



**SUL ROSS**  
KINESIOLOGY DEPARTMENT

**KINE 4390 001**  
**Physics of Sports**  
**Spring 2024**

**Dr. Billy Jack Ray**

**Assistant Professor - Kinesiology**

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**Office Hours:** Monday 10am-2pm, Tuesday 9am-2pm, Wednesday 10am-2pm, Thursday 9am-2pm  
**By appointment (email to set an appointment)**  
**Meeting:** MWF 10 am – 10:50 am  
**Required Text:** The Physics of Sports, 1st Edition, Lisa, M.  
ISBN: 9780073513973

## **COURSE DESCRIPTION**

This course is a study of the physics concepts (forces, momentum, acceleration, etc.) and equations relating them behind the motion of flying and spinning projectiles (humans too) in sports such as soccer, tennis, basketball, baseball, football, track and field, etc. We will also include rolling/sliding objects along flat surfaces such as in billiards and bowling. The focus will be on how to understand motion in sports and, perhaps, gain a competitive advantage through a better knowledge of the concepts and some mathematics, but not on physics derivations.

## **EXPECTATION OF STUDENTS**

Students are responsible for keeping up with the reading and are expected to read the assigned chapters and/or other posted readings prior to class in order to contribute to online discussion. Handouts distributed through Blackboard should be kept in a notebook in order to be referred to as necessary.

## **Marketable Skills – The following marketable skills are met in this course:**

- **Collaboration** – students will interact with one another through a multitude of class discussions and activities
- **Communication** – students will interact with one another through a multitude of class discussions and activities
- **Critical Thinking** – students will be asked to critically decipher a multitude of real-world scenarios
- **Career Management** –
- **Creativity** –

## STUDENT LEARNING OUTCOMES

By the end of the course you will:

- Know how to determine the hang time of a slam dunker, punted football, fly ball, and ballet dancer.
- Know how to use the center of mass concept to gain an edge in certain track & field events and give the appearance of floating in the air.
- Know why going low is the best option in tackling and blocking in football
- Know how to determine the launch angle and launch velocity for a given height release of a three-pointer to optimize your chances of making nothing but net.
- Know why the stitches on a baseball or the dimples on a golf ball reduce the drag force permitting the ball to go further than if it were perfectly smooth (drag crisis).
- Know how to hit the best drop shot and why you hit with top spin in tennis.
- Know the conceptual differences between what makes a cricket ball swing and a baseball and soccer ball curve.
- Know why a four-seam fast ball “rises” and a slow ball curves more than a fast ball.
- Know what a float-serve in volleyball and a knuckle ball have in common.
- And why is Coor’s Field not a paradise for a pitcher since he can throw the ball faster (less drag) giving the batter less time to react to the ball’s motion and much more.

## Course Format

The format for this course will include, but is not limited to – face to face delivery and on-line components.

## Attendance

Attendance for class is mandatory. Every class day is a grade. You will receive 100% credit for being on time, 75% credit for being tardy.

## GRADING POLICIES / TESTING / ASSIGNMENTS / ATTENDANCE / EXPECTATIONS

Grade calculation	% of Grade	Grading Scale
Weekly SmartBook (14)	40% (10 @ 40 = 400 points)	900 or more A
Unit Test (3)	30% (3 @ 100 = 300 points)	800 – 899 B
Unit Discussion Boards (3)	15% (3 @ 50 = 150 points)	700 - 799 C
Final Exam	15% (1 @ 150 = 150 Points)	600 - 699 D
	<b>Total Points = 1000</b>	<b>Less than 599 F</b>

**Late Assignments WILL NOT Be Accepted. Also, No Credit Will Be Given For Any Late Assignments**

# Course Schedule

		<b><u>BlackBoard Assignment</u></b>
<b><u>Week 1</u></b>	<b>Chapter 1: Warm-up: Basic concepts</b>	<b>SmartBook 1</b> 01/21/2024
<b><u>Week 2</u></b>	<b>Chapter 2: Racing, Mathematically</b>	<b>SmartBook 2</b> 01/28/2024
<b><u>Week 3</u></b>	<b>Chapter 3: Net Force: Dwight Howard illustrates</b>	<b>SmartBook 3</b> 02/4/2024
<b><u>Week 4</u></b>	<b>UNIT 1 Discussion Board</b> Post due by 02/06/2024 & Responses due by 02/09/2024	<b>Test 1</b> <b>Discussion Board 1</b> 02/11/2024
<b><u>Week 5</u></b>	<b>Chapter 4: Punts, the Fosbury Flop, and Other Projectile Motions</b>	<b>SmartBook 4</b> 02/18/2024
<b><u>Week 6</u></b>	<b>Chapter 5: Curveballs, Foul Shots, and Bent Kicks</b>	<b>SmartBook 5</b> 02/25/2024
<b><u>Week 7</u></b>	<b>Chapter 6: Game Changers: Collisions in Sports</b>	<b>SmartBook 6</b> 03/03/2024
<b><u>Week 8</u></b>	<b>UNIT 2 Discussion Board</b> Post due by 03/05/2024 & Responses due by 03/08/2024	<b>Test 2</b> 03/10/2024
<b><u>Week 9</u></b>	<b>Chapter 7: Energy in Sports: Bursts of Power</b>	<b>SmartBook 7</b> 03/24/2024
<b><u>Week 10</u></b>	<b>Chapter 8: Energy and Timing in Elastic Equipment</b>	<b>SmartBook 8</b> 03/31/2024
<b><u>Week 11</u></b>	<b>Chapter 9: The Physics of Cycling</b>	<b>SmartBook 9</b> 04/07/2024
<b><u>Week 12</u></b>	<b>Chapter 10: Twisting Athletes in Flight</b>	<b>SmartBook 10</b> 04/14/2024
<b><u>Week 13</u></b>	<b>UNIT 3 Discussion Board</b> Post due by 04/16/2024 & Responses due by 04/19/2024	<b>Test 3</b> 04/21/2024
<b><u>Week 14</u></b>		
<b><u>Week 15</u></b>		<b>Final Exam</b> 04/28/2024

## **ALL COURSE REQUIREMENTS DEADLINE**

**All test and assignments will be due on the date shown by 11:59 pm. The final exam will be due by the date and time shown.**

## **Distance Education Statement**

Students enrolled in distance education courses have equal access to the university's academic support services, such as Smarthinking, library resources, online databases, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires secure login information to verify students' identities and to protect students' information. The procedures for filing a student complaint are included in the student handbook. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website.

## **Accidents & Injuries**

In the case of bodily or personal property damage, the Kinesiology Department will not be held responsible. The student must report any field experience related injury or illness to the Instructor immediately. Any expense incurred due to injury or illness will be the student's responsibility.

### **Academic Integrity Statement**

Students in this class are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. A scholar is expected to be punctual, prepared, and focused; meaningful and pertinent participation is appreciated. Examples of academic dishonesty include but are not limited to: Turning in work as original that was used in whole or part for another course and/or professor; turning in another person's work as one's own; copying from professional works or internet sites without citation; collaborating on a course assignment, examination, or quiz when collaboration is forbidden. The Student Handbook can be found at: <https://www.sulross.edu/catalog/undergraduate-academic-regulations-2/#1605412215143-c8b265dc-3e01> In addition, please note that plagiarism detection software will be used in this class for written assignments.

### **Academic Civility Statement**

Students are expected to interact with professors and peers in a respectful manner that enhances the learning environment. Professors may require a student who deviates from this expectation to leave the face-to-face (or virtual) classroom learning environment for that particular class session (and potentially subsequent class sessions) for a specific amount of time. In addition, the professor might consider the university disciplinary process (for Academic Affairs/Student Life) for egregious or continued disruptive behavior.

### **Academic Affairs Service Statement**

Sul Ross faculty, staff, and students are expected to model responsible citizenship through service activities that promote personal and academic growth while enhancing the university, local, regional, national, and global communities. These activities will foster a culture of academic/public engagement that contributes to the achievement of the university's mission and core values.

### **Libraries**

The Bryan Wildenthal Memorial Library in Alpine.

Offers FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, [library.sulross.edu](http://library.sulross.edu). Off-campus access requires logging in with your LoboID and password. Librarians are a tremendous resource for your coursework and can be reached in person, by email ([srsulibrary@sulross.edu](mailto:srsulibrary@sulross.edu)), or phone (432-837-8123).

### **Academic Excellence Statement**

Sul Ross holds high expectations for students to assume responsibility for their own individual learning. Students are also expected to achieve academic excellence by:

- Honoring the core values of Sul Ross.
- Upholding high standards of habit and behavior.
- Maintaining excellence through class attendance and punctuality.
- Preparing for active participation in all learning experiences.
- Putting forth their best individual effort.
- Continually improving as independent learners.
- Engaging in extracurricular opportunities that encourage personal and academic growth.
- Reflecting critically upon feedback and applying these lessons to meet future challenges.

## **ADA Statement**

Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Mary Schwartz, M. Ed., L.P.C., in Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. Telephone: 432-837-8691. E-mail: [mschwartz@sulross.edu](mailto:mschwartz@sulross.edu)