Sports Engineering:

A Practical Application of Engineering Technologies in Athletics

November 12, 2013

**Overview and General Information**

*This space is reserved for class times, instructor name, office, contact info, and office hours.*

**Required Readings (to be purchased):**

Jenkins, M. (2003). *Materials in sports equipment*. Cambridge, England: Woodhead Publishing Limited.

Drowatzky, J. (1996). *Ethical decision making in physical activity research*. Champaign, IL: Versa Press.

Other reading assignments will be posted on Moodle.

**Course Description:**

This course is formatted as a 3-week, writing intensive interim seminar. The core objective of “Sports Engineering” is to have students understand the application of engineering technologies and principles within athletics. The course will further address the importance of applying ethics to both sports and engineering.

**Assignment Values:**

45%- 3 Response Essays

30%- Class Participation

20%- Short Response Questions

5%- Participation

**Learning Outcomes:**

1. Define the relationship between sports and engineering.

2. Describe the importance of ethics within both sports and manufacturing.

3. Identify technologies and sustainable solutions to manufacturing apparel.

4. Assess and understand the manufacturing techniques within two companies.

5. Relate the non-engineering sports world to the knowledge and technologies that engineering has developed.

**Weekly Course Syllabus**

**Week 1:**

**Goal** – to define the importance of engineering in the sports world and develop an understanding of different ways materials can affect performance.

**Monday:** Introduction to Sports Engineering – Syllabus review and discussion of the basics in materials and technology that are used in sports. Preparation reading: *Chapter 1 from Jenkins – Introduction.*

**Tuesday:** Materials of Protection – discussion of the materials that are used for sports gear and protection. Preparation reading: *Chapter 2 from Jenkins – Foam protection in sport.*

**Wednesday:** Performance of Surface Materials – discussion of the different surfaces that sports are played on and why; how can these materials make a difference from sport to sport. Preparation reading: *Chapter 3 from Jenkins – Performance of sports surfaces.*

**Thursday:** Shoe Materials – discuss the design necessities that go into shoe materials and manufacturing and how that differs from sport to sport. Preparation reading: *Chapter 4 from Jenkins – Running shoe materials.*

**Friday:** Balls and Ballistics – discuss the difference of the equipment that is used for specific sports and basic aerodynamic principles. Physics module with guest professor. Preparation reading: *Chapter 5 from Jenkins – Balls and Ballistics.*

**DUE MONDAY- Response Essay #1** – Pick a sport of your choice and attend a game (use the remaining chapters from *Materials in sports equipment* as a resource, if necessary) and discuss how engineering can be applied to the apparel and equipment design and how that affects the athlete’s performance.

**Week 2:**

**Goal** – focus on a local athletic apparel manufacturer and delve greater into an understanding of the manufacturing process for athletic gear.

**Monday:** Ethics of equipment. Preparation reading: *Materials and Science in Sports – Ethics of the Use of Advanced Materials in Sports Equipment. Pages 37-45*

**Tuesday:** Ethics of sports. Guest professor – main topic – Lance Armstrong. Preparation reading: *Drowatzky pages 1-72.*

**Wednesday:** Introduce Majestic Athletic and discuss the business of apparel design and materials; visit from representitives of Majestic Athletic – discussion of apparel manufacturing and design.

**Thursday:** Class trip to Majestic Athletic.

**Friday:** Discussion on clocks, timing, stadiums, and referees followed by a class trip to Iron Pigs facilities.

**DUE MONDAY- Response Essay #2** – discuss ethics in sports, manufacturing of apparel, and equipment design. Do the ethics differ from sport to sport? Examine the difference between sports ethics and apparel manufacturing and design ethics.

**Week 3:**

**Goal** – recognize the company that Lafayette Athletic Department most closely works with and learn about their relationship with Lafayette as well as their design and manufacturing techniques.

**Monday:** Introduce Nike and their relationship with Lafayette Athletic Department.

**Tuesday:** Equipment design and manufacturing and sustainable efforts.

**Wednesday:** Trip to see our gear and facilities to Metzgar and APK.

**Thursday:** Video session. *Sports Technology produced by Actuality Productions, Inc.*

**Friday:** Review session – discuss ideas for future sports engineering programs at Lafayette, what we could do different/better to improve the connection between engineering and athletics.

**DUE MONDAY- Response Essay #3** – choose one of the two companies we met with (or another, if you feel strongly that it is an important manufacturer) and discuss their roles in the sports and engineering industry. How can this apply to students at a college like Lafayette?

**Reading Assignments (by week)**

**Week 1:**

Jenkins, M. (2003). *Materials in sports equipment*. Cambridge, England: Woodhead Publishing Limited.

**Week 2:**

Drowatzky, J. (1996). *Ethical decision making in physical activity research*. Champaign, IL: Versa Press.

Prisbrey, K. A., Stoll, S. K., & Froes, F. H. (2001). *Materials and science in sports*. (pp. 37-45). Warrendale, PA: The Minerals, Metals, & Materials Society (TMS).

**Week 3:**