Faculty of Sports Medicine & Physiotherapy

SYLLABUS

FOR

MASTER OF NEUROLOGICAL PHYSIOTHERAPY
(SEMESTER: I–II)

(For Colleges)

Examination: 2012–13

GURU NANAK DEV UNIVERSITY AMRITSAR

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER SYSTEM)

Ordinances for Master of Neurological Physiotherapy

1. **Duration of Course:**
   A candidate for the Master of Neurological Physiotherapy will pursue his/her studies for four semesters.

2. **Eligibility for Admission:**
   Bachelor of Physiotherapy with at least 50% marks from any recognized University / Institute or equivalent degree.
   Rest of the part of the ordinances would be as per the semester system for Post Graduate examination as adopted by the Syndicate of University.

Scheme of Examination

A. Theory Examination:

Semester – I:

Paper	Paper Code	Course Title	Contact Hours	Max. Marks
1.1	A.B.M.S.-S1	Applied Basic Medical Sciences	50	100
1.2	A.E.N.P-S1	Assessment and Evaluation in Neurophysiotherapy	50	100
1.3	B.P.P.-S1	Basic Physiotherapy Principles	50	100
1.4	R.E.M.-S1	Research and Educational Methodology	50	100

Semester – II:

Paper	Paper Code	Course Title	Contact Hours	Max. Marks
2.1	A.P.C.S.-S2	Applied Para Clinical Sciences	50	100
2.2	N.H.M.-S2	Neuromechanics of Human Motion	50	100
2.3	P.M.-S2	Physiotherapy Methods	50	100
2.4	N.N.-S2	Neurology and Neurosurgery	50	100

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – I)

1.1 APPLIED BASIC MEDICAL SCIENCES (A.B.M.S.-S1)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution. Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I
Neuroanatomy (Review)

1. Development of nervous system,
2. Peripheral nerves and ganglia, receptors and effectors, dermatomes and muscular activity, CNS an overview, spinal cord, brainstem.
3. Nuclei, functional components and distribution of cranial nerves.

   Cerebellum and fourth ventricle
   Diencephalon and third ventricle
   Cerebrum,
   Basal nuclei
4. Blood supply of the brain
5. Meninges, cerebrospinal fluid and Fluid compartments and fluid balance in the CNS
6. Somatic motor and sensory pathways
   Special senses and their neural pathways
   Reticular formation and limbic system
   Sensory system, spinal cord and its connection
7. Autonomic nervous system
8. Brainstem and its connection, Inferior Colliculi, Epithalamus, Rhinencephalon, Meninges, Internal capsule, Auditory radiation, Pyramidal system, anatomic integration, neuromuscular junction, thalamus, Extra pyramidal systems.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – I)

UNIT – II
(Neurophysiology)

Organization and function of nervous system
Basic Neurophysiology, concerned to motor unit potentials, nerve conduction neuromuscular junction transmission and reflexes
Somatosensory function
Higher intellectual function
Reflex maturation- Neurophysiologic basis
Normal sequential physiological changes throughout the developmental age
Physiology of pain: Models of pain, Basic molecular biology, neurobiology, stress biology and pain, Peripheral and central pain mechanisms, theory of modulation of pain.
Properties of nerve fibers, synapse
Neurotransmitters-their clinical co-relation
Thermoregulation
Physiological basis of emotions.
Tone and its regulation
Neurophysiology of special senses

References:

1. Review of Medical Physiology, W F Ganong, MGH.
2. Textbook of Medical Physiology, C Guyton, W B Sunders.
3. Determinants of Abnormal Motor Control, Dunean & Badke, WBS.
4. Abnormal Postural Reflex Activity Caused by Brain Lesions, B Bobath, Heinnmann London
5. Pain, H Fields, MGH.
6. Neuroanatomy- Snells.
7. Grays Anatomy-Grays.
8. Clinical Neurophysiology- Andrew Robinson.
9. Motor Learning- Optimizing Motor Performance-Carr and Shepherd.
10. Textbook of Medical Physiology- Guyton-Mosby.
11. Grunts- Methods of Anatomy- Basmajin & Slonekar- Williams & Wilkins.
12. Textbook of Clinical Neuroanatomy- Vishram Singh.
13. Essentials of Neuroanatomy- Inderbir Singh.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – I)

1.2 ASSESSMENT AND EVALUATION IN NEUROPHYSIOTHERAPY (A.E.N.P-S1)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution. Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I
(CLINICAL DECISION MAKING)

Basic components-steps in patient/client management, patient participation and planning, evidence based practice, various factors, documentation.

UNIT – II
(EXAMINATION)

Sensory System: clinical indications, testing instruments
Motor system: Elements, tests and measures.

UNIT – III

Examination of coordination: Screening, non equilibrium and equilibrium tests, Instruments.
Functional level: Response format and instruments like FIM, SIP etc.
Examination of Balance, Vestibular System: tests and measures

UNIT – IV

Gait & environment

References:

1. Physical Rehabilitation: Susan O' Sullivan 5th Edition, JP Brothers.
2. Gilroy's Basic Neurology, J Gilroy, Mcgrew Hill.
3. Qualitative Research in Evidence Based Rehabilitation: Karen Whalley Hammell.
4. Neurological Examination Made Easy, Geriant fuller, Churchill Livingstone.
5. Clinical Evaluation of Muscle Function, M.Lacote, Churchill Livingstone.
6. Neuroscience- Exploring the Brain, Dhaines, Churchill Livingstone.
7. Neurological Assessment-Blicker Staff.
8. Assessment in Neurology- Dejong.
9. Differential Diagnosis, John Pattern.
10. Neurology in Clinical Practice, Bradlay and Darof.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – I)

1.3 BASIC PHYSIOTHERAPY PRINCIPLES (B.P.P.-S1)

Time: 3 Hrs. **Marks: 100**

Instructions for paper setters

1. There will be twelve questions of equal marks distribution.Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I

Physiotherapy Approach to Neurology and Neurosurgery: Planning of therapeutic exercise program, Exercise Prescription, Instructing the patient- Methods of Instruction, Schemes of exercise- General, Specific, Home Exercise Program, Treatment Sessions, and Frequency.

Determination of the type of therapeutic exercises, Details of Exercises to improve, restore or maintenance of mobility and flexibility stability, muscle strength, endurance, balance and functional skills.

UNIT – II

Area of Special Considerations in Neuro Physiotherapy, Referral system for early Physiotherapy, preventive Physiotherapy

Strategies to improve motor and sensory function: Principles of motor control, framework for intervention and various intervention strategies.

Musculoskeletal treatment concepts applied to Neurology: Adverse neural tissue tension tests in upper and lower limbs.

Practicals: The students will undergo hands on training on various Neuro physiotherapy techniques for handling Neurological patients.

References:

1. Neurological Physiotherapy, A Problem Solving Approach, Susan Edwards, Churchill Livingstone.
2. Neurological Rehabilitation, Umpherd, Mosby.
3. Motor Assessment of Developing Infant, Piper & Darrah, WE Saunders.
4. Pediatric Physical Therapy, Teckling, Lippincott.
5. Impact of Neurobehavioral Deficit on ADL, G Arndoltis, Mosby.
6. Therapeutic Exercises: Foundation and Techniques. Carolyn Kiser, Lynn Colby. FA Davis.
7. Selective Trunk Activity in The Treatment of Trunk Hemiplegic, P Davies, Springer, New York.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – I)

1.4 RESEARCH & EDUCATIONAL METHODOLOGY (R.E.M.-S1)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution.Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I
(Research Methodology)

1. Introduction:
    a. Importance of research in clinical practice
    b. Scientific approach
    c. Characteristics
    d. Purposes and limitations.
2. Ethical issues in research.
3. Structure, formulation and implementation of a research project
4. Research Questions:
    a. Selection and statement of problem
    b. Literature review
    c. Meta–analysis.
5. Types of Research:
    a. Basic and Applied
    b. Qualitative & Quantitative
    c. Descriptive & Experimental
    d. Longitudinal & Cross–sectional
6. Data Analysis:
    a. Statistical Tests of significance
    b. Correlation
    c. Reliability
    d. Validity
    e. Parametric and Non–parametric statistics
7. Experimental Research:
    a. Types of Sampling
    b. Variables
    c. Experimental design
    d. Factorial design
8. Survey Research:
    a. Conducting a survey
    b. Questionnaires
    c. Steps in conducting survey research
    d. Epidemiological research

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – I)

UNIT – II

1. Presentation
    a. Symposia
    b. Seminar
    c. Conference
    d. Journal
    e. Thesis
    f. Book
    g. Key element of scientific writing.

2. Presenting Research
    i) Writing and submitting papers
        (a) Strategies of paper writing
        (b) Design of paper writing
        (c) Tactics of paper writing
    ii) Where to publish
    iii) Poster presentation of a research paper
        (a) Pre ample
        (b) Poster space
        (c) Standard format
        (d) Planning
        (e) Design
3. Review of an indexed refereed research paper.
    i) Evaluating paper scientific merit.
    ii) Providing constructive feedback to the author.
    iii) Typical review formats for reviewing a paper
    iv) Reasons for rejection
4. Oral Presentations at Conferences/Seminars
    i) Preparing presentation
    ii) Duration of presentation
    iii) What to present

UNIT – III
(Educational Methodology)

1. Aim, philosophy and issues in physiotherapy education
2. Principles and methods of teaching with respect to physiotherapy students and client: Strategies and planning of teaching, curriculum development, formation of course Objective, time management, role of Audio – visual aids, method of knowledge Dissemination
3. Methods of outcome evaluation

Practicals:

The student will be required to prepare sample research proposal. He will have to teach at least one subject of Bachelor in Physiotherapy and will present the teaching plan.

References:

1. Mohsin S.M.: Research Methods in Behavioral Sciences: Orient Publications.
2. Colton: Statistics in Medicine, Little Brown Company, Boston.
3. Mahajan: Methods in Biostatistics, Jay Pee Brothers.
4. Vincent: Statistics in Kinesiology, Human Kinetics.
5. Hicks: Research for Physiotherapists, Churchill Livingstone.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – II)

2.1 APPLIED PARA CLINICAL SCIENCES (A.P.C.S.-S2)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution. Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

Unit – I

Pathology:

1. Inflammation and repair
2. "Failed" healing responses
3. Regional considerations of Inflammation & repair of peripheral nerves and nervous tissue.

Unit – II

Pharmacology:

1. Principles of drug action.
2. Basic pharmacokinetics and Pharmaco dynamics.
3. The use of drugs in various neuromuscular disorders.

Unit – III

Radiology and Electro Diagnosis:

Basics of radiology including ultra sonography CT & MRI scanning
Electro diagnosis: Methods, clinical applications.
EMG: Response analysis, NCV.
Electrical Stimulation, Evoked potentials

References:

1. The Pharmacological Basis of Therapeutics – Goodman and Gilman – MacMillan.
2. Pharmacology and Pharmacotherapeutics – Satoskar & Bhandarkar – Popular Publication. Bombay.
3. Davidsons – Principles and Practice of Medicine – Edward – Churchill Livingstone.
4. Text Book of Radiology – Sutton D. – Churchill Livingstone.
5. Electromyography and Neuromuscular Disorders: Clinical EMG Correlations, David C. Preston.
6. EMG Pearls, Steven A Greenberg.
7. Clayton's Electrotherapy.
8. Electrotherapy Explained, John Low & Reed.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – II)

2.2 NEUROMECHANICS OF HUMAN MOTION (N.H.M.-S2)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution. Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I

Neurological Basis:

Anatomic motor control structure, Motor development, interaction of child and environment

Motor developmental theories, their principles and applications

Sensory system and sensory input: tactile, vestibular, auditory, visual, kinesthetic modality

Motor programming

Motor output: As a reflex, reaction, skill.

Feedback

Muscle tone : main predictor of motor control

Motor learning: theories, their application, transfer of motor learning

UNIT – II

Mechanical Basis:

Framework and joints of the body, Role of muscles, types of muscles, contractions.

Mechanical principles: Motion, Angular motion, force system, COG, co-relations and support system.

UNIT – III

Abnormal and normal movements: characteristics, abnormal synergy patterns and their basis.

Human movement analysis: instruments, technique, interpretation.

References:

1. Paediatrics adapted Motor Development and Exercise. Charles C Thomas. Publications Ltd. USA.
2. Neurodevelopment Treatment Approaches Theoretical Principles of Clinical Practice: NDTA USA.
3. Brunnstrom – Clinical Kinesiology, F.A. Davis.
4. Luttgens K., Hamilton N.: Kinesiology – Scientific Basis of Human Motion 9th Edi, 1997, Brown & Benchmark.
5. Rasch and Burk: Kinesiology and Applied Anatomy, Lee and Fabiger.
6. White and Punjabi – Biomechanics of Spine – Lippincott.
7. Kapandji: Physiology of Joints Vol. I, II & III, W.B. Saunders.
8. Mishra: Clinical Neurophysiology, B.I. Churchill Livingstone.
9. Rehabilitation of Stroke, Kaplan & Cailliet, Butterworth Heinemann.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – II)

2.3 PHYSIOTHERAPY METHODS (P.M.-S2)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution. Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I

Electrotherapy in Neurophysiotherapy :goals and objectives, selection criteria for appropriate modality, instructing the patient- methods of instruction, scheme of electrotherapy treatment, modalities to enhance tissue healing, reduce inflammatory process, treatment protocol, dosimetry and dangers.

Modalities to facilitate or improve muscle function, reduce pain ,spasticity: Selection, treatment protocol, dosimetry and dangers

Modalities used for Electro diagnosis.

UNIT – II

Proprioceptive Neuromuscular facilitation (PNF): History, scope, basic principles, techniques and applications.

Sensory Motor Treatment approach: The Roods, Brunnstorm Approach of treatment: History, scope, basic principles, techniques and applications.

UNIT – III

Patterning Therapy: Doman Delacato technique**:** History, scope, basic principles, techniques and applications.

The Vojta Technique**:** History, scope, basic principles, techniques and applications.

Conductive Education: Peto Andras Technique: History, scope, basic principles, techniques and applications.

Enforced Use Therapy

Practicals: The students will undergo hands on training on various Neuro physiotherapy techniques for handling Neurological patients.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – II)

References:

1. Adult Hemiplegic: Evaluation and Treatment-Bobath-oxford Butterworth Heinemann.
2. Neurological Rehabilitation. Carr and Shepherd. Butterworth Heinemann.
3. Electrotherapy: Evidence-based Practice. Tim Watson. Churchill Livingstone.
4. Electrotherapy Explained: Principles and Practice. Low and Reed. Butterworth-Heinemann.
5. Treatment of Cerebral Palsy and Motor Delay-Sophie Levitt.
6. Motor relearning Programme for Stroke-Carr & Shepherd.
7. Electrotherapy: Evidence-Based Practice. Sheila Kitchen. Churchill Livingstone
8. PNF in Practice: An Illustrated Guide. Susan S Adler, Dominick Beckers, Math Buck. Springer.
9. Brunnstrom's movement therapy in Hemiplegia- Sawner & Lavigne. Lippincott Williams & Wilkins.
10. Physical Therapy of Cerebral Palsy. Miller. Springer.
11. The Bobath Concept in Adult Neurology. Bente E. Bassoe, Gjelsvic. Thieme Medical Pub.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – II)

2.4 NEUROLOGY AND NEUROSURGERY (N.N.-S2)

Time: 3 Hrs. **Marks: 100**

Instructions for Paper Setters:

1. There will be twelve questions of equal marks distribution. Candidate will have to answer any ten questions.
2. The questions should be equally distributed in the whole syllabus.

UNIT – I

Neurology:

Cerebrovascular accidents: primary and secondary impairments, acute care.

Infections of Nervous System: transverse myelitis, meningitis, encephalitis, types, post infection sequelae, Poliomyelitis, post polio syndrome, GBS.

Peripheral nerve and cranial nerve lesions.

Disorders of movement: Cerebellum, Basal ganglia, vestibular system etc.

UNIT – II

Demyelineting disorders of nervous system: primary and secondary impairments and prognosis

Degenerative diseases of nervous system.

Disease of muscles: Classification, myopathies, Muscular dystrophies, primary and secondary impairments and Physiotherapy.

Miscellaneous procedures like phenol injections, BTX-type A injections etc., indications and complications.

UNIT – III

Neurosurgery:

Neurosurgery ICU

Common surgeries of cranium ,brain, vertebral column and spinal cord and their complications

Common surgeries of peripheral nerves.

Surgical interventions in traumatic head injuries, complications and outcomes.

Miscellaneous: SPR, Neurectomies, ITB pump etc., indications and complications.

Practicals: The students will attend the various private hospitals attached with the department to acquaint himself/herself for various neurological and neurosurgical conditions.

MASTER OF NEUROLOGICAL PHYSIOTHERAPY (SEMESTER – II)

References:

1. Handbook of Neurosurgery. Mark S Greenberg. Thieme.
2. Principles of Neurological Surgery. Richard G Ellenbogen, Saleem I Abdul Rauf, Laligam N Shekhar. Saunders.
3. Neurology and Neurosurgery Illustrated. Kenneth W. Lindsay, Ian Bone, Geraint Fuller. Churchill Livingstone.
4. Essential Neurosurgery**.** Andrew H. Kaye. Wiley Blackwell.
5. Principles of Neurosurgery. Setti Rengachary and Richard Ellenbogen Mosby
6. Neurosurgery Review, Raj Kumar. Jaypee.
7. The Textbook of Human Neuroanatomy. I.B. Singh. Jaypee.
8. Brain’s Disease of the Nervous System- Nalton- ELBS.
9. Neurological assessment- Blicker Staff.
10. Davidson’s Principles and Practices of Medicine- Edward- Churchill Livingstone.
11. Hutchinson’s Clinical Methods- Swash- Bailliere Tindall.