



# TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P.)

## PhD PROGRAMME

### SYLLABUS FOR DISCIPLINE-SPECIFIC COURSE PHYSIOTHERAPY (NEUROSCIENCES)

| Course Code:<br>PDS240115 | Neurosciences rehabilitation & advances   | L | T | P | C |
|---------------------------|---|---|---|---|---|
|                           |   | 0 | 0 | 0 | 4 |
| <b>Objective:</b>         | In this course, one will develop clinical reasoning with evidence that integrates the effect of Physiotherapy on NEUROLOGICAL CONDITIONS. They shall also know about the recent advancements in rehabilitation for neurological diseases.   |   |   |   |   |
| <b>Course Outcomes:</b>   | On completion of the course, students will be able to:  |   |   |   |   |
| <b>CO 1:</b>              | Understand and apply the recent advances and techniques in rehabilitating neurological conditions.  |   |   |   |   |
| <b>CO 2:</b>              | Apply the principles of Exercise Physiology & Electrophysiology.  |   |   |   |   |
| <b>CO 3:</b>              | Analyze community-based rehabilitation in neurological conditions   |   |   |   |   |
| <b>CO 4:</b>              | Analyze the exercise performance.   |   |   |   |   |
| <b>CO 5:</b>              | Create the exercise prescription.   |   |   |   |   |
| <b>Course Content:</b>    |   |   |   |   |   |
| <b>Unit 1:</b>            | <b>RECENT ADVANCES:</b><br>Robotic therapy, biofeedback, virtual reality and AI in neurophysiotherapy, mental imagery, centering, arousal control, visualization, positive self-talk, relaxation techniques, CIMT, auditory rhythmic stimulation, Neuroplasticity and rehabilitation (Trans-cranial direct stimulation, trans-cranial magnetic stimulation) , sensory stimulation, tele rehabilitation.   |   |   |   |   |
| <b>Unit 2:</b>            | <b>ELECTROPHYSIOLOGY:</b><br>Concepts of bioelectricity and neurophysiology, recent advances in NCV, EMG, Evoked potential- VEP, SSEP, QST, EEG, BAER, RNS in relation to physiotherapy; Clinical electrophysiology along with evidence-based principles and practice from case study analysis.   |   |   |   |   |
| <b>Unit 3:</b>            | <b>EXERCISE PHYSIOLOGY:</b><br>ENERGY PRODUCTION, EXPENDITURE AND TRANSFER<br>Energy transfer in cells during exercise<br>Oxygen metabolism and transfer during metabolism<br>Oxygen Transport in the blood<br>Oxygen deficit and oxygen debt<br>Oxygen measurements during exercise and recovery<br>Energy release from carbohydrates, lipids, and protein<br>BMR - during rest and activity<br>Energy expenditure during activity<br>Short-term and long-term energy system<br>EXERCISE PERFORMANCE |   |   |   |   |

|                         |  |
|-------------------------|--|
|                         | <p>Lung function &amp; its role in exercise performance<br/> Regulation of ventilation and blood pressure during exercise<br/> Cardiovascular adjustment during exercise<br/> Muscle fiber, types, and its role in exercise performance<br/> Ventilation during steady and non-steady rate exercise<br/> Energy cost and breaking<br/> Blood pressure response to exercise<br/> Cardiac output during exercise in trained/untrained<br/> Cardiovascular drift</p>  |
| <b>Unit 4:</b>          | <b>RECENT ADVANCES AND EVIDENCE-BASED PRACTICES IN NEUROLOGICAL CONDITIONS</b>   |
| <b>Unit 5:</b>          | <b>COMMUNITY PHYSIOTHERAPY:</b><br>Population studies and epidemiological implications of impairment, handicap, and disability. Evidence-based practice in community health and community rehabilitation. Evidence-based practice and recent advances in women's health physiotherapy, mother and childcare. Health promotion and recent advances in the role of physiotherapy in industrial health, geriatrics health. Psychosomatic approaches in the management of disorders of stress.   |
| <b>Textbooks:</b>       | <ol style="list-style-type: none"> <li>1. Carr &amp; Shepherd – Neurological rehabilitation: optimizing motor performance</li> <li>2. Motor control Theory and practice: Anne Shumway-cook</li> <li>3. Neurological Rehabilitation: Umphred, Darcy, A.</li> <li>4. Motor learning and performance: a situation-based approach: Richard R. Schmitz</li> <li>5. Physical rehabilitation by Susan B, O'Sullivan, Thomas J. Schmitz.</li> <li>6. Electrodiagnosis in disease of nerve and muscles by Kimuraj J, F A Davis, Philadelphia.</li> <li>7. Neurological differential diagnosis – John Patten.</li> </ol>   |
| <b>Reference Books:</b> | <ol style="list-style-type: none"> <li>1. Functional neuro rehabilitation: Berner, Julie.</li> <li>2. Stroke Therapy: Fisher, Marc.</li> <li>3. Patricia Davies – Right in the middle (trunk activity in hemi).</li> <li>4. Patricia Davies – Steps to follow (comprehensive treatment for hemi).</li> <li>5. Sydney Sunderland – Nerves and nerve injuries.</li> <li>6. Neurological Rehabilitation: Taly, A.B.</li> <li>7. Proprioceptive Neuromuscular Facilitation Knott M &amp; Voss, Harper &amp; Row.</li> <li>8. Neurorehabilitation by Farber, W.B. Saunders.</li> <li>9. Clinical neurophysiology: U.K. Misra, J. Kalita.</li> <li>10. Bickerstaff's neurological examination in clinical practice.</li> </ol> |