

<b>Course Title</b>	<b>Neurological physiotherapy II</b>				
<b>Course Code</b>	PHYS210				
<b>Course Type</b>	Compulsory				
<b>Level</b>	Bachelor (Level 1)				
<b>Year / Semester</b>	2d/Spring				
<b>Instructor's Name</b>	Dr Julia Moissoglou Missitzi, Michail Pantouveris				
<b>ECTS</b>	6	<b>Lectures / week</b>	2	<b>Laboratories/week</b>	2
<b>Course Purpose</b>	The purpose of the course is to introduce students to the concept of physiotherapy assessment and treatment approach of adult neurological patients. Also, the course familiarizes the student with the methods and techniques of physiotherapy approaches and the mechanisms of influence of the different therapeutic means, techniques and exercise programs				
<b>Learning Outcomes</b>	<p>By the end of the course, the student will be able to:</p> <ul style="list-style-type: none"> <li>• understand and interpret the normal and pathological control mechanisms of posture, movement and balance,</li> <li>• thoroughly study the various diseases of the nervous system,</li> <li>• determination of the type of disorder (upper and peripheral motor neuron damage, extrapyramidal damage, etc.), as manifested in adult neurological patients,</li> <li>• identify and prioritize the major and minor problems to be addressed;</li> <li>• evaluate physiotherapy approaches – therapeutic systems – exercise programs and interpret their effect.</li> <li>• <b>Comprehend the role of digital physiotherapy for the assessment and treatment of neurological conditions (virtual reality, telephysiotherapy etc)</b></li> <li>• <b>Implement the ICF system for disorders of the central and peripheral nervous system (brain, spinal cord &amp; peripheral nerves</b></li> <li>• <b>Collaborate and interact with members of the mulrudisciplinary team including, physicians, speech therapists, occupational therapists, psychologists, nurses, orthotists, podiatrists, social workers etc.</b></li> <li>•</li> </ul> <p>Upon completion of the laboratory part of the course, the learner is expected to be able to:</p> <ul style="list-style-type: none"> <li>• demonstrate competency in subjective and objective evaluation and of the adult patient with stroke</li> <li>• demonstrate competency in the subjective and objective evaluation of the adult patient in chronic CNS diseases</li> </ul>				

	<ul style="list-style-type: none"> <li>• demonstrate competency in the subjective and objective evaluation of the adult patient with spinal cord injuries to</li> <li>• demonstrate competency in clinical reasoning and manner selection and application of research-based therapeutic techniques in the whole range of diseases and injuries of the central and peripheral nervous system,</li> <li>• synthesize and apply the appropriate methods of physiotherapeutic treatment, based on the findings of clinical evaluation, the existing neuromuscular retraining techniques and the research documentation of these techniques</li> <li>• demonstrate adequacy in the application of techniques of rehabilitation methods of diseases and injuries of the central and peripheral nervous system</li> <li>• to comprehend the role of the physiotherapist in the multidisciplinary team for the rehabilitation of neurological and diseases and injuries.</li> </ul>		
<b>Prerequisites</b>	None	Co-requisites	None
<b>Course Content</b>	<p>Principles of physiotherapeutic assessment. Clinical examination.</p> <ul style="list-style-type: none"> <li>• Basic principles of physiotherapeutic assessment of neurological patients. Patient record. Tests.</li> <li>• Evaluation and classification (ICD-ICF) for <b>disorders of the central and peripheral nervous system (CVA's, myopathies, head injuries, peripheral nerve injuries etc)</b></li> <li>• Diagnosis of neurological disorders. Neurological examination.</li> <li>• Neuro-imaging diagnostic methods (computed tomography, MRI, U/S, evoked potentials, etc.).</li> </ul> <p>Posture control in adults.</p> <ul style="list-style-type: none"> <li>• Motor - sensory control. Age-dependent changes in posture control systems (musculoskeletal, neuromuscular and somatosensory systems).</li> <li>• Balance training (assessment - restoration of balance, static control, kinesthesia, strengthening, etc.).</li> <li>• Factors of instability. Risk factors for falls.</li> <li>• Exercise and posture control in adults</li> </ul> <p>Cerebrovascular Accident (CVA) - Hemiplegia.</p> <ul style="list-style-type: none"> <li>• Definition. Anatomy - (patho)physiology (cerebral perfusion, mechanism of neuronal damage). Clinical picture - stages of the disease. Prognosis.</li> <li>• Clinical - laboratory examinations of patients with CVA</li> <li>• Physiotherapeutic assessment.</li> <li>• Physiotherapeutic approach of patients with CVA. Problem-solving strategy. Stages of rehabilitation.</li> <li>• Physiotherapeutic care in the intensive care unit. Physiotherapeutic approach to the chronic stage of rehabilitation.</li> <li>• The shoulder of the hemiplegic patient - evaluation and treatment.</li> <li>• Exercise and Hemiplegia</li> </ul> <p>Traumatic brain injury (TBI) - Brain tumors.</p>		

- Definition. Epidemiology. Causes. Mechanism of injury. Types of injuries and concomitant lesions (disorders).
- Diagnosis, gravity and treatment.
- Physiotherapeutic assessment.
- Physiotherapeutic approach of patients with TBI Stages of rehabilitation. Problem-solving strategy.
- Physiotherapeutic approach of patients with brain tumors. Problem-solving strategy.
- Physiotherapeutic care in the intensive care unit. Physiotherapeutic approach to the chronic stage of rehabilitation.
- Exercise and TBI

#### Spinal cord injury - Quadriplegia, Paraplegia.

- Aetiology. Epidemiology. Pathogenesis. Types of injuries. Concomitant disorders.
- Clinical syndromes (central medullary, Brown-Sequard, anterior medullary, medullary cone, cauda equina).
- Physiotherapeutic assessment (assessment tests, ASIA disability scale).
- Physiotherapeutic approach of patients with spinal cord injury. Physiotherapeutic goals. Problem-solving strategy.
- Physiotherapeutic care in the intensive care unit. Physiotherapeutic approach to the chronic stage of rehabilitation.
- Use of special aids (adaptations) and modern technological systems (computer systems, robotics) - education.
- Exercise and Spinal Cord Injury

#### Peripheral nerve injuries.

- Anatomical and functional features of the peripheral nerves. Etiology and classification of injuries to the peripheral nerves.
- Medical and surgical treatment.
- Symptomatology and diagnosis. Muscle test.
- chin (Frenkel, use of audiovisual means, assembly exercises, balance platform, etc.).
- Interdisciplinary approach. Group therapy. Exercise.

#### Ataxia.

- Definition. Aetiology. Anatomical formations and function. Clinical signs (central – peripheral ataxia). The physiological role of cerebellar Physiotherapeutic approach of patients with peripheral nerve injuries. Physiotherapeutic assessment (muscle test).
- Special therapeutic means and techniques (Biofeedback, electrical muscle irritation, orthotic means, mobilization of nervous tissue, robotic systems, etc.). Exercise.

#### Multiple Sclerosis (MS).

- Etiology, epidemiology, pathology (demyelination, plaque breakdown, etc.), clinical picture, symptoms.
- Medical treatment of S.K.P.

- Physiotherapeutic assessment and approach of patients with MS Principles of treatment.
- Therapeutic means (hydrotherapy, aerobic exercise, stretching, etc.).

Extrapyramidal disorders (Parkinson's disease. Huntington's disease - chorea).

- Etiology, epidemiology, pathophysiology, clinical picture, symptoms.
- Medical treatment in Parkinson's disease. Surgical approach (implants).
- Medical treatment of chorea.
- Physiotherapeutic assessment and approach of patients with Parkinson's and chorea. Principles of treatment.
- Special therapeutic teida and vestibular system.
- Clinical evaluation, measurement and assessment (tests).
- Adapted motor behavior. Adjustment of posture.
- Physiotherapy treatment. Special therapeutic techniques - means (Frenkel, Cawthorne-Cooksey, use of audiovisual commands, assembly exercises, balance platform, etc.). Exercise.

Neuropathies – Polyneuropathies.

- Etiology, epidemiology, neuropathology, effect on peripheral nerves (axonopathies, myelinopathies, neuropathies), types of neuropathies - polyneuropathies (mononeuropathies, multiple mononeuropathies, Guillain-Barr é, etc.), clinical picture and symptoms.
- Physiotherapeutic assessment. Principles of physiotherapeutic approach to various types of neuropathies - polyneuropathies. Exercise.

Disorders of the neuromuscular synapse - myasthenias.

- Definition, types (myasthenia gravis, Lambert-Eaton syndrome), epidemiology, etiology, symptomatology, course, treatment.
- Physiotherapeutic approach to patients with myasthenia gravis.

Chronic neurological diseases with onset in childhood.

- Neurological diseases of childhood – overview (cerebral palsy, CNS malformations, metabolic disorders, traumatic brain injuries, tumors, etc.).
- Physiotherapeutic approach of children with neurological disorders - overview. Interdisciplinary or team.
- Physiotherapeutic approach of chronic neurological patients with onset in childhood. Physiotherapeutic principles. The role of the interdisciplinary team.
- **Advanced technology in the assessment and treatment of neurological disorders (digital physiotherapy, biomechanical analysis, virtual reality, electronic assessment platforms and applications)**

Special topics in neurology.

- The specific topics of neurology refer to rare diseases or syndromes that cannot by themselves form a separate unit due to their rarity and / or tendency to eliminate them (eg polio)

	<ul style="list-style-type: none"> <li>• <b>Collaboration with mulrudisciplinary team including, (physicians, speech therapists, occupational therapists, psychologists, nurses, orthotists, podiatrists, social workers etc.)</b></li> </ul> <p><b>Laboratory</b></p> <p>Physiotherapeutic approaches to the rehabilitation of neurological diseases, according to the theoretical content of the course,</p> <ul style="list-style-type: none"> <li>• Physiotherapeutic approaches. General description of approaches – historical background (Kabat (PNF), Fay, guiding (inductive) education – Peto, reflex mobilization – Vojta, Rood, sensory integration (SI), neurodevelopmental education (NDT), Phelps, Collis, Frenkel, Brunnstrom, Cawthorne-Cooksey, etc.).</li> <li>• Combination of approaches - physiotherapeutic techniques and programs.</li> <li>• <b>Practice in the assessment and treatment, clinical reasoning techniques and ICF classification of neurological disorders</b></li> </ul>
<p><b>Teaching Methodology</b></p>	<p><b>Theory</b></p> <p>The course is delivered to the students through lectures, using computer-based presentations programmes. Case Studies, Discussion, Questions / Answers are also used depending on the content of the lecture. Lecture notes and presentations are available online for use by students in combination with textbooks. Relevant material published in international scientific journals is also used to follow the latest developments related to the subject of the course.</p> <p><b>Laboratory</b></p> <p>During the laboratory courses, students develop their clinical skills in skill trainers and patient simulators so that they can successfully and safely apply them in a real clinical environment.</p>
<p><b>Bibliography</b></p>	<p><b><u>Textbooks:</u></b></p> <p>Barnes M., Johnson G. (2008). Upper motor neuron syndrome and spasticity. Parisianos Publications,</p> <p>Boelen M. (2009). Health professional’s guide to physical management of Parkinson’s disease. Εκδόσεις Human kinetics; 1st edition.</p> <p>Lennon S, Ramdharry G, Verheyden G. (2020) Φυσικοθεραπευτική Διαχείριση για Ασθενείς με Νευρολογικές Διαταραχές. Εκδόσεις Broken Hill Publishers Ltd.</p> <p>Nichols-Larsen D. (2017). Neurological Rehabilitation, Konstandaras Publ.</p> <p>Raine S., Meadows L., Lynch-Ellerington M. (2009). Bobath concept – Theory and clinical practice in neurological rehabilitation. Εκδόσεις Wiley-Blackwell</p>

	<p>Shumway-Cook A., Woollacott M. (2006) Motor Control: Translating Research into Clinical Practice. Εκδόσεις Lippincott Williams &amp; Wilkins, third edition.</p> <p>Umphred D. A. (2006). Neurological Rehabilitation. Mosby.</p> <p><b><u>References:</u></b></p> <p>Aboutorabi A, Arazpour M, Bahramizadeh M, Farahmand F, Fadayevatan R. Effect of vibration on postural control and gait of elderly subjects: a systematic review. <u>Aging Clin Exp Res.</u> 2018;30(7):713–726.</p> <p>Brito, Sherindan Ayessa Ferreira de, et al. (2022) Measurement properties of outcome measures used in neurological telerehabilitation: A systematic review protocol. <u>PLoS one</u> 17.3 e0265841.</p> <p>Donath L, Rossler R, Faude O. (2016) Effects of virtual reality training (exergaming) compared to alternative exercise training and passive control on standing balance and functional mobility in healthy community-dwelling seniors: a meta-analytical review. <u>Sports Med.</u> 46(9):1293–1309.</p> <p>Farlie MK, Robins L, Haas R, Keating JL, Molloy E, Haines TP. (2018) Programme frequency, type, time and duration do not explain the effects of balance exercise in older adults: a systematic review with a meta-regression analysis. <u>Br J Sports Med.</u> [epub ahead of print] <a href="https://doi.org/10.1136/bjsports-2016-096874">https://doi.org/10.1136/bjsports-2016-096874</a>.</p>
<b>Assessment</b>	<p><b><u>Continuous Assessment (50%):</u></b></p> <p>The assessment may include any combination of the following:</p> <ul style="list-style-type: none"> <li>• <b>Written and/or oral</b>, and it consists of multiple – choice, short answer, open ended questions and/or essay questions, that align with the learning outcomes, in order to assess the theoretical knowledge gained. The questions ensure that students will demonstrate a deep understanding of the subject matter and apply their knowledge to solve problems or analyse scenarios.</li> <li>• <b>Assignments and projects</b> provide opportunities for students to apply their theoretical knowledge in practical ways. The assignments are designed in a way that require critical thinking, research, analysis, and synthesis of information. Projects can be individual, self directed learning or group-based and should align with the learning outcomes. Students are evaluated on the quality of their work, the depth of understanding displayed, and their ability to effectively communicate their ideas. Assignments and projects may be individual or group work.</li> <li>• Use of <b>case studies or problem-solving exercises</b> to assess how students can apply theoretical knowledge to real-life situations. Students are presented with scenarios that require analysis, critical thinking, and the application of theoretical concepts and they are assessed based on their ability to perform verbal presentations, viva voce examinations, identify and evaluate relevant information, propose solutions, and provide justifications for their choices.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Online quizzes or interactive assessments:</b> Online quizzes or interactive assessments, reflective writing can be used through the Moodle platform, to create quizzes with various question formats. These assessments can be self-paced or timed, and immediate feedback can be provided to students.</li> <li>• <b>Classroom discussions and debates:</b> Students engage in classroom discussions and debates to assess their theoretical knowledge. Active participation is encouraged to hone their critical thinking skills by posing open-ended questions and facilitating dialogue.</li> <li>• <b>Peer and self-assessment:</b> Students are assigned to review and provide feedback on each other's work, encouraging them to critically evaluate their peers' understanding and provide constructive suggestions.</li> </ul> <p><b>Laboratory</b> evaluation consists of assessment of the expected skills and competences, critical thinking, problem-solving and teamwork skills. During the laboratory sessions, students are closely observed as they engage in the assigned tasks and note is taken regarding the actions, approach and any relevant observations that demonstrate their understanding of the subject matter and application of skills. After assessing the laboratory work, constructive feedback is provided to students. Their strengths and areas for improvement are highlighted, linking them back to the learning outcomes to help students understand their progress and guide them towards further development. Depending on the nature of the laboratory work, peer assessment can be incorporated, where students evaluate each other's work based on the established criteria to promote self-reflection, collaboration, and a deeper understanding of the subject matter.</p> <p><b>Final Exam (50%):</b> comprehensive final exam, to assess students' overall theoretical knowledge. These assessment covers a broader range of topics and learning outcomes from the entire program of study, to gauge the students' understanding and integration of knowledge across different areas.</p>
<b>Language</b>	Greek / English