



School of Physical Education and Sports  
Science (Serres), Aristotle University of  
Thessaloniki (AUTH)

MSc “Kinesiology”

Postgraduate studies Program in  
“Kinesiology”

A5. Study Guide

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## 1. Introduction

Welcome to the Master's Program in Kinesiology of the Department of Physical Education and Sport Science in Serres, School of Physical Education and Sport Science (SEFAA), Aristotle University of Thessaloniki (AUTH). The Master's Program in Kinesiology was initially established in 2005 (Government Gazette Issue B' 1247/6-9-2005). In the academic year 2018-2019, the Master's Program in Kinesiology was re-established and operates with some modifications in accordance with the provisions of Law 4485/2017 (Government Gazette 114 Issue A'/4-8-2017) at the Department of Physical Education and Sport Science in Serres, SEFAA, AUTH (Government Gazette 2101, Issue B'/8-6-2018). The program leads to the award of a Master's Degree in Kinesiology and is the only one of its kind in Greece in this specific field of study.

The staff of the Master's Program in Kinesiology wishes you a successful academic journey.

## 2. Quality Policy of the MSc Program in Kinesiology

The quality policy of the Postgraduate Programs (MSc) of the Department of Physical Education and Sport Science (TEFAA) - Serres is defined with a focus on continuous improvement of the quality of studies, the continuous enhancement of the educational and research work of the Department, and the highest possible scientific training of graduates. The MSc programs of TEFAA-Serres are committed to the principles of scientific ethics and accountability, aiming to equip their graduates with the necessary qualifications and skills for a successful academic or professional career. The quality policy developed and implemented by the MSc programs of TEFAA-Serres is fully aligned with the strategic plan and quality policy of the institution (<https://qa.auth.gr/el/node/7234>) and aims to:

1. Continuous improvement of quality in education and research.
2. Continuous improvement of the quality of processes and services.
3. Continuous improvement of working conditions.
4. Transparency at all levels.
5. Promotion of the department's work in society, the state, and the international scientific community.

Quality policy is implemented by committing to compliance with the legal and regulatory framework of the institution and establishing, reviewing, redesigning, and redefining quality assurance processes, fully aligned with the department's strategic planning. In collaboration with the Department of Physical Education and Sport Science (Serres), the staff of the MSc programs of TEFAA-Serres, through their decision (141/16.03.2023), are committed to implementing quality processes that demonstrate:

- Learning outcomes and desired qualifications in accordance with the National and European Qualifications Framework for Higher Education.
- Suitability of the structure and organization of the study program.
- Quality and effectiveness of teaching work, primarily evidenced by student evaluation.
- Suitability of the qualifications of teaching staff.
- Quality of the research work of the academic unit.

- The connection between teaching and research.
- Demand in the job market for acquired skills.
- Quality of supporting services, such as administrative services, libraries, and student welfare services.

#### *Action Planning and Specific Objectives*

The strategic quality objectives of the MSc programs of TEFAA-Serres include (i) high-quality education, (ii) improvement of educational performance, (iii) development of high-level research, and (iv) improvement of the department's infrastructure, functions, and services. To achieve each strategic objective, specific quality objectives are defined, aiming at:

- Modernization of the postgraduate study program.
- Improvement of the educational process.
- Alumni satisfaction and assistance in professional careers.
- Adequacy of teaching staff.
- Improvement of student performance.
- Reduction of the duration of studies.
- Increase in published high-quality research work.
- Participation in national and European programs.
- Integration of research with the education of undergraduate students.
- Improvement of the learning environment and daily operations.

The Department is committed to implementing a variety of actions and initiatives to achieve these quality objectives, which may vary for each MSc program and are detailed in the Quality Objectives of each respective program (see Program Quality Objectives). The evaluation of the quality assurance system of the MSc programs is carried out through the collaboration of the Program Coordinators, the Internal Quality Assurance Unit, and the Internal Quality Assurance Unit of AUTH, and the results of the internal audit are communicated to all members of the Department through the Assembly.

### 3. Purpose of the MSc Program in Kinesiology

The MSc program in Kinesiology aims at the scientific enhancement of the approach to issues related to the science of human movement, such as improving and maintaining human health and fitness, maximizing performance, and rehabilitating musculoskeletal and chronic conditions through exercise. Graduates are equipped with qualifications and skills that make them adaptable to a constantly evolving technological and cultural reality. The overall purpose of the program is:

(i) To provide scientifically trained and specialized personnel with better job prospects in the field of exercise/movement sciences, such as gyms, physical rehabilitation structures, motion analysis centers, and ergometric centers.

(ii) To serve as a pre-stage for the creation of new scientists in the specific cognitive subject. Graduates of the MSc in Kinesiology can acquire skills related to:

1. The implementation of exercise programs for all age groups, individuals with disabilities, elderly individuals, and individuals with chronic diseases.
2. The design of physical fitness programs for athletes with or without disabilities.
3. Conducting laboratory measurements and assessments of physical fitness.
4. Interdisciplinary collaboration with health sciences at the research level.
5. Providing advice in the broader field of exercise for health.

The program also aims to enable graduates, with the skills they have acquired, to use their knowledge to solve complex problems in Kinesiology in a broader (interdisciplinary) but relevant to Kinesiology field. The MSc in Kinesiology seeks to give graduates the skills/abilities to combine their acquired knowledge to create new information, handle and solve complex issues, and formulate judgments and advice on Kinesiology-related matters.

## 4. Entry Requirements

The MSc program is addressed to:

- (i) Graduates of all Departments of Physical Education and Sport Science (TEFAA) in Greece.
- (ii) Graduates of Physical Education Departments from foreign countries, whose degrees are recognized as equivalent to Greek degrees by the Hellenic National Academic Recognition and Information Center (DOATAP).
- (iii) Graduates of other University Departments and Technological Educational Institutes (TEI) in Greece or abroad, with a recognized degree equivalent to Greek degrees.

The Department of Physical Education and Sport Science in Serres announces annually, on dates determined by the Department Assembly, 20 open positions through a competitive process (<https://kinesiology.phed-sr.auth.gr/>) for the admission of graduates to the MSc program in Kinesiology. Selection is based on the Internal Operating Regulation (Government Gazette 114, Issue A', 4-8-2017) using a point system, where each candidate's points are determined by the selection criteria specified in the expression of interest invitation.

## 5. Tuition Fees - Rights and Obligations of Students

The MSc program in Kinesiology does not involve tuition fees or provide scholarships. Postgraduate students receive institutional email accounts and student cards upon registration, providing them access to all facilities of the Aristotle University (spaces, libraries, gym, catering), as well as discounts on public transportation (buses, trains, and maritime transport). Postgraduate students of the MSc in Kinesiology have all the rights, benefits, and facilities provided for undergraduate students, excluding the right to free textbooks. Additionally, the Department ensures facilities for postgraduate students with disabilities or special educational needs.

The regulations of the MSc in Kinesiology, such as the internal operating regulation, study regulation, academic advisor regulation, complaints/disputes management regulation, and the regulation of internships/mobility within the framework of ERASMUS, are posted on the program's

website (<https://kinesiology.phed-sr.auth.gr/>). Information regarding the quality policy and objectives of the MSc programs at the Aristotle University of Thessaloniki (AUTH) is also available on the program's website. It is the obligation of the students to study the content of these regulations to be aware of their rights and obligations in the MSc in Kinesiology, as they contain important information not covered in this handbook.

## 6. Academic Calendar

The academic year runs from September 1st to August 31st. The academic calendar of the MSc in Kinesiology is maintained by the relevant Secretariat and is posted on the program's website (<https://kinesiology.phed-sr.auth.gr/>). The academic calendar includes information on student registration dates, the first day of classes, lectures and exams, holidays, makeup classes, as well as dates related to the presentation and defense of the master's thesis.

## 7. Teaching Staff of the MSc in Kinesiology

The core of the teaching staff of the MSc in Kinesiology at the Department of Physical Education and Sport Science in Serres, AUTH, consists of faculty members (teaching and research staff) of the Department, who are also responsible for the subjects taught in the MSc program. In addition to them, other faculty members and teaching staff of the Department, as well as faculty members from other AUTH departments and institutions, contribute to the teaching of MSc courses. All instructors in the MSc in Kinesiology possess teaching and research experience in the respective subject matter.

## 8. Teaching Facilities - Research Laboratories

Educational and research activities for MSc students take place in the central, privately-owned building of the Department, located in Agios Ioannis, Serres. The central building houses classrooms, the library, offices of the Department's Administration and the MSc program's teaching staff, the Student Association, and established Research Laboratories. Specifically, the central building includes:

- A classroom serving the needs of MSc courses and presentations of proposals and support for master's theses.
- A large "central" auditorium with a capacity of 176 people and two smaller auditoriums, each with a capacity of 51 people, used alternately for courses and presentations of proposals and support for master's theses.
- A computer room with 20 workstations, accessible to all MSc students.
- A library equipped with Greek and international scientific books and journals, also functioning as a reading room.
- Five established research and teaching laboratories, where specific MSc lectures are held, master's theses are developed, and cutting-edge research is conducted in the fields of Physiology, Sports Medicine, Hygiene and Biochemistry, Adapted Physical Education, Social Research in Physical Activity, Neuromechanics of Exercise and Sports, and Athletic Entrepreneurship and Innovation.

## 9. Duration of Study

The minimum duration of study leading to the award of the Master's Degree (MSc) is set at three (3) academic semesters, including the time for the preparation and evaluation of the master's thesis. The maximum allowed completion time for the program is six (6) semesters, with the possibility of suspension of studies or part-time enrollment. Part-time enrollment is available for working students, with a duration not exceeding twice the normal full-time enrollment. Part-time enrollment is also possible for non-working students who are unable to meet the minimum requirements of the "full" enrollment program and for special, exceptionally serious cases determined by the Department's Assembly. More information on part-time enrollment is provided in the study regulations (LINK) and by the MSc Secretariat.

## 10. Program Structure

The course program is structured over three (3) academic semesters of full-time enrollment, common to all MSc students. During the first and second semesters, 10 courses are taught, while the third semester is dedicated to the completion of the Master's Thesis. The language of instruction is Greek, and attendance for all courses is mandatory, as well as the completion of the master's thesis. Only two absences are justified, regardless of the reason. Courses are semester-based, with each semester comprising 13 teaching weeks. Ten out of the 13 lectures are conducted in person, and the remaining three are conducted remotely. The lectures correspond to 3 teaching hours with a workload equivalent to 5 to 8 ECTS, while the master's thesis is equivalent to 30 ECTS. Thus, the total program has a workload equivalent to 90 ECTS, with 30 ECTS per semester. The courses of the MSc in Kinesiology, along with corresponding hours and credit units (ECTS) for full-time students, are presented in the table below:

<b>1<sup>st</sup> Semester</b>	<b>HOURS</b>	<b>ECTS</b>
1. Neuro-muscular Adaptations and Training Control	3	8
2. Psychology of Sports and Exercise	3	7
3. Practical Applications of Exercise Physiology – Exercise Testing	3	8
4. Statistics	3	7
<b>2nd Semester</b>		
5. Research Methods	3	5
6. Experimental Design and Analysis in Kinesiology	3	5
7. Functional Anatomy	3	5
8. Topics in Kinesiology in Adapted Physical Activity	3	5
9. Evaluation of Human Performance and Training Guidance	3	5
10. Practical Applications of Sports Industry	3	5
<b>3rd Semester</b>		
Master's Thesis		30
<b>Total</b>	<b>30</b>	<b>90</b>



The European Credit Transfer and Accumulation System (ECTS) is a systematic way of describing an educational program by allocating credit units to its components. It was established in 1989 and was initially created for the transfer of credits within the Erasmus program. The fundamental principle of ECTS is to specify, in addition to the workload, the level, content, and learning outcomes of an educational element in relation to the study program. One Credit Unit corresponds to 25 to 30 hours of work. Students receive Credit Units only after successfully completing the required work and the appropriate assessment of the learning outcomes, representing the set of skills they possess, understand, or can perform after completing a learning process, whether short or long. The student's workload consists of the actual time required to complete all the scheduled educational activities required for each educational element of a study program to be implemented, in relation to the total work for the successful completion of a full year of study.

## 11. Program of Study and Courses Outlines

### 11.1 First Semester

#### *11.1.1 Neural adaptations and exercise control*

The purpose of this course is (i) to deepen and understand the fundamental principles of Neuromechanics and Training, (ii) to explore and study concepts and phenomena related to the structure and function of the nervous and muscular systems after exercise intervention, (iii) to familiarize students with the design and implementation of exercise prescriptions with specific goals and the use of Neuromechanics and Training principles, (iv) to understand the specificities of different age groups in designing training programs for optimal neural adaptations, and (v) to educate students in methods of assessing motor performance and exercise guidance.

#### **Learning Outcomes**

Upon successful completion of the course, the student will be able to:

1. Understand the structure and function of the nervous and muscular systems.
2. Identify central and peripheral adaptations after exercise intervention (e.g., training unit, long-term training, etc.).
3. Understand the specificities of different age groups (childhood, elderly).
4. Use methods to assess the function of the neuro-muscular system.
5. Design appropriate protocols and apply these methods, e.g., record, process, and present electromyographic data.
6. Present methods and research findings in a 2-minute poster teaser format.

#### **Course Content**

- Basic principles of muscle mechanics: Reminder of basic knowledge of neuroanatomy and muscle mechanics. Contents include the structure of motor units, classification based on their characteristics, recruitment of motor units, and the Henneman principle. Types of muscle function. Myosin dynamics and non-dynamic relationship of the muscle.

- Neuro-mechanical basis of kinesiology: Analysis of the role of motor neurons and sensory receptors. Contents include alpha-motor neurons, the muscle spindle, Golgi tendon organs, and sensory-articular receptors. Who "reads" length and who produces muscle tension.
- Mechanism of muscle function: Detailed analysis and description of the chemical processes of Excitation and the mechanical result of Contraction. Contents include the role of calcium, sliding of myofilaments, excitability of the cell membrane, and its dependence. Neuromuscular junction.
- Muscle activation – Electromyography: Analytical description of muscle activation and factors affecting it. Contents include recording electrical signals with surface and intramuscular electrodes, signal analysis and processing, and the relationship of EMG to produced tension.
- Muscle modeling and elastic energy: Familiarization and first contact with muscle models. Contents include the 3-component model, Contractile component, Series elastic component, Parallel elastic component. Storage and reuse of elastic energy.
- Muscle stiffness, alignments, and stable force application: Measurement of stiffness, effects of alignments, and stability training. Contents include increased stiffness of the myotendinous complex after plyometric training, consequences of passive alignments, isometric stability, dynamic accuracy, and accuracy of athletic movement.
- Muscle fiber architecture: Analysis of mechanical performance in relation to the angle of muscle fiber pennation. Contents include the pennation angle of fast and slow muscle fibers, ultrasound and the localization of muscle fiber pennation. The effects of training on the pennation angle.
- Co-activation of agonists and the mechanism of muscle tension regulation: Understanding the function of agonistic and antagonistic motor neurons during maximum and submaximum muscle function. Contents include the role of Golgi tendon organs and the muscle spindle in controlling muscle integrity and joint protection.
- Spinal reflexes: Learning the central pathways of reflexes and their effects on muscle activation. Contents include H-reflex and M-wave, reflex excitability in trained and untrained individuals, feedback from proprioceptors.
- Fatigue: Analysis of central and peripheral fatigue phenomena and assessment of indicators. Contents include changes in EMG during fatigue, neuromuscular transmitters, the concept of overtraining.
- Static and dynamic balance: Analysis of upright posture and walking. Parameters influencing balance. Contents include upright posture, balance strategies, rate of force development, the role of proprioception.
- Aging and neuromuscular adaptations: Recording the effects of training in elderly individuals. Contents include strength training and neuromuscular adaptations, stability, and tremor. Elimination of motor units and its effects on movement stability.
- Neuromuscular electrical stimulation: Involuntary muscle function and contraction with electrical stimulation. Contents include the reversal of the recruitment principle of motor units, isometric strength training with neuromuscular electrical stimulation.

### ***Course Assessment***

A. Written final exam including (60%):

1. Multiple-choice test

2. Short-answer questions

3. Essay questions

B. Completion and presentation of group work: 25%

C. Individual quizzes: 15%

### ***11.1.2 Sports Psychology and Exercise Psychology***

The purpose of the course is to deepen the understanding of psychological factors influencing the behaviors and athletic performance of athletes and exercisers, and to understand the application of strategies for managing the psychology of athletes for supporting their athletic performance and exercisers for tactical and long-term participation in exercise.

#### ***Learning Outcomes***

Upon successful completion of the course, students will be able to: (a) Explain the complexity of the psychology of athletes in sports and exercisers in exercise, (b) Formulate basic psychological theories and practices of sports psychology in the field of sports and exercise, (c) Interpret psychological factors that aim to enhance the motivation of athletes for athletic performance, (d) Describe psychological factors aimed at supporting athletic performance and motivation for exercise, and (e) Develop strategies for managing the psychology of athletes to improve their athletic performance and exercisers for tactical and long-term participation in exercise.

#### ***Course Content***

- Introduction to Exercise and Sport Psychology
- The Psychology of Exercise Participation
- Self-determination theory and exercise
- Motivation for achievement and participation in sports
- Anxiety, positive psychology, and athletic performance
- Concentration and attention in sports
- Overtraining, psychological burnout, and weight management in sports
- Psychology of recovery from sports injuries
- Communication, psychological dynamics of sports teams, and sports leadership
- Applied psychology for maximizing athletic performance.

#### ***Course Assessment***

Written exams (70%) Presentation of research work (30%)

Methods of Student Evaluation:

- Written Exam with Short Answer Questions (Conclusive)
- Written Exam with Extended Answer Questions (Conclusive)
- Public Presentation (Conclusive)

### ***11.1.3 Practical Applications of Exercise Physiology – Exercise Testing***

The purpose of the course is to provide postgraduate students with specialized knowledge regarding the latest research findings in Exercise Physiology and Exercise Testing. Topics include (i) a deeper understanding of the collaboration of energy systems during exercise, (ii) adaptations of the cardiorespiratory and neuromuscular systems and the oxygen transport and consumption system with exercise, and (iii) the study of the positive effects of exercise and nutrition on health indicators and athletic/physical performance in healthy individuals and those with chronic diseases. The course aims to create conditions for scientific thinking and research in Exercise Physiology and Exercise Testing in line with modern trends and international literature.

#### ***Learning Outcomes***

Upon successful completion of the course, students will be able to:

- Understand the biological adaptations caused by exercise to maximize human performance
- Recognize the contribution of measurement and evaluation to achieving specific educational goals and objectives in physical education
- Apply the basic principles of exercise physiology and exercise testing in sports and physical education
- Describe the mechanism of oxygen transport and consumption with training
- Highlight the scientific application of exercise for health improvement and physical performance
- Design exercise programs for the general and specific population and training programs for athletes based on the principles of exercise physiology.

#### ***Course Content***

- Energy sources - Energy phases of muscle work
- Oxygen transport and consumption system
- Exercise-induced effects and adaptations of respiratory muscles
- Exercise-induced hypoxemia. Hemoglobin saturation curve
- Muscle contraction - electromechanical coupling
- Cardiovascular system and exercise (theory)
- Cardiovascular system and exercise – fatigue test (practice)
- Ergogenic aids
- Free radicals – Antioxidants
- Exercise in patients with chronic diseases I
- Exercise in Patients with Chronic Diseases II
- Student Presentations
- Student Presentations

### **Course Assessment**

Written final exams (70%) Written assignment (15%) Presentation of assignment (15%)

#### *Methods of Student Evaluation:*

- Written Exam with Multiple-Choice Questions (Formative, Summative)
- Written Exam with Short Answer Questions (Formative, Summative)
- Written Assignment (Formative, Summative)
- Public Presentation (Formative, Summative)

### **11.1.4 Statistics**

The purpose of the course is to understand and apply the fundamental principles of descriptive and inductive statistics. Topics to be discussed include (i) organization and presentation of data, (ii) types of data/variables, (iii) types of distributions and normality testing, (iv) hypothesis testing, (v) inductive parametric (t-tests, one-way and two-way ANOVA, post-hoc tests) and non-parametric statistical tests, (vi) correlation and linear regression, and (vii) principles of qualitative analysis. Students will gain experience using statistical software and technology for data analysis and drawing statistical conclusions.

#### **Learning Outcomes**

Within the course, students are expected to:

- Organize and summarize data numerically and through graphical representations (data/variable categories, measurement scales, histograms, tables, measures of central tendency and dispersion, frequency distribution description, distribution types).
- Demonstrate the ability to examine the relationship between quantitative data (direction and strength of correlation, differences of relationship and causation, linear regression).
- Understand the connection between probability and inductive statistics (research and null hypotheses, testing and interpreting the null hypothesis).
- Recognize when to use parametric and non-parametric statistical tests, and which statistical test to use for quantitative and qualitative data to examine the relationship between two and more variables (creation of simple and multiple regression equations, comparison of two samples, comparison of three and more samples with one and two factors, post-hoc comparisons).
- Practice statistical analyses using software and interpret the results (descriptive statistics, correlation, regression, comparison of two or more samples with parametric and non-parametric tests).
- Understand fundamental principles and practice the analysis and interpretation of qualitative data.
- Apply the knowledge acquired in the tasks they undertake (e.g., master's/doctoral thesis).

### **Course Content**

- Introduction to Statistics, Introduction to the research process
- Basic statistical concepts
- Central tendency and dispersion statistical indices, Normal distribution, Introduction to SPSS
- Hypothesis testing, Types of errors, Statistical power, Significance level, Critical value, Standard normal distribution, SPSS basic functions
- Parametric tests / Comparison of 2 groups: Independent samples
- Parametric tests / Comparison of 2 groups: Dependent samples
- Parametric tests / Comparison of >2 groups: One-Way Analysis of Variance (ANOVA)
- Analysis of Variance for Dependent Samples (One-WAY ANOVA)
- Two-Way Analysis of Variance (TWO-WAY ANOVA)
- Non-parametric tests / Comparison of 2 groups: Dependent and Independent samples
- Correlation
- Regression
- Social Research

### **Course Assessment**

Written exams at the end of the semester.

Methods of Student Evaluation:

- Written Exam with Multiple-Choice Questions (Summative)
- Written Exam with Short Answer Questions (Summative)

## **11.2. Second Semester**

### **11.2.1. Research Methods**

The purpose of the course is for students to understand the fundamental principles of research methodology, distinguish the stages of the research process, and learn how to design and implement a quantitative or qualitative research study. Additionally, the course aims for students to become familiar with experimental designs, critically evaluate a published article, write a scientific text, and recognize important ethical issues in research.

### **Learning Outcomes**

Upon successful completion of the course, students will be able to:

- Understand the fundamental principles of research methodology.
- Know how to design a research study.

- Write a scientific article.
- Critically review a scientific article.
- Recognize basic ethical issues in research.

### **Course Content**

- Introduction to research methods
- Stages of the research process
- Sampling techniques
- Validity and reliability
- Searching databases
- Types of studies
- Systematic review and meta-analysis
- Qualitative research
- Non-experimental studies
- Ethical issues in research
- Writing a scientific article/thesis
- Evaluation of a scientific article
- Interpretive issues in scientific research

### **Course Assessment**

Written exams.

Methods of Student Evaluation:

- Written Exam with Multiple-Choice Questions (Summative)
- Written Exam with Short Answer Questions (Summative)

### **11.2.2. Experimental Design and Analysis in Kinesiology**

The aim of this course is to comprehend the principles governing the methods of industrial analysis in the fields of kinematics, kinetics, electromyography, and ultrasound investigation of motion. Additionally, it focuses on identifying the fundamental variables that can arise from the aforementioned analyses. Furthermore, the course aims to organize an experiment, select the relevant methodology with appropriate industrial analysis, and choose the right measurement tools. It also aims to determine the independent and dependent variables necessary to answer specific research questions. Finally, within the course, there is a hands-on application of the experiment with the participation of students.

### **Learning Outcomes**

Within the course, students are expected to:

- (a) Understand the principles and process of Experimental Design and Analysis in Kinesiology,
- (b) Grasp the principles governing the methods of industrial analysis in kinematics, kinetics, electromyography, and ultrasound analysis and recognize the basic variables that can be extracted from each corresponding analysis,
- (c) Search international literature for research questions arising from the conduct of an experiment and the discussion of its results,
- (d) Organize an experiment, formulating their own research question, combining the relevant industrial analysis to solve it,
- (e) Define the methodology, choosing the right measurement tools to evaluate and collect the independent and dependent variables necessary to answer the research question,
- (f) Demonstrate the ability to define the purpose, research, and null hypotheses, and control and interpret the null hypothesis of the research question,
- (g) Recognize the statistical test to be used to examine the relationship between quantitative data,
- (h) Apply the knowledge gained in the course through their participation.

#### **Course Content**

- Lecture: Basic Principles of Kinesiology - Methods of Kinematic Analysis,
- Laboratory: Acquisition of 2D kinematic data
  - Walking
  - Rising from a chair
  - Static Jump
  - Depth Jump
  - Ball throwing
  - Kicking in soccer
- Computer Laboratory: Analysis of kinematic data with APAS and Maxtraq,
- Lecture: Principles of dynamic analysis / The force platform,
- Analysis of vertical jumps,
- Analysis of walking and rising from a chair,
- Analysis of multi-joint sports techniques,
- Analysis of isometric force,
- Shortening stretch cycle,



- Analysis of plantar pressures and balance,
- Electromyography / Biopac software demonstration,
- Muscle architecture,
- Laboratory for the analysis of electromyographic data and stretching of the patellar tendon with Biopac and MaxTraq.

### ***Course Evaluation***

The final written exams will assess problem-solving using specific scientific tools.

Student Evaluation Methods:

- Written Exam with Multiple-Choice Questions (Summative)
- Written Exam with Short Answer Questions (Summative)
- Written Exam with Problem Solving (Summative)

### ***11.2.3. Functional Anatomy***

The purpose of this course is to understand and consolidate knowledge of the descriptive anatomy of the musculoskeletal system. The course will analyze movements and the functionality of various joints of the human body, either as isolated movements (degrees of freedom) of each joint or as complex movements (modeling) by reducing them to various sports movements and activities.

### ***Learning Outcomes***

During the course, students are expected to:

- (a) Acquire fundamental principles and terminology of functional anatomy and understand the relationship between theoretical anatomical knowledge and practice,
- (b) Understand the importance of functional anatomy in exercise and maximizing athletic performance,
- (c) Become familiar with the conduct of specific laboratory tests and field tests of motor problems due to musculoskeletal disorders,
- (d) Be able to interpret and evaluate intervention methods aiming at designing specialized exercise programs to improve functionality,
- (e) Use measurement results in designing training programs.

### ***Course Content***

- Introduction to Functional Anatomy
- Musculoskeletal System: Levels and axes of movement. Terminology. Research methods in human movement
- Functional anatomy of the joints of the Spinal Column and Thorax
- Functional anatomy of the joints of the Shoulder Girdle and Elbow

- Functional anatomy of the joints of the Pelvis and Hip
- Functional Anatomy of the Knee and the Joints of the Ankle and Foot
- Kinesiological analysis of posture and gait – Foot arch
- Kinesiological analysis of complex Athletic Movements
- Physiology of the Neuromuscular Junction
- Presentation of research articles, submission of review papers.

### ***Course Evaluation***

Following relevant information to the students at the beginning of the course, a written test is conducted during the examination period, including thematic questions requiring sufficient development and commentary. This evaluation also includes the joint assessment of the written submission of a review paper throughout the course, the presentation of the review paper, and the overall active presence and participation of the student in the course.

#### *Student Evaluation Methods:*

- Written Exam with Extended Answer Questions (Summative)
- Written Assignment (Summative)

### ***Course Evaluation***

- The final written exams will assess problem-solving using specific scientific tools. Student Evaluation Methods:
- Written Exam with Multiple-Choice Questions (Summative)
- Written Exam with Short Answer Questions (Summative)
- Written Exam with Problem Solving (Summative)

#### ***11.2.4. Topics in Kinesiology in Adapted Physical Activity***

The aim of this course is to deepen the understanding and consolidation of the principles of the science of Adapted Physical Activity and how they contribute to the health and well-being of individuals with disabilities. Throughout the course, students will be taught and analyze the motor, cognitive, sensory, and emotional situations experienced by individuals with disabilities. They will also explore the adaptations required for their successful participation in physical activity and various sports. Students will learn to connect scientific principles with Adapted Physical Education and Kinesiology, such as Biomechanics, Neuro-mechanics, Nutrition, Coaching, to assist in the smooth rehabilitation and maximization of performance for individuals with disabilities. Furthermore, they will demonstrate the ability to categorize athletes and organize and implement personalized exercise programs.

### ***Learning Outcomes***

Upon successful completion of the course, students are expected to:

- (a) Understand the principles of Adapted Physical Education - Adapted Physical Activity,
- (b) Delve into the principles of Kinesiology and its relationship with changes in human movement affected by disability,
- (c) Understand the motor, cognitive, sensory, and emotional conditions that require adjustments in physical education and exercise programs,
- (d) Demonstrate the ability to design personalized Physical Education and exercise programs,
- (e) Apply modern training methods to high-level athletes with disabilities.

### ***Course Content***

- Introduction to Adapted Physical Education/Activity
- Motor development and assessment of individuals with normal development and individuals with disabilities in the educational process and in sports
- Motor disabilities - Cerebral Palsy (2 sessions)
- Nutritional support for athletes with spinal cord injury (2 sessions)
- Motor disabilities - Cerebral Palsy
- Functional assessment of cerebral palsy
- Motor disabilities - Amputation
- Biomechanical analysis of running with lower limb prosthetics (2 sessions)
- Presentations
- Presentations

### ***Course Evaluation***

- Participation in lectures (20%)
- Assignment (30%)
- Final exams (50%)

### ***Student Evaluation Methods:***

- Written Exam with Short Answer Questions (Summative)
- Written Exam with Extended Answer Questions (Summative)
- Written Assignment (Summative)
- Public Presentation (Summative)

### ***11.2.5. Performance Assessment and Training Guidance***

The purpose of this course is twofold: (i) to deepen the understanding of the theoretical principles and practices of coaching, with an emphasis on performance assessment and guidance, and (ii) to create conditions for scientific reflection and research, following contemporary trends and international literature. Based on these objectives, students will participate in laboratory and field measurements and will subsequently be required to use the information from assessments and measurements in practice and in the coaching process.

#### ***Learning Outcomes***

Upon successful completion of the course, students are expected to:

- (a) Understand the fundamental principles of coaching,
- (b) Comprehend the fundamental principles of assessing physical abilities,
- (c) Understand the fundamental principles of coaching guidance in the training process,
- (d) Understand the fundamental principles of applying the coaching process,
- (e) Acquire knowledge of the biological and physiological factors that influence physical abilities,
- (f) Familiarize themselves with laboratory and field tests for measuring and assessing endurance, aerobic capacity, speed, strength, flexibility,
- (g) Be able to transfer the results of measurement and assessment of physical abilities into the design, evaluation, and implementation of exercise programs.

#### ***Course Content***

- Introduction - Coaching Theory,
- Training Load - Principles of Training,
- Assessment and guidance of strength training,
- Assessment and guidance of endurance training,
- Assessment and guidance of speed training,
- Assessment and guidance of agility-flexibility training,
- Assessment and guidance of coordination abilities training,
- Assessment and guidance of technical training,
- Assessment and guidance of tactical training,
- Training design,
- Practical applications of training programs,
- Presentations

- Presentations

### **Course Evaluation**

Methods of Student Evaluation:

- Multiple-Choice Written Exam (Summative)
- Written Exam with Short Answer Questions (Summative)
- Written Exam with Extended Answer Questions (Summative)
- Written Assignment (Formative)
- Public Presentation (Formative)

### **11.2.6. Practical Applications of Sports Biomechanics**

The aim of this course is to provide students with both theoretical knowledge and practical skills to (i) design a biomechanical experiment, (ii) conduct biomechanical measurements, (iii) analyze biomechanical data, and (iv) present a comprehensive experiment both in written and oral form.

### **Learning Outcomes**

Upon successful completion of the course, students are expected to:

- (a) Design a biomechanical experiment,
- (b) Analyze the results of an experiment,
- (c) Interpret the results and correlate them with findings from other studies,
- (d) Write a scientific paper based on data collected during the semester,
- (e) Present an experimental work to a wider audience.

### **Course Content**

- Introduction. Group formation. Assignment of groups to various topics,
- Organization and conduct of research work,
- Review of laboratory methods (3 sessions),
- Isometry,
- Force platform,
- 2D and 3D cameras,
- Architectural Analysis of the Muscle-Tendon Unit - Contraction-Lengthening Cycle,
- Electromyography and electrical stimulation,
- Measurements - Group 1,
- Measurements - Group 2,

- Measurements - Group 3,
- Measurements - Group 4,
- Measurements - Group 5,
- Supplementary Measurements,
- Writing a research paper,
- Group support.

### **Course Evaluation**

- Laboratories and Practical Exercise: Students are divided into groups. Each group aims to conduct a small-scale experiment using at least 3 out of the 5 available laboratory instruments/techniques. They analyze the results and write the corresponding paper, which they submit and present at the end of the semester. Evaluation is based on the final (a) written assignment (70%) and (b) presentation of their group work at the end-of-semester special seminar (30%).

Methods of Student Evaluation:

- Written Assignment (Formative, Summative)
- Public Presentation (Formative, Summative)
- Laboratory Work (Formative, Summative)

### **11.3. Third Semester - Master's Thesis**

The completion of a master's thesis is mandatory, primarily during the third semester of study. Upon successful completion of at least 22 ECTS, the master's student can apply to undertake the Master's Thesis (November for the winter semester and April for the spring semester). The application includes the declaration of the thesis topic and the proposal of the supervisor for the appointment of the three-member advisory committee. The Supervisor is a faculty member of the Department. While the master's thesis is mainly written in Greek, the Department's Assembly may allow writing it in another language with justified decision. Detailed information regarding the extent, font, writing style, and other structural aspects is provided in the Department's Thesis Writing Guide.

The presentation of the Master's Thesis is supported before the Three-Member Examination Committee on a date and location determined by the Department's Assembly. The evaluation of the master's thesis is exclusively conducted by the three-member examination committee. The process of completing the Master's Thesis involves the following stages:

- Public Presentation of the Thesis Proposal: This includes the literature review and the experimental protocol (2nd fortnight of December or May).
- Submission of the Written Thesis Proposal: The thesis proposal must be submitted to the postgraduate secretariat one month after the public presentation. Failure to submit the proposal within this timeframe cancels the public presentation, and the process is repeated in the next semester (winter or spring). The proposal must be signed by the three-member committee.

- Thesis Defense: The defense takes place in the first fortnight of June or November or February. It can occur during the 6th month from the date of the thesis proposal presentation, only if the candidate submits the written thesis to all committee members at least fifteen days before the defense. At the end of the defense, the committee completes the Assessment Report, which remains with the supervisor and is handed over to the candidate upon completion of thesis corrections.
- Submission of Documents: The candidate must submit the Assessment Report to the postgraduate secretariat along with one printed copy and one electronic copy (PDF) of the thesis on a CD. A copy of the thesis in electronic form must also be submitted to the Information Services (PE8) of the Central Library of AUTH.

The exact dates of the thesis proposal presentation and defense are announced by the postgraduate secretariat. The invitation and required documents for the public presentation and defense must be submitted to the secretariat at least fifteen (15) days before the presentation. The award of the Master's Degree takes place after the approval of the Assessment Report by the Department's Assembly.

The necessary forms for the thesis proposal, final presentation, and the Thesis Writing Guide are available on the program or department's website.

## 12. Knowledge Assessment

In order to obtain the Master's Degree of Specialization, students must successfully pass examinations in all 10 courses (60 ECTS - 30 ECTS per semester) and complete their master's thesis (30 ECTS). The assessment of knowledge in the postgraduate courses involves written or oral exams, assignments, or a combination of these. The grading scale for evaluating the performance of master's students is defined on a scale from zero (0) to ten (10), as follows: Excellent (8.5 to 10), Very Good (6.5 to 8.5, exclusive), Good (6 to 6.5, exclusive). A passing grade is six (6) and higher. Each student can participate in the assessment processes of a course up to two times. In case of failure on the second attempt, they are required to retake the course. Failure of a course for the second time, due to a grade lower than six on a 10-point scale, and/or non-participation in exams for two consecutive scheduled sessions, and/or exceeding the allowed number of absences, results in removal from the program.

Examinations in courses are held in three examination periods (February, June, and September), each lasting one week. If a master's student fails an exam or exams and is considered by the relevant Regulation of Postgraduate Studies not to have successfully completed the program, they are examined, following their request, by a three-member committee of faculty members of the School. The committee members must have the same or related field of expertise as the examined course and are appointed by the Department's Assembly. The instructor responsible for the examination is excluded from this committee.

## 13. Graduation

Upon successfully completing all the requirements outlined in the study program (courses and completion of the master's thesis), the student must submit an application to the department's secretariat for the award of the Master's Degree. The grade for the Master's Degree is determined by the weighted average of the courses in the MSc program and the master's thesis (weighting is based on the credit units of the courses and the master's thesis). The grading scale is as follows: "Good" (from 5 to 6.49), "Very Good" (from 6.50 to 8.49), and "Excellent" (from 8.50 to 10).

## 14. Program Evaluation

The MSc in "Kinesiology" aligns with the evaluation processes of the Hellenic Quality Assurance and Accreditation Agency in Higher Education (HQAA) of AUTH. It encourages anonymous evaluation of the teaching staff for each course, as well as an overall evaluation of the program and the educational process by the students. Every semester, before the start of the examination period, students have the right to evaluate the courses and instructors, aiming to improve the quality of their studies. Additional information about the evaluation process is available on the website of the Quality Assurance Unit of the University (QA Unit - AUTH <http://qa.auth.gr/>) and on the MSc's website.

## 15. Student Mobility for Studies and Internship

The MSc in Kinesiology offers an optional mobility program for Studies (3-6 months) and Internship (2 months) under the Erasmus+ and ERASMUS+ International programs for students. The main objectives include promoting collaboration and mobility in the field of Kinesiology and gaining work and research experience. Details about European educational programs are provided in the General Study Guide of AUTH. Students interested in participating in the ERASMUS program should contact the department's coordinator for ERASMUS issues (Dr. Ioannis Amoiridis, Associate Professor, tel. 2310991058, e-mail: [jamoirid@phed-sr.auth.gr](mailto:jamoirid@phed-sr.auth.gr)).

## 16. Library – Digital Databases

The main sources of teaching and research information are libraries and digital databases. Reference is made to the central library of AUTH in the General Study Guide of AUTH. Additionally, students can access information about library services and resources through the central library's website (<https://www.lib.auth.gr>). The Library of the School of Physical Education and Sport Science in Serres includes books and periodicals classified according to the Library of Congress (LC) system. Most titles are in English and Greek, with some in German. It also provides access to information on sports content through Sport Discus, including journals, books, conferences, and symposia. Students can access electronic links for book and thesis searches through the Department's website (<https://tinyurl.com/yfvlm2gv>) and electronic resources of AUTH's central library using the IP address of their computer (VPN function) for book searches across all AUTH departments, foreign-language articles (unified search engine), and electronic journals, books, and videos. Finally, students of the MSc in "Kinesiology" are encouraged to use the services and spaces of the Central Library of AUTH for borrowing educational materials, using specialized equipment, etc., and for study in the library reading room. Members of the academic community in Greece have access to full texts of an extensive list of scientific journals ([www.heal-link.gr](http://www.heal-link.gr)). Students must log in with their institutional account details to access these journals. The search for scientific articles is usually done through international databases, with widely used search engines including [www.pubmed.com](http://www.pubmed.com), [www.scopus.com](http://www.scopus.com), and [www.webofscience.com](http://www.webofscience.com), relevant to the subject matter of the MSc program.

## 17. Digital Services

Students of the MSc are provided with individual email addresses ([user@phed-sr.auth.gr](mailto:user@phed-sr.auth.gr)) by the Center for Electronic Governance (KEP) of AUTH. These addresses facilitate official communication with the department and instructors, as well as access to various services, including the Electronic Secretariat of the University (<https://it.auth.gr/el/dashboard>), VPN connection, wireless connection - eduroam in all department and AUTH spaces, bibliographic sources of the Central Library (<https://www.lib.auth.gr/>) of AUTH, software installation license (Microsoft Office365 Education,



SPSS, etc.), course registration declaration submission (<https://sis.auth.gr/>), checking the content of courses and their grades, and electronic application submission for certificates/confirmations, etc.

## 18. Academic Identity and Travel Facilities

All students of Greek Higher Education Institutions are entitled to an Academic Identity and Special Ticket Card. The process of obtaining the Academic Identity is done through the website <http://academicid.minedu.gov.gr>. MSc students are entitled to reduced fares for their city travels using urban buses and, more generally, for travels within the city of Serres and within the country using various modes of public transportation.

## 19. Catering Facilities and Health Care

Students of the MSc in "Kinesiology" can electronically apply for free catering through the University's online platform, using their institutional account credentials. Those entitled to catering services are served at the restaurant located within the premises of the International Hellenic University (former TEI) of Serres. Uninsured postgraduate students are entitled, according to the Ministry of Education's circular, to full medical and hospital care in the National Health System (ESY), with coverage of related expenses by the National Organization for the Provision of Health Services (EOPYY).

## 20. Sports Facilities and Recreation Services

The Department provides a training room with weights and muscle strengthening equipment in the "Indoor Gymnastics Hall," where interested individuals can exercise outside their class hours. Additionally, specific training hours are available on certain afternoons in the main area of the Indoor Gymnastics Hall. Moreover, MSc students have access to sports facilities on the central campus of AUTH in Thessaloniki. During the summer break, MSc students are entitled to enter, stay, and receive meals at a reduced cost at the University Camp in Kalandra, Halkidiki.

## 21. AUTH Support Centers and Services

It is noted that MSc students in "Kinesiology" have all the rights, benefits, and facilities provided to undergraduate students at AUTH, except for the provision of free textbooks. In addition to the above, services at AUTH for MSc students include (i) services based on the central campus of AUTH, such as the Career Office and Counseling and Psychological Support, and (ii) committees of AUTH to support students facing specific problems, such as the Interdisciplinary Committee for the Study of Proposals against Narcotics, Social Welfare, Psychological Support, and the Student Observatory, Health Committee, and Accessibility Committee.

## 22. Official Websites

All information and announcements regarding the program can be found on the department's website (<http://phed-sr.auth.gr>) and the MSc website (<https://kinesiology.phed-sr.auth.gr/>). Students can electronically access important guides and forms related to:

- Announcement and admission criteria to the program
- Registration forms for the program

- Program structure
- Course and exam schedule
- Study guide
- Proposal and support forms for the master's thesis
- Master's thesis writing guide
- Graduation application
- Internal regulations of the MSc, study regulations
- Study regulations, academic advisor, and management of objections/complaints

## 23. Final Remarks

The information provided in the study guide reflects the current conditions at the time of writing. Changes to the program and procedures may occur with decisions from the central administration after the time of writing and may not be reflected in the current study guide. Therefore, students are advised to stay informed through the department's and program's websites for up-to-date procedures or to contact the secretariat.