Course Title	**Electrotherapy – Physical Modalities II**				
Course Code	PHYS301				
Course Type	Compulsory				
Level	Bachelor (Level 1)				
Year / Semester	3^{d}/ Fall				
Instructor's Name	Dr Emmanuel Papadopoulos				
ECTS	6	**Lectures / week**	2	**Laboratories/week**	2
Course Purpose	This course, following the first part, aims to teach the theory and practice of Physical and Electrophysical modalities in Clinical Physiotherapy. The aim of the course is for students to understand the principles of Biophysics of Electrophysical modalities, as well as the neurophysiological response of the body to their application. In addition, the aim of the course is to familiarize students with the design and implementation of treatment regimens in various diseases, injuries and syndromes, by selecting the appropriate treatment protocols, with the appropriate order of application.				
Learning Outcomes	Upon successful completion of the course, students will: • know the indications of application, contraindications, biological effects and therapeutic effects of all Electrophysical modalities used to this day. • have the clinical competence to evaluate their patient in detail, as well as to select and apply the appropriate treatment regimens **and protocols for the application of Electrophysical modalities based on clinical reasoning and classification of functioning disorders (ICF**) • be able to control the therapeutic outcome of the patients and adjust the electrophysical interventions accordingly in combination with other physiotherapeutic techniques. • be able to inform the patient in a simple and understandable way about the purpose of the implementation of each intervention, the benefits, as well as the expected therapeutic effect Upon completion of the laboratory part of the course, the student is expected to be able to: • choose the appropriate physical and electrophysical modalities, depending on the clinical case • apply the appropriate physical and electrophysical modalities depending on the clinical case • combine different types of electrophysical modalities, electrical stimulation and other techniques depending on the initial evaluation and reassessment				

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- reassess and adjust the therapeutic application of electro-physical physical modalities, depending on the variation of symptoms and the stage of recovery.

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<tr><td>Prerequisites</td><td>None</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Course Content</td><td colspan="3">

Theory

- Basic Principles of Biophysics & Physiology
- Alteration of the Thermal Environment & Effects on Biological Tissues: The physical effects of heat, heat propagation, thermal homeostasis, physiological effects of thermal changes.
- Heat therapy, superficial and in-depth application techniques
- Therapeutic ultrasound, electromagnetic fields, lasers, etc.) physiological effects-effects, therapeutic applications and selection criteria.
- Inductive heat therapy. Results of inductive thermotherapy. hot packs, paraffin baths, hydrotherapy, whirlpool, thermal baths, radiant heat, bright / non-luminous infrared generator, sensory rating, warm / cold.
- Cryotherapy: physiological effects, indications, contraindications, therapeutic effects. Ways, means and devices of application, contraindications, therapeutic effects.
- Therapeutic Ultrasound: Biophysics, physiological effects, indications and contraindications, application parameters, physiological effects, phobophoresis
- Shock Wave Therapy, Macrowave diathermy Ultrasound. Imaging ultrasounds, physiological effects, indications and contraindications, application parameters.
- Low Level Laser Therapy: Physics of Lasers. Technical characteristics. Indications and Contraindications. Parameter Analysis. Biological – therapeutic effects.
- Pulsed & Continuous Short Wave Therapy/ Microwave Diathermy: Physics of Short Waves. Technical characteristics. physiological effects, indications and contraindications, parameters of application.
- Capacitive & Antistatic Diathermy-TECAR, Indications and Contraindications. Parameter Analysis. Biological – therapeutic effects.
- Electromagnetic Fields: Physics of Electromagnetic Fields, physiological effects, indications and contraindications, application parameters.
- Research Evidence guidelines

Laboratory

- **Assessment and clinical reasoning techniques for the implementation of electrotherapy modalities, based on the severity and classification of disability and dysfunction**
- Familiarization of students with devices and electrophysical means presentation, maintenance and calibration
- Laboratory training for sensory evaluation, preparation and application of inductive thermotherapy, hot compresses.
- Laboratory training in the application of inductive thermotherapy, paraffin bath, infrared radiation.

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	• Laboratory training in the application of Capacitive & Antistatic Diathermy-TECAR Laboratory training in the application of Hydrotherapy – Whirlpools • Laboratory training in the application of Cryotherapy. • Laboratory training in the selection, regulation and application of Therapeutic Ultrasounds • Laboratory training in the selection, regulation and application of therapeutic Lasers. • Laboratory training in the selection, regulation and application of Electromagnetic Fields. • Laboratory training in the selection, adjustment and combined application of electrophysical modalities
Teaching Methodology	**Theory** 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. **Laboratory** 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.
Bibliography	**Textbooks:** Mackler L, Robinson A. Clinical Electrophysiology: Electrotherapy and Electrophysiologic Testing. Third Edition. Baltimore, MD: Wolters Kluwer – Lippincott Williams & Wilkins, 2008. Nelson RM, Currier DP, Hayes KW. Clinical Electrotherapy. Third Edition. USA: Apleton & Lange, 1999. Robertson V, Ward A, Low J, et al. Electrotherapy Explained. Principles and Practice. 4th Edition. Edinburgh: Butterworth Heinemann, 2006. Robertson V, Ward A, Low J, et al. Ηλεκτροθεραπεία - Βασικές Αρχές και Πρακτική Εφαρμογή. 4ήΈκδοση. Αθήνα: Εκδόσεις Παρισιάνου Α.Ε., 2011. Prentice WE. (2018) Therapeutic Modalities in Rehabilitation, McGraws-Hill Books. Bellew JW., Michlovitz SL. (2016) Michlovitz's Modalities for Therapeutic Intervention (Contemporary Perspectives in Rehabilitation) Sixth Edition, ISBN-13: 978-0-8036-4563-9

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Papadopoulos ES, Mani R. The Role of Ultrasound Therapy in the Management of Musculoskeletal Soft Tissue Pain. The International Journal of Lower Extremity Wounds. 2020;19(4):350-358. doi:10.1177/1534734620948343

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E. Karatzanos, V. Gerovasili, D. Zervakis, E. Papadopoulos**,** S. Nanas et al (2012) Electrical Muscle Stimulation: An Effective Form of Exercise and Early Mobilization

	to Preserve Muscle Strength in Critically Ill Patients, Critical Care Research and Practice, Volume 2012, Article ID 432752, 8 pages, doi:10.1155/2012/432752 Papadopoulos E**.,** Patsaki I., Christakou A., Nanas S. (2013). Therapeutic applications of neuromuscular electrical stimulation in intensive care. Hospital Chronicles: Volume 8, No 3. p. 112-119. Castana, O., Dimitrouli, A., Argyrakos, T., Theodorakopoulou, E., Stampolidis, N., Papadopoulos, E., ... & Poulas, K. (2013). Wireless electrical stimulation: an innovative powerful tool for the treatment of a complicated chronic ulcer. The international journal of lower extremity wounds, 12(1), 18-21. Papadopoulos, E. S., et al. "Low-level laser therapy does not aid the management of tennis elbow." Clinical rehabilitation 10.1 (1996): 9-11.
Assessment	**Continuous Assessment (50%):** The assessment may include any combination of the following: • **Written and/or oral**, 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. • **Assignments and projects** 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. • Use of **case studies or problem-solving exercises** 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. • **Online quizzes or interactive assessments**: 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. • **Classroom discussions and debates**: 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. • **Peer and self-assessment**: 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.

	Laboratory 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. **Final Exam (50%):** 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.
Language	Greek / English