

Course:	<i>Exercise Physiology</i>
PEIMS Code:	N1160014
Abbreviation:	EXPHY
Grade Level(s):	9-12
Number of Credits:	1.0

Course description:

During the first semester of the course, students will explore the world of exercise physiology by gaining knowledge and skills to properly design a program for themselves and other populations in the various stages of life. Nutrition, dietary supplements, energy systems, exercise physiology, biomechanics and applicable safety standards are examples of units students will experience during this course. The second semester will pull first-semester learnings into a cohesive, culminating project that focuses students on developing three-month plans and applying their learning in real-world applications such as interning in a fitness-center or assist teaching in a physical education class. The real-world application will also expose the students to various opportunities for careers in Exercise Physiology or personal training. Another outcome of the course is that students will gain a solid foundation to pursue the entry-level certification as a personal trainer by assessing mastery through both written and practical exams modeled after prominent certification exams within the fitness industry.

Essential knowledge and skills:

(a) Introduction.

(1) In Strength and Conditioning, students acquire a greater understanding of exercise physiology, biomechanics, and learn to apply the knowledge through analyzing the different adaptations of the human body with regards to multiple modes of exercise.

(2) In this course, students have the opportunity to build a career pathway foundation as they create exercise programs based upon needs analysis through physical assessment, using scientifically proven program design models for both anaerobic and aerobic exercise. Students will assess and perform techniques in resistive exercise, as well as, evaluate safety and administration concerns in a fitness facility.

(b) Knowledge and Skills:

(1) Exercise Science. The student examines the structure and function of the human body with regard to exercise. The student is expected to:

(A) examine the anatomy and physiology of the muscular system, neuromuscular system, cardiovascular system, and respiratory system;

(B) differentiate the bioenergetics of exercise employing knowledge of biological energy systems and substrate repletion and depletion, and their limiting factors in exercise performance;

(C) compare oxygen uptake and aerobic and anaerobic contributions to exercise, and appraise the metabolic specificity of exercise;

(D) analyze the basic concepts of the endocrine system in response to exercise including the synthesis, storage and secretion of hormones;

(E) demonstrate understanding of the biomechanics of resistance exercise with regards to the musculoskeletal system including human strength and power;

(F) appraise neural, muscular, connective tissue, endocrine, cardiorespiratory adaptation to anaerobic training;

(G) distinguish the adaptive effects of aerobic exercise on the body in terms of both acute response and chronic adaptations; and

(H) appraise the role of performance enhancing substances and nutrition in health and performance.

(2) Exercise analysis and performance. The student performs needs analysis, exercise technique perfection, and advises exercise plans. The student is expected to:

(A) evaluate warm up and stretching techniques including flexibility and comparing and contrasting static versus dynamic stretching;

(B) examine resistance training with regards to needs analysis, exercise selection and order, and training load, repetition, frequency and volume;

(C) analyze plyometric training through mechanics and physiology including program design and age considerations;

(D) discriminate speed, agility, and speed endurance development through movement mechanics including program design;

(E) examine aerobic endurance exercise training program design with regards to application to training seasons, type, and issues related to aerobic training;

(F) compare periodization models with regard to cycles and linear versus undulating programs; and

(G) contrast injury rehabilitation and reconditioning strategies through exercise including injury types and tissue healing.

(3) Administration and Organization. The student will examine different areas of administration in the fitness facility. The student is expected to:

(A) analyze the best practices of fitness facility design and renovation through needs analysis, equipment arrangement and litigation concerns; and

(B) create a mission statement for facility and policies and procedures to fulfill the tenets of the statement.

(4) Safety. The student will evaluate the necessary safety procedures to the fitness facility. The student is expected to:

- (A) examine and perform exercise technique fundamentals and resistance training techniques;
- (B) appraise and perform spotting techniques for free weight exercises; and
- (C) analyze and perform safety techniques for plyometric activities.

(5) Program design. The student will create, implement and follow an exercise program for anaerobic and aerobic exercise. The student is expected to:

- (A) construct and perform a program for resistance training in each of the following areas strength, hypertrophy, and endurance;
- (B) develop and perform a plyometric training program;
- (C) design and perform an aerobic endurance program;
- (D) design and perform a core specific stabilization, strength and endurance program; and
- (E) implement and instruct the class through one or more of the days in the student designed program.

(6) Assessment and evaluation. The student will examine different exercise assessment areas. The student is expected to:

- (A) differentiate terminology and methods for assessment of exercise with regards to strength, power and endurance;
- (B) argue the quality and validity of various assessment tools; and
- (C) interpret the data yielded from the assessment.

Description of specific student needs this course is designed to meet:

Provide students a foundation in exercise physiology and biomechanics as it relates to fitness and physical therapy career paths for various populations.

Major resources and materials:

Baechle, Thomas R., Roger W. Earle, National Strength & Conditioning Association. Essentials of Strength and Conditioning. Champaign: Human Kinetics, 2000.

Access to fitness equipment such as barbells, weights, kettlebells, dumbbells, pull-up bars, “superbands”, Bosu balls, physio balls, suspension system, agility cones and ladders, exercise mats, and stationary aerobic devices similar to what one would find in a health club (treadmill, elliptical, rowing machine, and stationary bike)

Access to Internet and computers



Required activities and sample optional activities to be used:

Required: development of three month plans

Recommended: intern in fitness center or assist-teach in regularly scheduled physical education classes

Optional: Development of fitness plan for a “client” during internship, public relations unit, basic marketing unit

Methods for evaluating student outcomes:

- Written exams
- Practical exams
- Projects
- Journals and logs
- Performance Method Assessments

Teacher qualifications:

Secondary Physical Education Certification

Additional information:

The demand for personal trainers and fitness experts has increased as the obesity epidemic rises and people struggle to meet the demands of their life and find balance that benefits their health. Current available high school courses do not provide students an avenue to pursue this career interest. The Strength and Conditioning course will provide students an opportunity to gain State elective credit and pursue this fitness career interest.