussion of the problem often with some literature noted.
- 3. Statement of the significance of this study to the field :** In other words, why is this study important? It should include a statement about how it advances knowledge in the field with reference to past literature and general concerns of the area.
- 4. Literature Review related to the problem, issue, or topic:** In this, various schools of thought on this problem are explored with significant attention to the conceptual and the theoretical aspects of the problem and how those contribute to the topic's development.
- 5. Methodology:** It includes a discussion of the research design, the population to be studied, discussion of appropriate instruments, sampling concerns, data collection approaches, analyses to be conducted and a projected timetable for completion of the dissertation.
- 6. Limitations:** It is to clarify or limit the scope of the method(s) employed in this study.

Once the student has received the permission from their Dissertation guide to defend their proposal, the proposal defense will be scheduled. The proposal approval committee would be constituted consisting of 3 members with one external member, one internal faculty (other than guide) from the institute and the head of institute. The dissertation committee member's backgrounds should complement the area of anticipated study. This does not require that each member be an expert on

every aspect of the study. Potentially, the members will all bring different strengths or knowledge bases to the committee.

The dissertation proposal approval committee approves the dissertation proposal subject to the further approval from IRB.

The Institutional Review Board Approval Process:

Researchers who use human participants in their research must follow specific guidelines as a condition for using the data provided by these persons. If the proposal involves human participants, the student will need to submit an application to the Institutional Review Board (IRB) of the Institute. In consultation with his or her Guide, the student prepares an IRB application and submits it to the institute's IRB coordinator. The IRB judge's application on issues related to protection of participants from physical and emotional distress and not on theoretical or methodological grounds. The study cannot go forward until IRB approval is received. In many cases, minor revisions to the study will be necessary to gain approval. Collecting data prior to receiving IRB approval is considered sufficient grounds for halting a research study. In general, students should not submit their IRB application before the proposal defense as any major changes in the proposal would necessitate re-applying to the IRB.

This proposal is considered an agreement or contract describing how the student will conduct the study and cannot be changed without guide/committee approval. Substantial changes to the methods, goals, and objectives articulated in a proposal will necessitate a new proposal defense.

DISSERTATION

Course work:

Submission of the completed dissertation

Content :

Every candidate shall submit to the Registrar (Academic) of the university in the prescribed proforma, within 1 month from the date of commencement of the course on or before the dates notified by the university.

The dissertation should be written under the following headings.

1. Introduction
2. Aims or objectives of study
3. Review of literature
4. Methodology
5. Results
6. Discussion
7. Conclusion
8. Summary
9. References
10. Tables & Figures
11. Annexure.

The printed text of dissertation should not be less than 50 pages/2500 words and shall not exceed 75 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing (Font 12, Times New Roman) on one side of paper (A4 Size, 8.27" X 11.69") and Hard bound properly (No Spiral binding). Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), one month before final examination on or before the dates notified by the university duly certified by the guide, head of the department and head of the institution. In the Dissertation the Candidate should not disclose his Identity or of the Guide or Institution in anyway.

Three examiners appointed by the university shall evaluate the dissertation. Two of the examiners (external) shall be from outside university and one examiner (internal) will be from the institute.

A candidate who has submitted his/her dissertation once is not required to submit a fresh dissertation if he/she reappears for the examination in the same branch on the subsequent occasion, provided the dissertation has been accepted by the examiners.

If the student has submitted her examination form & also his/her dissertation previously, he/she will be permitted to give the examination within a period of 4 years anytime in future provided the dissertation has been accepted. The terms satisfactorily kept by him will be valid for a period of 4 years

subsequent to submission of the dissertation after which he/she will have to undergo Post-graduate training again for terms to be eligible for appearing for theory & Practical examination.

POST-GRADUATE GUIDE:

A PG guide must have a Post-Graduate Degree in Physiotherapy with at-least 5 years of full time teaching in the core areas of physiotherapy after post-graduation. Notwithstanding the above clause, in a case of acute shortage of qualified Post-Graduate guides, a PG teacher with 3 years full time teaching experience after Masters Degree can be considered. The PG guide can only guide student belonging to his/her specialized branch. These clauses may be reviewed after two years. The age of teacher /guide shall not exceed 62 years and the guide student ratio shall be 1: 3.

Co-guide: may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching /training by the University. The co- guide shall be a recognized postgraduate teacher of the University

Change of Guide: In the event of a recognized guide leaving the college for any reason or in the event of death of guide, another recognized guide may take over the duties of the guide with prior permission from the university.