

EID 424 Bioengineering Applications in Sports Medicine

Prof. Kremenec

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Mondays, 5-8 PM

Course Procedures

- There is no 10-minute rule
- You *will* participate
- Random quizzes
- Weekly journal club
- “Hands-on” demonstrations and exams (e.g., knee laxity, strength testing)
- Visit to NISMAT research lab, if possible, at the end of the semester
- Final exam

Lectures will be done via slide presentations which will be distributed via email or uploaded to the Teams site. This is useful in several ways:

- I do not get covered in chalk dust
- You do not have to try to understand the chicken scratch that is my handwriting
- You do not have to struggle to scribble down every word that I am saying/writing, but can concentrate on *listening*, and *making annotations* to the printed slides as you feel necessary

Note that there is no textbook specified for this course. Since you have saved around \$100 thanks to this policy, you may want to spend a few dollars for a binder in which you can safely collect your notes, and any articles and handouts used in the course, if you like the tactile sensation of paper. Of course, you may prefer to go completely digital, which is understandable.

Occasionally, we will start the class with a quiz, which will be based on the previous week's material. The wise student would review the notes and journal article (if any) discussed in the week prior to class, as these will be considered fair game.

Note that if you miss a class for any reason, you are still responsible for the material from that week. It is expected that you will obtain and review any relevant material prior to the next class. If you plan on not coming to class (e.g., for religious observance, interview, etc), I would appreciate being informed in advance. Do not be afraid to “call in sick,” as I can assure you that no one wants your illness, least of all me. Again, please let me know before or shortly after class, and feel better.

Course Outline

- Intro to sports medicine
- Basic anatomy and pathologies of some popular joints
 - Knee

- Ankle
- Shoulder
- Basic muscle and nerve physiology
 - Sources of energy for exercise
 - Measurement of oxygen consumption
 - Quantification of muscle activity via electromyography (EMG)
 - Simple interpretation of the electrocardiogram (EKG)
- Interesting (?) topics in sports medicine
 - Physical therapy
 - Ergogenic aids
 - Muscle injury and remodeling
 - Biomechanics
 - Interpretation of basic biostatistics

What's this journal club thing?

Every week, we will review an article from the medical literature. At the beginning of the semester, I will be leading the discussion of the article. Articles will be either current papers on the “cutting edge” in a certain area, or important papers that have been published in the past. As the semester progresses, I will become tired of leading the discussions and will pass that responsibility to you. Based on the size of the class, papers will be presented either individually or by pairs of students. Individual discussants are preferred unless the paper is lengthy or the class is large.

Note the use of the word “discussion” above. This should *not* be a presentation given to the class, but rather a *discussion* of the content in the paper. The person(s) presenting it should be very well-versed in their knowledge of the paper, but it is expected that *everyone* will participate in the discussion, or to have questions. The entire class will be expected to read the article(s) for each week. If you are leading the discussion, it is expected that you will have read the article several times and made some notes to aid in your leadership. In this context, I will moderate discussion of papers as appropriate.

It is also anticipated that portions of some papers may be over your head, especially in the earlier part of the semester. This is to be expected—no one can be an expert in every aspect of a topic as wide as sports medicine. Appropriate assistance will be provided.

Grading

Your grade will be based on attendance and participation in lectures and discussions, quizzes, your own journal club (i.e., the one where you assist in leading the discussion) and, of course, the final exam.