The University of Texas at El Paso
College of Health Sciences
Doctor of Physical Therapy Program

PT 6316 EXERCISE PHYSIOLOGY/PRESCRIPTION Fall 2023

COURSE SYLLABUS

Credit Hours: **3**

Contact Hours: 75 hours - Lecture: 30 hours; Lab: 45 hours; Clinic: 0 hours

Schedule: Lecture (Monday)
Lab A (Tuesday), Lab B and C (Thursday)

Coordinator/Instructor:

Faculty: Fredy Solis, PT, MS, PhD
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Course Description: This course focuses on the fundamental physiology of exercise and an introduction to clinical exercise prescription. Physical therapists must understand the acute and adaptive physiological and metabolic responses to endurance and resistance exercise in normal and clinical populations. Proper understanding of cardiovascular, pulmonary, neuromuscular, musculoskeletal, endocrine, thermoregulatory, and renal system responses facilitate implementation of safe exercise testing and prescription.

Course Objectives:
Upon completion of this course, the student will be able to:

1. Identify the neuromuscular system's morphologically varied anatomy and integrative physiology to meet functional demands. (7A Anatomy; 7A Physiology; 7C Musculoskeletal; 7C Nervous) [Comprehension]
2. Analyze how the components, control and regulation of the physiologic systems work to maintain homeostasis. (7A Anatomy, 7A Physiology, 7C Cardiovascular; 7C Hematologic; 7C Hepatic; 7C Integumentary; 7A Respiratory; 7C Renal and urologic; 7C System Interaction) [Analysis]
3. Differentiate how hormonal and neural control mechanisms regulate homeostasis and the metabolism of physiologic systems and resting, recovering, and exercising

muscle. (7A Exercise Science; 7C Endocrine and metabolic; 7C Nervous) [Analysis]
4. Compare and contrast the utilization, anabolism and catabolism of energy substrates within and outside the muscle cell. (7A Physiology, 7C Endocrine and metabolic) [Analysis]
5. Examine how metabolic byproducts and processes (including lactate parameters) affect the performance, recovery and fatigue of exercising muscle. (7A Exercise Science; 7A Physiology; 7C Endocrine and metabolic) [Analysis]
6. Differentiate how the six categories of nutrients are employed by physiological systems to maintain homeostasis and facilitate recovery, and to optimize performance and minimize fatigue associated with exhaustive, aerobic and resisted exercises. (7A Physiology; 7A Nutrition; 7A Exercise Science) [Analysis]
7. Examine how nutritional advice, including the utilization of supplementation, can and should be dispensed by the physical therapist to promote general health and optimize performance and recovery. (7A Nutrition; 7A Exercise Science) [Application]
8. Identify how environment factors (altitude, humidity, heat, cold) affect physiologic systems performance and physiologic system adaptation. (7A Physiology; 7A Exercise Science; 7C Medical surgical conditions) [Comprehension]
9. Appraise the acute and chronic adaptive physiological responses to cardiorespiratory and resistive exercise. (7A Physiology; 7A Exercise Science; 7C System interactions) [Analysis]
10. Compare and contrast physiologic differences and response to exercise related to gender, age, and special medical populations. (7A Physiology; 7A Pathology; 7C Genetics; 7C Endocrine and metabolic; 7C Medical surgical conditions) [Analysis]
11. Identify the effects of bed rest, immobilization, and inactivity on physiological systems. (7A Physiology; 7A Pathology; 7C Cardiovascular; 7C Musculoskeletal; 7C Medical surgical conditions) [Comprehension]
12. Select and demonstrate tests of aerobic capacity and endurance, anthropometric characteristics, and muscle performance that might be utilized to predict performance and are related to exercise prescription for healthy, clinical and medically compromised individuals. (7D19a; 7D19b; 7D19o; 7D19w) [Application]
13. Critically analyze, and summarize select current scientific literature in the field of exercise science. (7D9) [Analysis]
14. Integrate identified pathoanatomic, pathophysiologic, and tissue healing principles into exercise prescription interventions for varied demographics and select medical populations. (7A Anatomy; 7A Pathology; 7A Histology; 7A Kinesiology; 7C Musculoskeletal; 7D20; 7D27i) [Analysis]
15. Determine how continuous subjective and objective examination cues influence mode (type) and intensity of exercise prescription and modification, and signal the need for physician referral. (7D16; 7D20; 7D27i; 7D30) [Analysis]
16. Apply motor learning and teaching principles to guide exercise prescription and advancement. (7D27g; 7D27h; 7D27i) [Application]
17. Utilize protective phases, patient irritability, and response to treatment to guide rehabilitation exercise and functional progression (e.g. weight bearing). (7A Exercise Science; 7D20; 7D27i; 7D30) [Analysis]

18. Prescribe, choose, and modify exercise interventions to improve range of motion, strength, power, sport specificity, flexibility, agility, balance, aerobic capacity, and stress reduction in clinical populations with impairments in one or more systems using evidence-based exercise principles and response to treatment. (7D20, 7d27g; 7D27i; 7D30) [Analysis]
19. Demonstrate manual skills related to passive and active assistive range of motion, stretching, and resisted exercises (7D27f) [Application]
20. Synthesize patient/client preferences and factors (recreation, work, functional status) and non-client stakeholders (referral source, spouse, family members, payers) interests guide therapeutic exercise prescription. (7D7; 7D8; 7D16; 7D27h) [Synthesis]
21. Identify primary, secondary and tertiary prevention, health promotion, and wellness strategies and principles to individuals, groups, and communities as related to exercise. (7D14; 7D34) [Application]
22. Critically analyze and summarize the scientific literature related to exercise prescription. (7D9) [Analysis]

Methods of Instruction: Lectures, problem solving, laboratory, demonstrations, video/multimedia presentations, group case based interactions, writing assignments.

Methods of Evaluation: Student competence and attainment of course objectives are assessed using a variety of methods. These methods and their contribution to the final grade are listed in the table below.

Item	**Grade Composition**
Daily lecture quizzes	20%
Assignments	10%
Exam I	20%
Exam II	20%
Final exam (cumulative)	30%
Total	100%

Grading Scale: The following letter grade scale is used for the UTEP Doctor of Physical Therapy Program:

Letter Grade Scale	Numerical Grade Scale
A	90-100
B	80-89
C	75-79
F	Below 75

Required Texts:

1. Scott K. Powers, Edward T. Howly, John C. Quindry. Exercise Physiology: Theory and Application to Fitness and Performance. McGraw Hill. 12th Edition.
2. Kisner C & Colby LA. *Therapeutic Exercise: Foundations and Techniques*. 6th ed. Philadelphia, PA: F.A. Davis; 2012. ISBN-13: 978-0-8036-2574-7
3. American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 10th ed. Baltimore, MD: Lippincott, Williams, & Wilkins; 2017. ISBN-13: 978-1-4963-3906-5

Recommended Textbooks and Other Learning Resources: If you want to delve deeper and have an interest in further academic work, i.e. PhD in exercise physiology.

1. American College of Sports Medicine. *Advanced Exercise Physiology*. 2nd ed. Baltimore, MD: Lippincott, Williams, and Wilkins; 2011. ISBN-13: 978-0781797801
2. Kenney, WL; Wilmore, JH; Costill, DL. *Physiology of Sport and Exercise*. 6th ed. USA: Human Kinetics.; 2015. ISBN-13: 978-1-4504-7767-3

Resources Available for Student Success:

Confidential Resources:

- **Center for Accommodations and Support Services (CASS):** If you have or suspect a disability and need accommodations, you should contact the Center for Accommodations and Support Services (CASS) at 747-5148. You can also e-mail the office at cass@utep.edu or go by their office in Union Building East, room 106 (next to the UTEP post-office). For additional information, visit the CASS website at http://sa.utep.edu/cass.
- **The UTEP Student Health Center**: Union East Suite 100; 915.747.5624; www.utep.edu/chs/shc
- **The UTEP Counseling and Psychological Services:** 202 Union West, 915.747.5302; www.utep.edu/student-affairs/counsel

Additional Resources:

- Division of Student Affairs. 915.747.5076, www.utep.edu/student-affairs
- DPT Library Research Guide: http://libguides.utep.edu/pt
- Writing Center: 915.747.5112. https://uwc.utep.edu
- Computer Labs: Independent Learning Center (ILC), 1st floor Campbell Building
- Military Student Success Center: 915.747.5342, www.utep.edu/student-affairs/mssc
- Student Wellness Program. 915.747.6738, www.utep.edu/chs/wellness

University Policies: All students are responsible for following UTEP policies and procedures found in the Handbook of Operating Procedures at www.utep.edu/vpba/hoop

Program Policies: All DPT students are responsible for following all policies and procedures documented in the current DPT Student Handbook. Course policies found in the DPT Student Handbook apply to all courses in the DPT curriculum. The current DPT Student Handbook may be found on the DPT Student Resources site on Blackboard.

Academic Integrity: The UTEP DPT Program has a "zero tolerance policy" for scholastic dishonesty. DPT students must demonstrate academic integrity at all times. The current DPT Student Handbook outlines specific definitions, expectations, details, and consequences related to academic integrity and scholastic dishonesty. Additional information related to academic integrity is available through the UTEP Division of Student Affairs at www.utep.edu/student-affairs/osccr/student-conduct/academic-integrity.html

Course-Specific Policies:

1. **Attendance Policy - Absences**: Refer to current DPT Student Handbook "Attendance and Classroom Behavior" for the DPT Program policy.
    - Attendance is expected; however, life happens. Therefore, **ONE absence of a single class*** is permitted for *any* reason. Labs are not to be missed unless there is a documented illness or emergency.
    - In order for your first absence to be excused, you must meet the expectation described further down. HOWEVER (with very rare exception [eg, documented serious illness or emergency] that will be considered on a case by case basis) there will be NO accommodations offered for missed class time. Specifically, there is NO opportunity to make up in-class quizzes, either in advance of or after the scheduled class, or provide individual tutoring for missed content. Additionally late work caused by your absence will not be accepted. You should make prior arrangements with a classmate to find out what you missed, turn in any work, and/or pick up any handouts. **(*NOTE: Single class is 2 hours, Lab is 3 hours).**
    - In order to be excused for your first missed class, you must do the following:
        Email me at klbrowne@utep.edu AND call my cell phone: 781-835-5045 at least 2 hours in advance if you will not be attending class OR will be late. I do not require you to give me a reason, but I expect notice in advance. A message from one of your classmates is not acceptable. Should you need to text me, please IDENTIFY yourselves.
    - If you miss a second (or more) class for any reason, it will be considered *unexcused unless it is due to documented illness or emergency*. In these cases, you should email me and then arrange a meeting with me upon your return to school to discuss why you missed class. Documentation will be required for any additional absence (eg, doctor's note documenting illness or treatment). I will notify you after our meeting and review of your documentation whether or not the absence will be considered excused or unexcused.
    - For each incident of an unexcused absence (beyond the first), 5% will be deducted from your final semester grade.

2. **Attendance Policy - Tardiness & Early Departures**: Refer to current DPT Student Handbook "Attendance and Classroom Behavior" for DPT Program policy.
    - Missing 50% or more of a class will be considered an absence. Nevertheless, if you have unavoidable consequence causing you to miss the first or last portion of a class, please attend the rest. Every class and every lab are important in your DPT journey.
3. **Electronic Devices:** Refer to current DPT Student Handbook "Electronic Devices" for DPT Program policy.
4. **Professional Behavior Policy**: See DPT Student Handbook "Attendance and Classroom Behavior", "Professional Behaviors" and "Unprofessional Behavior:" for general program policy.
5. **Late or Missed Assignments and Assessments Policy:** See current DPT Student Handbook "Written Examination Policy". Additional course-specific policy is as follows:
6. **Skills Check Policy:**
    - Refer to the DPT Student Handbook for details
7. **Practical Exam Policy:**
    - n/a

8. **Student Course Evaluation Policy:**

• Course evaluations are an important part of the Department's DPT curriculum assessment plan. The expectation is that all students will give meaningful feedback, in a professional and respectful way, to instructors. Instructors use this feedback to enhance their teaching and to improve students' learning. Giving feedback in a course is a professional expectation. For example, when you attend a continuing education (CE) course as a clinician, you will be asked to give feedback to be eligible for CE units (CEUs) The Department depends on and is grateful for your valuable feedback. Therefore, this course will add an ungraded assignment where you will need to upload a screenshot of your completed course evaluation, from your 'myutep' course evaluations confirmation page, the week before the final exam. This screenshot will be the proof that you submitted your course evaluation. This proof may be used as evidence of your professionalism and commitment to the success of the DPT curriculum, when faculty are making decisions regarding who will be chosen for research grant and/or travel funding.

Daily Quizzes. Available Extra Credit.

A 5-question quiz will be administered each day at the beginning of the class. The expectation is for the learner to read and review all information prior to the class.

Course Content and Schedule: (Note: Students will be notified of changes via Blackboard or email. Additional details may be available in supporting course documents provided by the course instructor).

Note: Labs will take place in the CHS, Mesa building, and student recreation center

Week		Class Topic	Lab	Instructor
1	Aug 28	Control of the internal environment Cell signaling and the hormonal response to exercise (part I)		Solis
2	Sept 4	Cell signaling and the hormonal response to exercise (part II) Exercise and the immune system (Labor Day: recorded lecture)		Solis
3	Sept 11	Skeletal muscle structure and function	Lab 1	Solis
4	Sept 15	Circulatory responses to exercise	Lab 2	Solis
5	Sep 18	Circulatory responses to exercise	Lab 3	Solis
6	Sep 25	EXAM I (first hour) Circulatory responses to exercise (second hour)		Solis
7	Oct 2	Bioenergetics and exercise metabolism	Lab 4	Gurovich
8	Oct 9	Respiration during exercise	Lab 5	Solis
9	Oct 16	VO2 max assessment Nutrition and performance	Lab 6	Gurovich
10	Oct 23	Acid-base balance Temperature regulation during exercise		Solis
11	Oct 30	EXAM II The physiology of resistance training	Lab 7	Solis
12	Nov 6	Principles of exercise training/exercise prescription	Lab 8	Gurovich
13	Nov 13	The physiology of training: Effects of aerobic and anaerobic training	Lab 8	Solis
14	Nov 20	Exercise is medicine: prevention of chronic diseases and age-related physiological dysfunction	Lab 10	Solis
15	Nov 27	Exercise prescription for health and fitness		Solis
16	Dec 4	FINAL EXAM (cumulative)		Solis