<table>
<tr><td>Course Title</td><td colspan="5">Practical training</td></tr>
<tr><td>Course Code</td><td colspan="5">DLSEM541</td></tr>
<tr><td>Course type</td><td colspan="5">Compulsory</td></tr>
<tr><td>Level</td><td colspan="5">Master</td></tr>
<tr><td>Year / Semester of study</td><td colspan="5">2nd / 4th</td></tr>
<tr><td>Teacher's Name</td><td colspan="5">Dr. Anthi Xenofontos, Dr. Elena Papacosta, Prof. Dimitris Patikas</td></tr>
<tr><td>ECTS</td><td>5</td><td>Duration weeks</td><td>2</td><td>Contact hours</td><td>46</td></tr>
<tr><td>Course Purpose</td><td colspan="5">This course is designed to immerse students in practical laboratory settings, where they will perform, observe, and analyze various tests and measurements related to exercise physiology and biomechanics. By the end of the practical traning, students will gain a deeper understanding of how to apply scientific principles to real-world scenarios, thereby enhancing their practical skills in the core areas of sports and exercise medicine.</td></tr>
<tr><td>Learning Outcomes and Skills</td><td colspan="5">Upon successful completion of the course, students will be able to:
Effectively employ laboratory safety measures and protocols.
Perform physiological tests using appropriate methodologies and equipment.
Perform biomechanical tests using appropriate methodologies and equipment.
Apply statistical tools to analyze data collected from physiological and biomechanical assessments.
Critically analyze and interpret data from physiological and biomechanical tests to draw meaningful conclusions.
Collaborate effectively within multidisciplinary teams to create and present cohesive research findings and practical recommendations.</td></tr>
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Course Content	Introduction and Orientation ○ Overview of the week's schedule and objectives ○ Laboratory safety and protocols Exercise Physiology ○ Body composition (bmi, skinfold measurements, bioimpedance analysis) ○ Physiological measurements (blood pressure, heart rate, blood lipids profile, blood glucose, blood cell count, ECG) ○ Aerobic capacity (Vo2 max and aerobic power) ○ Critical speed (maximal lactate steady state) ○ Anaerobic capacity (wingate test vs repeated sprints ability test) ○ Exercise stress testing (Naughton protocol, bruce protocols, cycle ergometer protocols) ○ Functional capapcity in clinical populations (6-Minute Walk Test, Timed Up and Go Test, Sit-to-Stand Test, Short Physical Performance Battery, Berg Balance Scale, Functional Reach Test, Step Test) Biomechanics ○ Kinematic analysis techniques (Kinematic analysis techniques, Joint angle and torque analysis, Motion capture technology) ○ Force and Torque Measurement Techniques (Ground reaction force measurement, Dynamometry, Joint angle and torque analysis) ○ Muscle Activity and Stimulation Techniques (Electromyography, Dynamometry, Electromyography, Transcranial magnetic stimulation and torque output, Peripheral electrical stimulation and torque output) ○ Performance Testing (Vertical Jump test, maximal velocity, acceleration, maximal power) Data Analysis and Interpretation ○ Statistical tools and methods ○ Interpretation of physiological data ○ Interpretation of biomechanical data Interprofessional Collaboration ○ Working in multidisciplinary teams ○ Case studies and problem-based learning
Teaching Methodology	The practical training will employ a variety of teaching methods to enhance learning. Hands-on laboratory sessions will provide practical experience where students perform various tests and measurements. Interactive workshops will facilitate discussions on methodologies, data analysis, and result interpretation. Group activities will involve collaborative projects and problem-based learning to foster teamwork and the practical application of knowledge. Additionally, a flipped classroom approach will be used, where students review theoretical content beforehand and engage in active learning during sessions.

Bibliography	Textbook(s): • Haff, G. G., & Dumke, C. (2022). Laboratory Manual for Exercise Physiology. Human Kinetics. • Watkins, J. (2017). Laboratory and Field Exercises in Sport and Exercise Biomechanics. In Routledge eBooks. https://doi.org/10.4324/9781315306315 • Garner, J. C., Allen, C., Chander, H., & Knight, A. C. (2022). Applied Biomechanics Lab Manual. Human Kinetics. References: • Bosquet L, Leger L, Legros P (2002) Methods to determine aerobic endurance. Sports Med. 32: 675-700 • Faude O, Kindermann W, Meyer T (2009) Lactate threshold concepts: how valid are they? Sports Med. 39: 469-490 • Jones AM, Vanhatalo A, Burnley M, Morton RH, Poole DC (2010) Critical power: implications for determination of VO2max and exercise tolerance.Med.Sci.Sports Exerc. 42: 1876-1890 • Keir DA, Fontana FY, Robertson TC, et al (2015) Exercise Intensity Thresholds: Identifying the Boundaries of Sustainable Performance. Med.Sci.Sports Exerc. • Svedahl K, MacIntosh BR (2003) Anaerobic threshold: the concept and methods of measurement. Can.J Appl.Physiol 28: 299-323 • Black MI, Durant J, Jones AM, Vanhatalo A (2014) Critical power derived from a 3-min all-out test predicts 16.1-km road time-trial performance. Eur J Sport Sci. 14: 217-223 • Constantini K, Sabapathy S, Cross TJ (2014) A single-session testing protocol to determine critical power and W'. Eur J Appl.Physiol 114: 1153-1161 • Murgatroyd SR, Wylde LA, Cannon DT, Ward SA, Rossiter HB (2014) A 'ramp- sprint' protocol to characterise indices of aerobic function and exercise intensity domains in a single laboratory test. Eur J Appl.Physiol 114: 1863-1874 • Pettitt RW, Jamnick N, Clark IE (2012) 3-min all-out exercise test for running.Int.J Sports Med. 33: 426-431 • Vanhatalo A, Doust JH, Burnley M (2007) Determination of critical power using a 3-min all-out cycling test. Med.Sci.Sports Exerc. 39: 548-555 • Beaver WL, Wasserman K, Whipp BJ (1986) A new method for detecting anaerobic threshold by gas exchange. J.Appl.Physiol 60: 2020-2027 • Broxterman RM, Ade CJ, Craig JC, Wilcox SL, Schlup SJ, Barstow TJ (2014) The relationship between critical speed and the respiratory compensation point:Coincidence or equivalence. Eur J Sport Sci. 1-9

	• Bosquet L, Leger L, Legros P (2002) Methods to determine aerobic endurance.Sports Med. 32: 675-700 • Faude O, Kindermann W, Meyer T (2009) Lactate threshold concepts: how valid are they? Sports Med. 39: 469-490 • Svedahl K, MacIntosh BR (2003) Anaerobic threshold: the concept and methods of measurement. Can.J Appl.Physiol 28: 299-323 • Aagaard P. et al (2002). Increased rate of force development and neural drive of human skeletal muscle following resistance training. Journal of Applied Ph ysiology. 93: 1318-1326 • McLellan, C.P. et al (2011). The role of rate of force development on vertical jump performance. Journal of Strength and Conditioning. 25:379-385 • Bar-Or, O. (1987). The Wingate Anaerobic Test: an update on methodology, reliability and validity. Sports Med . 4: 381-394. • Narici, M.V. et al (1989). Changes in force, cross-sectional area and neural activation during strength training and detraining of the human quadriceps. EJAP. 59:310-319 • Dotan, R. and Bar-Or, O. (1983). Load Optimization for the Wingate Anaerobic Test. EJAP. 51: 409-417 **Note: The course manual is being developed and will be ready before the program begins**
Assessment	• Practical Performance (40%): Assessment of students' ability to conduct physiological and biomechanical tests, following protocols and safety guidelines. • Reflective Journal (30%): A reflective journal documenting the learning experience, challenges faced, and skills developed during the week. • Data Analysis Report (30%): A written report analyzing and interpreting the data collected during laboratory sessions
Language	Greek/English