Physics 1110 – Physics of Sports – Spring 2015

As the OSU course bulletin says, Physics 1110 “examines the physics of motion set in the context of sports.” This is a course in physics. We will discuss physics concepts (force, momentum, acceleration) and equations relating them. The focus will not be on derivations, but on how these concepts and simple equations can be used to help us understand sports.

The goal is that you will leave this course with an improved qualitative understanding of the physics of sports, as well as an appreciation of how scientists apply models to the real world.

Instructor: Prof. Michael Lisa
2146 Physics Research Building
Office: 292-8524
lisa@physics.osu.edu

Office hours: Mondays and Wednesdays 2:00-3:20

Meeting time: 12:45-2:05 Tues & Thurs Smith Lab 1005

Web site: Course material will be on Carmen.

Prerequisites: Math 1050 (075 under the quarter system) or equivalent. See Prof. Lisa if you are concerned about your preparation.

Text: We will use The Physics of Sports, a text that will be published by McGraw-Hill in March 2015. Because we will use it prior to the official publication date, we get to use the ebook at no cost! In the Administrative content section in Carmen is a guide on getting signed up with the ebook system.

Notes: Lectures will be based on note pages that you may download in the “Notepackets” content section of Carmen. These pages contain pictures, some math, text, and plenty of blank space. We will go through these together in lecture.

Print these pages out before lecture and bring them with you – it will make everything MUCH easier for you. I strongly suggest buying a three-hole binder and keeping these pages in it. Bring empty three-hole looseleaf paper as well.

Grading: Your grade is based on several components, so no one thing makes or breaks it.

• Final Exam or project (see below) – 20%
• Best 5 of 7 quizzes – 50%
• Homework (due Tuesday in class) – 20%
• Participation – 10%
• Depending on the development status of our e-book, there may be “active learning” assignments. These will be discussed if necessary.

The homework due Tuesday and the quizzes on Thursday generally cover material from the previous 1-2 weeks; see the schedule for details. Toward the end of the term, quizzes may include questions from student presentations.

Late homework policy: Homework is due at the beginning of class on Tuesday. If you don't have it then, but get it to my mailbox in the physics department by Wednesday at noon, you can get 50% credit. That's the latest it will be accepted.
**Missed quiz policy:** In a class as large and diverse as this, students will have many valid events (participation in athletics, university events, family issues) that conflict with a quiz. The policy of dropping two quizzes is intended to accommodate these valid excuses. My assumption is a student has a valid excuse for any missed quiz, so you don’t have to provide documentation if you miss one or two. In the truly extraordinary case that you have three or more valid, documented excuses, come talk to me. There are no make-up quizzes.

**Final exam:** Do not make travel arrangements that are in conflict with the midterm or final exam. Refer to the schedule for dates. See me during the first week of the semester if there is a problem. There will be no make-ups for the final.

**Alternative to the final exam:** In lieu of a final exam, you may choose to do a project in a small group. You can do a course-related project based on your own measurements, calculations and/or video analysis, supplemented by light literature research. Your group will generate a PowerPoint presentation and may be asked (for extra credit) to give a short (~10 minutes) presentation to the class. We will discuss the details of this project around the 3rd week of the term.

**Participation:**
1) I expect you to participate in class, paying attention and asking/answering questions. My subjective judgment of this will help determine this part of your grade as well as any “bump” that might be appropriate if your grade is on the edge between, say, a B and a B+.
2) Occasionally we may have “clicker” questions in class. You will be assigned a clicker number and are expected to participate in the polls.
3) You are required to submit a sports video, as described below.

**Sports video:** As part of your participation grade, you are also required to submit a link to a sports video clip (YouTube is fine) by the Sunday morning of your assigned week. You must use the dropbox feature on Carmen to do it. Don’t send it by email, seriously. The clip should be relevant to the topic we will be studying the week following the submission day. You must tell me briefly (can be as few as 3-4 sentences) what physics principle is illustrated in the clip. I may choose to show and discuss the video in class, so make sure it is of decent quality and clearly demonstrates the physics we are discussing at the time. You get bonus points if I use your video.

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The ideas behind the sports video clip and the group project are...
1) ...to get you to think about the physics concepts that you see in athletics
2) ...to provide material that is interesting to you, for discussion in class

**Schedule:** Provided is a tentative schedule of topics for the class. This schedule will be updated during the semester, to account for our progress.

Read the listed sections before lecture! I tried to make the book not too boring. Several worked-out examples are given, showing how to apply physics to sports situations.
Physics 1110 is an introductory-level physics course serving a broad range of students. It satisfies the requirements for a Natural Science course in OSU's General Education Curriculum (GEC). The following is a statement from the University about courses in the Natural Science category of the GEC.

**Goals:**
Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

**Expected Learning Outcomes:**
1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the inter-dependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Physics 1110 meets these objectives through a pedagogical discussion of fundamental physics principles as they relate to the real world in the context of athletics. Note is taken of the historical context in the development of these principles, and the connection between fundamental principles and technological implementation is discussed. In addition to regular coursework, the student is provided the opportunity to strengthen understanding of these principles through an independent group project and presentation on the application of physics in sports.

**ACADEMIC MISCONDUCT**

Academic misconduct will not be tolerated in this class. As instructor, I am required to report suspected misconduct to the university's Committee on Academic Misconduct.

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/info_for_students/csc.asp).

**STUDENTS WITH DISABILITIES**

Please contact the course instructor at the start of the semester so that arrangements can be made to accommodate you. Students needing the services provided the Office for Disability Services (ODS) will need to be certified by that office. The ODS is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/