TEXAS A&M UNIVERSITY
SAN ANTONIO

College of Education and Human Development
Department of Counseling, Health & Kinesiology
EDKN 3426-001 – Basic Physiology of Exercise (4 credits)
Spring 2024

Instructor: T. Brock Symons, Ph.D.

Class time & Location: 3:30 p.m. to 5:10 p.m.
Monday and Wednesday (Face-to-Face), STEC 279

E-mail & Phone: tsymons@tamusa.edu (preferred contact method) and 210 – 784 – 2587 (office)

Office Hours: Tuesday and Thursday at 3:00 p.m. – 5:00 p.m. via face-to-face or WebEx or by appointment via email.

I understand that this may not be possible for everyone; so, you can always email me at tsymons@tamusa.edu if you have any questions.

I am available from 10:00 a.m. – 5:30 p.m. Central Standard Time (CST) Monday through Friday to contact via telephone and/or e-mail using your Texas A&M University – San Antonito e-mail. If these times are not convenient for you, please let me know and I will be happy to accommodate your schedule if possible. I provide you with these times to make it easier to communicate with me, not to limit our contact and want you to know that, should you need to contact me outside these periods, you should not hesitate to do so.

In the event a third party needs to contact me, please direct them to my contact information listed under "E-mail & Phone" information above. No third party should use your login credentials to gain access to the classroom in Blackboard (Bb).

I will respond to your inquiry within 24 hours of receipt except on weekends and holidays, it will then be the next business day. If I do not respond in that period, know that I probably did not receive your message.

Office Location: STEM 142K

WELCOME to the Texas A&M University – San Antonio, Department of Counseling, Health and Kinesiology's Basic Physiology of Exercise (EDKN 3426 – 001) course. This is a 16-week course in which you will learn how the human body, specifically its organ systems, respond to a single bout of exercise and to recurring bouts of exercise.

The course will contain assignments, quizzes, and exams designed to help you obtain the core concepts of each organ system studied in this course. You will read, attend class, and watch online modules and participate in both classroom and online activities.

Required Textbooks: Physiology of Sport and Exercise (2020, 8th. edition).
Kenney L., Wilmore, J., & Costil, D.
Human Kinetics: Champaign, IL.
ISBN: 978-1-7182-0172-9 (hardback)

https://www.bkstr.com/texasamsanantoniostore/home

Recommended Textbooks: NA

Course Description:
Physiology as applied to exercise and human performance. How the systems of the body respond to both acute and chronic exercise training. Includes required laboratory experiences.

Course Prerequisites: EDKN 3315.

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

Student Learning 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 exercise.
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.

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

Incompletes
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.

Title IX

Message for pregnant and parenting students: Title IX of the Education Amendments of 1972 ("Title IX"), 20 U.S.C. §1681 et seq., protects students in all of the academic, educational, extracurricular, athletic, and other programs or activities of universities. This includes prohibiting discrimination against pregnant and parenting students. A student who is pregnant or parenting is entitled to special services. Texas A&M University-San Antonio is committed to implementing all provisions of Title IX. For availing of special services available to students whose curricular and co-curricular work is impacted by pregnancy and parenting related issues, contact Dr. Jo Anna Benavides-Franke, Associate Vice President for Student Engagement and Success or visit http://www.tamusa.tamus.edu/studentengagementsuccess/index.html

Policy on Instructional Modifications

Students with Disabilities: 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. If you believe you have a disability that may require accommodations, please contact Disability Support Services (DSS) for the coordination of services. DSS is located at the Main Campus on the 2nd floor of the Central Academic Building in room 210 and at the Brooks City-Base Campus in room 149. The phone number for DSS is (210) 784-1335 and email is dsupport@tamusa.tamus.edu.

Grading Policy

Your final grade will be presented as a standard percentage point. Your final grade will be determined by dividing the total points you earned by the total points offered in this course. ***I will not respond to individual request for calculation of grade***. It is your responsibility to keep a record of the grade points you have earned in the exams, assignments, and in-class quizzes. All grades will be posted to Blackboard.

Your final grade will be determined as a percentage of the following points:

	Points
Exams (125 points per exam)	375
Quizzes (5 points per quiz)	55
Assignments (15 points per assignment)	165
Total	**595**

Grading Scale

90 or higher = A, 80 – 89 = B, 70 – 79 = C, 65 – 69 = D, Below 65 = F

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 will round up your grade under the following condition, if you earn an ##.9, then I will round your grade up to the next letter grade. Therefore, if you an 89.9, I will then round your grade up to 90.0 and you will earn an A. If you earn an 89.8, then your final grade will be a B.

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 via Blackboard; thus, you should not be surprised with the grade you earn. There are no exceptions (eligibility, financial aid, etc.)

Course Requirements

You will depend on technology to submit and complete course work and to communicate. The key word here is "depend." If cyber communication is disrupted, you will be required to submit assignments via email or in an alternate manner to Texas A&M University – San Antonio, Health and Kinesiology Program, Science and Technology Building, San Antonio, TX 78224. Please keep in mind; you might need to find alternate internet sources if the computer at your home/work has an outage. Texas A&M University – San Antonio and many public libraries offer access. Need help? Contact the IT HelpDesk at (210) 784-4357 or helpdesk@tamusa.edu . Hours: Monday through Friday: 8:00 a.m. – 6:00 p.m. (closed Saturday and Sunday).

Exams. There will be *3 regular exams, each worth 125 points,* throughout the semester. The exams will consist of multiple-choice questions, true or false, matching, diagram labeling questions, and/or short descriptive questions. Exams will cover material from the preceding lectures.

***Quizzes*.** Module quizzes will be given to assess your knowledge following the completion of a module. You will be required to complete *13 module quizzes*. Each module quiz will be worth *5 points* and will be given on Blackboard. Quizzes will cover material from the particular module, *semester total of 65 points.*

Assignments. There will be *12 assignments, each worth 15 points*. Each assignment will consist of short answer question(s) and will cover material from preceding lectures, *semester total 180 points.*

Make-up Exam/Late Assignment Policy: There will be no make-up exams. Exceptions may include 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 note. In which case, you need to take the exam on specific date & time that I will assign).

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*

Technology Requirements: Quizzes are to be completed on Blackboard (Bb) according to the directions provided.

I will holding virtual office hour via WebEx. I will post a WebEx meeting link to Blackboard and we will be able to meet virtually.

Continuing and regular use of your TAMUSA e-mail is expected. You must be able to use Internet search tools, access Bb, download and print documents and upload assignments.

To access Blackboard, go to https://tamusa.blackboard.com/.

Library Support for COEHD Programs & Courses

The A&M-SA Library provides access to thousands of research and learning materials for COEHD students, faculty, and staff. These resources are mainly provided in electronic format and are accessible 24/7/365 with Jaguar log-in credentials. They include, but are not limited to, scholarly academic journals, professional publications, newspapers, eBooks, streaming video, and curated web resources. Additionally, there is a smaller physical collection, study space, and computer access available in CAB 202. Two unique physical collections housed in CAB 202 are the curriculum materials (sample textbooks, teachers' guides, activity guides, manipulatives, models, classroom reading collections, educational games, etc.) and the children's literature collection. These materials are available for checkout and can be used by students in lesson planning and in their clinical school placements.

Education Librarian Kimberly Grotewold is available to assist with finding, accessing, evaluating, and effectively using relevant library resources and other information. She has developed subject, topic, and course-specific research guides which are linked into Blackboard (under Campus Resources in the left menu) and are accessible through the Library's website under the Research Guides link. If you have questions, concerns, or need help, please contact her through email at kimberly.grotewold@tamusa.edu; via phone: (210) 784-1519; or request an appointment using her online scheduling calendar.

Counseling Resources:

As a college student, there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily functioning. If you or someone you know is experiencing life stressors, emotional difficulties, or mental health concerns at Texas A&M University – San Antonio, please contact the Student Counseling Center (SCC) located in Modular C, Room 166 (Rear entrance) or call 210- 784-1331 between the hours of 8:00AM and 5:00PM, Monday – Friday. All mental health services provided by the SCC are free, confidential (as the law allows), and are not part of a student's academic or university record. SCC provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information, please visit www.tamusa.edu/studentcounseling In a crisis situation, please walk-in to the Student Counseling Center (SCC) any time between the hours of 8:00AM and 5:00PM, Monday – Friday, to be seen by a clinician. For after-hours support, please call 210-784-1331. Please contact UPD at 911 if harm to self or harm to others is imminent.

Schedule of Course Activities

Module	Topic	Date	Tasks		
			Reading	Objectives	Deliverables (Date Posted)
1	Introduction and Structure and Function of Exercising Muscle	1.17	Ch. 1	1.1 Anatomy of Skeletal Muscle	
		1.22		1.2 Muscle Fiber Contraction 1.3 Fiber Type	
		1.24		1.4 Skeletal Muscle & Exercise	
		1.29		1.4 Skeletal Muscle & Exercise	**Assignment 1** **Post-Mod Quiz**
2	Bioenergetics and Muscle Metabolism	1.31	Ch. 2	2.1 Energy Substrates 2.2 Controlling the Rate of Energy Production 2.3 Storing Energy: High Energy Phosphates	
		2.5		2.4 Basic Energy Systems	
		2.7		2.4 Basic Energy Systems 2.5 Interaction of the Energy Systems	
		2.12		2.6 Crossover Concept 2.7 Oxidative Capacity of Muscle	**Assignment 2** **Post-Mod Quiz**
3	Neural Control of Exercising Muscle	2.14	Ch. 3	3.1 Structure and Function of the Nervous System 3.2 Central Nervous System	
		2.19		3.3 Peripheral Nervous System 3.4 Sensory Motor System	**Assignment 3** **Post-Mod Quiz**
		2.21		Catch-Up and Exam Preparation	
EXAM 1		***2.26***	***Modules 1 to 3 (Chapters 1,2,3)***		
4	Cardiovascular System and Its Control	2.28	Ch. 7	4.1 Heart 4.2 Vascular System	
		3.4		4.2 Vascular System 4.3 Blood	**Assignment 4 and 5** **Post-Mod Quiz**
5	Cardiovascular Response to Acute Exercise	3.5	Ch. 9	5.1 Cardiovascular Responses to Acute Exercise	
		3.11 to 3.17		***Spring Break***	
6	Principles of Exercise Training	3.18	Ch. 10	6.1 Heart General Principles of Training 6.2 Resistance Training Programs 6.3 Anaerobic and Aerobic Power Training Programs	**Assignment 6** **Post-Mod Quiz**

7	Adaptations to Resistance Training	3.20	Ch. 11	7.1 Resistance Training and Gains in Muscular Fitness 7.2 Mechanisms of Gains in Muscle Strength	
		3.25		7.3 Interaction Between Resistance Training and Diet 7.4 Resistance Training for Special Populations	**Assignment 7** **Post-Mod Quiz**
8	Adaptations to Anaerobic	3.27	Ch. 12	8.1 Adaptations to Anaerobic Training 8.2 Adaptations to High-Intensity Interval Training 8.3 Specificity of Training and Cross-Training	
		4.1		8.4 Adaptations to Aerobic Trainings	**Assignment 8** **Post-Mod Quiz**
		4.3		Catch-Up and Exam Preparation	
EXAM 2		***4.8***		***Modules 4 to 8 (Chapters 7,9,10,11,12)***	
9	Training for Sport	4.10	Ch. 16	9.1 Optimizing Training 9.2 Periodization of Training 9.3 Overtraining	
		4.15		9.3 Overtraining 9.4 Tapering for Peak Performance 9.5 Detraining	**Assignment 9** **Post-Mod Quiz**
10	Nutrition and Body Composition	4.17	Ch. 17	10.1 Assessing Body Composition 10.2 Body Composition, Weight, and Sport Performance 10.3 Classification of Nutrients	
		4.22		10.3 Classification of Nutrients 10.4 Water and Electrolyte Balance 10.5 Nutrition and Athletic Performance	**Assignment 10** **Post-Mod Quiz**
11	Ergogenic Aids in Sport	4.24	Ch. 18	11.1 Ergogenic Nutrition Aids 11.2 Contamination of Dietary Supplements	
		4.29		11.2 Contamination of Dietary Supplements 11.3 Prohibited Substances and Techniques	**Assignment 11** **Post-Mod Quiz**
EXAM 3				***Modules 9 to 13 (Chapters 16,17,18)***	