College of Education and Human Development  
Department of Counseling, Health & Kinesiology  
EDKN 4417 Advanced Physiology of Exercise  
Spring 2020, Mon & Wed 02:00-03:50 pm, STEM 227A

Instructor: Dr. Sukho Lee  
Class time & Location: Mon & Wed 02:00-03:50 pm, STEM 227A  
E-mail & Phone: slee@tamusa.edu & 210-78402537  
Office Hours: Mon/Wed 12:00 - 02:00 & Tue 01:00-05:00.  
Office Location: STEM 142A


Recommended Textbooks: NA

Course Description: This course investigates the role of various physical environments, activity extremes, and disease status on the human response to physical activity. Additional emphasis is placed on the nutrient demands and role of supplements in human performance. Includes required laboratory experiences. Prerequisite: EDKN 3426.

Course Objective: This course emphasizes the acquisition of advanced theoretical and practical knowledge for pre-service teachers and fitness/clinical professionals to assist them in better understanding how physiological responses to physical activity impact 1) the instructional process as it relates to physical education and 2) the management/delivery of services in fitness and rehab/clinical setting.

TEA Standards:
Standard I. The physical education teacher demonstrates competency in a variety of movement skills and helps students develop these skills.
Standard II. The physical education teacher understands principles and benefits of a healthy, physically active lifestyle and motivates students to participate in activities that promote this lifestyle.

Student Learner Outcomes: Upon completion of this course, each student will be able to:

1. Demonstrate knowledge of the 3 major nutrients and their action upon the body.
2. Identify the functional status of the anaerobic and aerobic energy systems.
3. Display an understanding of the functioning of the respiratory system during rest and
4. Identify and discuss the physiology of the cardiovascular/circulatory system and its responses to rest and exercise.
5. Demonstrate knowledge of the functioning of the muscular system.
6. Develop an understanding of the nervous system and its relationship to the muscular system.
7. Demonstrate one method of estimating body composition and an understanding of body composition and obesity.
8. Identify aids for performance and the side effects and risks involved with ergogenic aids.
9. Explain methods of measurement for work, power, and energy expenditure.
10. Determine the effects of the environment upon exercise and performance.
11. Develop an individual project through literature review and other resources.

Outcomes are also based on the expected Knowledge, Skills, and Abilities (KSA’s) for exercise science majors from the American College of Sports Medicine. Upon completion of this course, each student will be able to demonstrate the following competencies required for the Heath/Fitness Specialist exam:

1.1.2 Knowledge of the basic structure of the cardiovascular system and respiratory system
1.1.7 Knowledge to describe the myotatic stretch reflex
1.1.9 Ability to define aerobic and anaerobic metabolism
1.1.10 Knowledge of the role of aerobic and anaerobic energy systems in the performance of various activities
1.1.11 Knowledge of the following terms: ischemia, angina pectoris, tachycardia, bradycardia, arrhythmia, myocardial infarction, cardiac output, stroke volume, lactic acid, oxygen consumption, hyperventilation, systolic blood pressure, diastolic blood pressure, and anaerobic threshold
1.1.12 Knowledge to describe normal cardiorespiratory responses to static and dynamic exercises in terms of heart rate, blood pressure, and oxygen consumption
1.1.13 Knowledge of how heart rate, blood pressure, and oxygen consumption responses change with adaptations to chronic exercise training
1.1.14 Knowledge of physiological adaptations associated with strength training
1.1.15 Knowledge of the physiological principles related to warm-up and cool-down
1.1.16 Knowledge of the common theories of muscle fatigue and delayed onset muscle soreness
1.1.17 Knowledge of the physiological adaptations that occur at rest and during submaximal and maximal exercise following chronic aerobic and anaerobic exercise training
1.1.18 Knowledge of the differences in cardiorespiratory response to acute graded exercise between conditioned and unconditioned individuals
1.1.19 Knowledge to the structure of the skeletal muscle fiber and the basic mechanism of contraction
1.1.20 Knowledge of the characteristics of fast and slow twitch fibers
1.1.21 Knowledge of the sliding filament theory of muscle contraction
1.1.22 Knowledge of twitch, summation, and tetanus with respect to muscle contraction
1.1.23 Knowledge of the physiological principles involved in promoting gains in muscular strength and endurance
1.1.24 Knowledge of muscle fatigue as it relates to mode, intensity, duration, and the accumulative effects of exercise
1.1.25 Knowledge of the basic properties of cardiac muscle and the normal pathways of conduction in the heart
1.1.26 Knowledge of the response of the following variables to acute static and dynamic exercise: heart rate, stroke volume, cardiac output, pulmonary ventilation, tidal volume, respiratory rate, and arteriovenous oxygen difference
1.1.27 Knowledge of blood pressure responses associated with acute exercise, including change in body position
1.1.28 Knowledge of and ability to describe the implications of the ventilatory threshold (anaerobic threshold) as it relates to exercise training and cardiorespiratory assessment
1.1.29 Knowledge of and ability to describe the physiological adaptations of the respiratory system that occur at rest and during submaximal and maximal exercise following chronic aerobic and anaerobic training
1.1.31 Knowledge of how the principle of specificity relates to the components of fitness
1.1.32 Knowledge of the concept of detraining or reversibility of conditioning and its implications in fitness programs
1.1.33 Knowledge of the physical and psychological signs of overtraining and to provide recommendations for these problems
1.1.34 Knowledge of and ability to describe the changes that occur in maturation from childhood to adulthood for the following: skeletal muscle, bone structure, reaction time, coordination, heat and cold tolerance, maximal oxygen consumption, strength, flexibility, body composition, resting and maximal heart rate, and resting and maximal blood pressure
1.1.35 Knowledge of the effect of the aging process on the musculoskeletal and cardiovascular structure and function at rest, during exercise, and during recovery
1.1.36 Knowledge of the following terms: progressive resistance, isotonic/isometric, concentric, eccentric, atrophy, hypertrophy, sets, repetitions, plyometrics, Valsalva maneuver
1.3.1 Knowledge of and ability to discuss the physiological basis of the major components of physical fitness: flexibility, cardiovascular fitness, muscular strength, muscular endurance, and body composition
1.7.12 Knowledge of the principles of overload, specificity, and progression and how they relate to exercise programming
1.7.15 Knowledge of the components incorporated into an exercise session and the proper sequence (i.e., preexercise evaluation, warm-up, aerobic stimulus phase, cool-down, muscular strength and/or endurance, and flexibility)
1.7.36 Ability to convert weights from pounds (lbs) to kilograms (kg) and speed from miles per hour (mph) to meters per minute (m/min-1)
1.7.37 Ability to convert METs to VO2 expressed as mL/kg-1/min or L/min.
1.8.1 Knowledge of the role of carbohydrates, fats, and proteins as fuels for aerobic and anaerobic metabolism
1.8.11 Knowledge of the number of kilocalories in one gram of carbohydrate, fat, protein, and alcohol

**Undergraduate Class Policies**

A student has the right to expect competent, well-organized instruction for the full number of clock hours allotted for a course; to sufficient written assignments, graded fairly and with reasonable promptness to show the student's academic standing in the course at least before mid-semester; to
have ample opportunity to confer with the instructor at published office hours and to review graded written work; to freedom from ridicule, discrimination, harassment or accusations in the presence of other students or faculty members; and to an avenue for appealing to higher academic authority in case of alleged unfairness by an instructor.

**Student Rights and Responsibilities**
As members of the University community, all enrolled students assume full responsibility for adhering to the university's values and goals. Students are held responsible for staying abreast of their rights as students and for being cognizant on what is deemed proper conduct as outlined in the Student Handbook. The Student Handbook is available through the Student Rights and Responsibilities webpage: http://www.tamusa.edu/uploadFile/folders/fcestrad/Pdf/Pdf-635767864704349879-10.100.150.124.pdf

**Academic Dishonesty**
Students are expected to do their own course work. Academic dishonesty is a violation of the Student Code of Conduct; therefore, the instructor may report any form of academic dishonesty to the Office of Student Rights and Responsibilities. Please review the Student Handbook for a complete description of the process.

**Class Attendance**
A vital part of every student's education is regular attendance of class meetings. Any absences tend to lower the quality of a student's work in a course, and frequent or persistent absences may preclude a passing grade or cause a student to be dropped from one or more courses upon the request of a faculty member to the Provost and Vice President for Academic Affairs.

- Quizzes and assignments related to weekly topics will be completed inside and/or outside of class. In-class quizzes and assignments missed because of absence will *not* be made up.
- You will have **two unexcused absences without penalty**.
- You will have **1 point** deducted each absence if you do not attend class. You will receive **F** on **5th absences** (excused or unexcused).

1. The general policy outlined by the University will be followed: (http://www.tamusa.edu/studenthandbook.html)

2. The instructor’s policy for this course includes:
   a. Your presence is expected in class daily except for emergencies. Students assume responsibility for any material missed in class. Arrange to pick up handouts as soon as possible. It is YOUR responsibility to make up missed work.
   b. Requests to be absent from class for official University business (athletics, field trips, student government, etc.) shall be made prior to the anticipated absence. Arrangements for missed work will be made at that time.
c. If you miss an exam or quiz or do not show up on the day of a presentation or when an assignment is due without prior arrangement with the instructor, no make-up will be allowed unless there is a documented emergency.
   i. If there is an emergency (hospital, funeral, etc) please contact me the day of the problem or the day you missed class.
   ii. If you cannot participate in a lab you must have documentation (hurt ankle, sick, etc), otherwise you will receive half credit for being there but not participating.
      1. This includes not participating in one or more assessments for that lab.
   iii. If you completely miss a lab and have no documentation, 20 points will be deducted from the written assignment.

d. Excused absences: Excused absences: In the event that you need to be away for a given period of time (e.g. funerals, hospital stays, family emergencies, military duty, etc), you should contact Student Life and Wellness (210-784-1331; studentlife@tamusa.tamus.edu). If you will be missing more than a week of classes (whether continuous or not), inform them of the situation and they can send a notice to all your instructors rather than you having to explain to each of them your circumstances.

e. Do not make doctor’s appointments on the days of class, tests, labs, or presentations.

Absences for Religious Holidays
The university will allow students who are absent from classes for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence if, not later than the fifteenth day after the first day of the semester, that student has notified the instructor of each class to be missed. The instructor may appropriately respond if a student fails to complete the assignment or examination within a reasonable time after the absence.

Research on Human Subjects
Research that involves human subjects must be approved by the Institutional Review Board for the Protection of Human Subjects.

Americans with Disabilities Act
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disability. Disability Support Services (DSS) provides services, auxiliary aids and accommodations for students at Texas A&M University-San Antonio (A&M-SA) who have self-identified, registered and provided DSS with
documentation supporting their disability. Students may access additional information on the Disability Support Services webpage:
http://www.tamusa.edu/studentengagementsuccess/dss/AccessDSS/index.html

**Incomplete**
The spirit of the “Incomplete” is to give a student an opportunity to complete a course after the end of the semester. An Incomplete will only be considered under specific circumstances: 1. 70% of the class has been completed and student is passing with a “C” or better 2. The circumstance for which the “I” is requested is supported with documentation 3. Student has been attending class on a regular basis Incompletes are not to be used to remedy excessive absences. Unforeseen circumstances precipitating the request for an “I”, should occur near the end of the semester. Students who are experiencing difficulties at the beginning or midway through the course should contact their professor immediately to discuss options. When a professor agrees to grant an “I”, a contract between the student and professor that outlines a specific timeline for completion of the course will be generated. Topics such as highest possible grade will also be outlined. If the contract is not fulfilled, the professor will submit a change of grade form with earned letter grade. All “I”s will automatically revert to an “F” after one year.

**Dropping a Course**
A course may be dropped by a student without approval from his/her academic advisor or other university official. Students who have been readmitted on academic/scholastic probation must also consult with their advisors prior to dropping or withdrawing. It is highly recommended that a student consult his/her academic advisor because of the impact on financial aid, graduation, veteran benefits, etc. After the online registration system is closed, all drops must be processed by the Office of the Registrar. A student who, by dropping a course, becomes registered for less than a normal load will be reclassified as a part-time student. Freshmen students who intend to drop a course must first visit their Academic Success Coach.

**Administrative Drops for Non-Attendance**
A faculty member may drop an undergraduate student for non-attendance at any time prior to the mid-point of a long semester. A drop processed by a faculty member for non-attendance will be treated as a non-punitive grade unless the undergraduate student is subject to the requirements of Senate Bill 1231. The Office of the Registrar will treat all drops processed by a faculty member in accordance with the requirements of Senate Bill 1231 and may change a grade of W to a grade of WS or an F, depending on the student’s status.

**Grading Policy**
90 or higher: A, 80 – 89: B, 75 – 79: C, 70 – 74: D, **Below 70: F**

However, final letter grade will be determined by instructor not by this scale.
Quiz = 10 (02:00-02:30 pm on Feb 03)
Mid-tern exam = 20 (02:00-03:00 pm on Mar 04)
Class writing evaluation = 10 (Apr 01)
Project report due = 10 (Apr 22)
Presentation = 10 (Apr 27 & 29)
Class participation = 10 (Discussion & Attendance)
Final exam = 30 (TBA)
Total : 100 points.

Course Requirements
Class writing by April 01 (by midnight)
You will write one single page summary of peer-review article given through blackboard.

Group report & Presentation (Group)
Any topic of your choice (5 students) closely related to this class.
Group report due date 02:00 p.m. on April 22.
Double space A4, follow APA manual, Maximum 10 pages including title, references (at least 3 from the article or journal not from the internet resources).

Group presentation dates: April 27 & 29.
Students (5) will present study to the class (20 mins) and answer the questions (10 mins)

Exam Format:
The tests (exams and quiz) will consist of various forms of questions including multiple choices, true and false, fill in blank, figure and tables, and short essay questions.
A grade of “C” or better must be earned in this course to satisfy Kinesiology requirements. Majors who do not earn a grade of “C” or better will be required to repeat the course. I round up your grade. If you earn an 89.5, then you earn an A. If you earn 89.4, then you earn a B, not a A.

No changes to your final grade will occur once class has ended unless I have made a mistake. You are given the opportunity to follow your grade throughout the semester thus you should not be surprised with the grade you earn. There are no exceptions (eligibility, financial aid, etc.)

To access Blackboard, go to the TAMU-SA homepage (http://www.tamusa.edu/).

Make-Up/ Late Assignment Policy: There will be no additional make-up for all assignments. (Exceptions: if you are absent because of school-sponsored activity (you need to notify me at least one week in advance) or illness with doctor’s excuse. In which case, you need to take the exam on specific date & time that I will assign).
The professor has the right to include or take away any materials that help to improve quality of class. All class work is due on the date and time assigned; work received later than the due date will be penalized one letter grade per day, after which 4 days will result in a zero (F).

- I do not offer extra credit.
- I do not offer Independent Studies if an acceptable grade is not earned.

Schedule of Course Activities

Tentative Schedule: This is a tentative schedule. The course schedule will change as the demands of the students dictate. Quizzes may be given at the beginning of class.

The professor has the right to include or take away any materials that help to improve quality of class.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Jan 13</td>
<td>Introduction &amp; Chapter 1: Structure and Function of Exercising Muscle</td>
</tr>
<tr>
<td>Jan 15</td>
<td>Chapter 2: Fuel for Exercise: Bioenergetics and Muscle Metabolism</td>
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<tr>
<td>Jan 20</td>
<td>Martin Luther King Day (Holiday)</td>
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<tr>
<td>Jan 22</td>
<td>Chapter 3: Neural Control of Exercising Muscle &amp; Chapter 6: The Cardiovascular System and Its Control and Its System &amp; Chapter</td>
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<td>Jan 27</td>
<td>Chapter 8: The Cardiorespiratory Responses to Acute Exercise &amp; Chapter 9: Principles of Exercise Training, Chapter</td>
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<td>Jan 29</td>
<td>10: Adaptations to Resistance &amp; Chapter 11: Adaptations to Aerobic and Anaerobic Training &amp; Chapter 14: Training for Sports</td>
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<tr>
<td>Feb 03</td>
<td><strong>Quiz (02:00-02:30 only)</strong></td>
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<tr>
<td>Feb 05</td>
<td>Chapter 15: Body Composition and Nutrition for Sport &amp; Chapter 22: Obesity, Diabetes, and Physical Activity</td>
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<td>Feb 10</td>
<td>Chapter 4: Hormonal Control during Exercise</td>
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<td>Feb 12</td>
<td>Special Topic via Blackboard</td>
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<td>Feb 17</td>
<td>Chapter 5-1: Energy Expenditure and Fatigue</td>
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<td>Feb 19</td>
<td>Chapter 5-2: Energy Expenditure and Fatigue</td>
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<td>Feb 24</td>
<td>Hands on Practice (Respiratory Function Test &amp; Muscle Testing)</td>
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<td>Feb 26</td>
<td>Chapter 7-1: The Respiratory System and Its Regulation</td>
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<td>Mar 02</td>
<td>Chapter 7-2: The Respiratory System and Its Regulation</td>
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<td>Mar 04</td>
<td><strong>Midterm (02:00-03:00)</strong></td>
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<td>Mar 09 &amp; 11</td>
<td>Spring Break (no class)</td>
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<td>Mar 16</td>
<td>Chapter 12: Exercise in Hot and Cold Environment</td>
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<td>Mar 18</td>
<td>Chapter 13-1. Exercise at Altitude</td>
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<td>Mar 23</td>
<td>Chapter 13-2. Exercise at Altitude</td>
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<td>Mar 25</td>
<td>Special Topic via Blackboard</td>
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<td>Mar 30</td>
<td>Chapter 17: Children and Adolescents in Sport and Exercise</td>
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<td>Apr 01</td>
<td><strong>Class Writing (Journal and instruction on Blackboard)</strong></td>
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<td>Apr 06</td>
<td>Chapter 19: Sex Difference in Sports and Exercise</td>
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<td>Apr 08</td>
<td>Special Topic via Blackboard</td>
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<td>Apr 13</td>
<td>Chapter 20: Prescription of Exercise for Health and Fitness</td>
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<td>Apr 15</td>
<td>Chapter 21: Cardiovascular Disease and Physical Activity</td>
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<tr>
<td>Apr 20</td>
<td>Hands on Practice (Anaerobic Power Test: Wingate Cycle &amp; Power Bike)</td>
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<td>Apr 22</td>
<td>Special Guest Lecture (Topic TBA)</td>
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<td>Apr 27</td>
<td>Presentation</td>
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<td>Apr 29</td>
<td>Presentation &amp; Final exam review</td>
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<td>May 06</td>
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