MEMORANDUM

To: Professor Cohen, EGRS 451 Capstone
From: Arin Stasco, James Kaminek, and Megan Connolly
Date: December 6, 2013
Subject: Final Memo for Sports Engineering Capstone Project

Introduction & Research Question

Our project began as a continuation of a project by Anthony Buffolino ’12 combined with a project by Kelsy Lantz ’13 and Kristin Tuttle ’13. Buffolino’s project focused on creating and sustaining a relationship between the Lafayette College Engineering Department, the Lafayette College Athletic Department, and a nearby athletic apparel manufacturer, Majestic Athletic. Lantz and Tuttle created a three week interim course on developmental engineering. Our decision to combine the two resulted in a three week course called Sports Engineering. Our goal for this course was to bridge the gap between traditional engineering practices and the broader liberal arts through both the Lafayette communities and regions elsewhere. The project we have created responds to our research question: Why is sports engineering important and how does it fit into the current Lafayette engineering program?

Context

This project is relevant to contemporary academia because the sports industry has seen a rapid increase in the use of engineering technologies and there has also been an up rise of sports engineering research and training. More specifically, sports engineering programs have been implemented at many prestigious schools across America. Some of these programs have the ability to work hand in hand with major sporting companies, for example, Oregon and Nike, Maryland and Under Armor, and Georgia and EvoShield. This program proposal is not impossible for such a small engineering school like Lafayette College since Majestic Athletic is located only 5.4 miles away. Sports engineering is becoming more and more prevalent in all athletics and does not seem to be slowing down, therefore it makes sense to teach engineering students the discipline of sports engineering.

Currently, Lafayette offers courses in both Sports Economics and the Sociology of Sports - Econ 338: Economics of Sports and A&S 265: Sociology of Sport respectively. Our community is both heavily populated in engineering and in athletics. One in four Lafayette students are engineering majors according to USNews and one in every five Lafayette students play a varsity athlete according to Forbes. Based on this information, joining the two seems logical. It is almost hard to believe that our proposed course is not already in place at Lafayette especially since the Forbes statistic

did not include the vast number of students who participate in intramural or club sports. Our encompassing goal of this Sports Engineering Capstone Project is to integrate engineering and athletics because there has been an increase in sports participation over the last four decades especially amongst adolescents.

In soccer, which remains one of the country's most popular youth sports, numbers have risen from about 15 million participants in 1987 to more than 17.5 million participants in 2002, according to CNN. In Pop Warner Football, a youth football organization, participation increased two hundred percent from 1990 to 2006, from about 130 thousand players to 260 thousand players, according to the same CNN article. This means the demand for sports engineers is only going to increase as sports become more prevalent assuming that the study done by CNN foreshadows decades to come. Our idea is to draw students toward the Engineering Studies Major, which will touch on the expanding sports engineering field to fully experience what it means to be an Engineer at a Liberal Arts College.

Method

As a topic of socio-technical debate, we further examined the sports engineering programs that are established at University of Oregon, University of Maryland, and University of Georgia, and their partnerships with Nike, Underarmour, and EvoShield, respectively. This gave us a foundation for the beginnings of our three-week course. Lafayette College and the University of Colorado Denver share similar contexts, each carrying a high percentage of students who are interested or involved in sports. We completed extensive research on the Sports Engineering Program implemented at the University of Colorado Denver. After successfully launching their first Introduction to Sports Engineering course in 2010, The University of Colorado has been able to follow through and establish a program providing graduate degrees in Sports Engineering. Following this cohesion, along with analogous goals and objectives we found that it would be beneficial to use the guidelines set by University of Colorado for the foundation of our Sports and Engineering Course.

Our approach to Sports Engineering was to continue on a course curriculum based path modeled after the aforementioned program. Our team contacted representatives with Nike, the current provider for primary athletic apparel and gear for Lafayette athletics. Our intention is for Nike to become an important resource in the course's direction by providing insight to students about what goes on behind the scenes of athletics at Lafayette. Not only will this benefit our program and our students' knowledge, but Nike will be able to obtain an additional academic program allowing for the development of sports technology and innovative gear for the future.

Objectives

Through our research of sports engineering, we were able to ascertain the concepts that we deemed most important for students to learn. The stated objectives of the sports engineering course are for students to:

- Define the relationship between sports and engineering
- Describe the importance of ethics within both sports and manufacturing
- Identify technologies and sustainable solutions to manufacturing apparel
- Assess and understand the manufacturing techniques within two companies
- Relate the non-engineering sports world to the knowledge and technologies that engineering has developed.

The course objectives that we have devised come from a list of resources that we will require students to obtain for their participation in the course. The advantage of having an interim course rather than a semester long course is that it presents the opportunity to work hand in hand with the sports teams that are on campus at the time.

Product

We met these course objectives by developing a three-week an informational-segmented course syllabus outlining every day of the course for the full fifteen days of the interim period. The syllabus identifies the course objectives that we have created and effectively assigns a topic to each day throughout the course. The syllabus contains required and optional readings; three essay prompts, and educational field trips.

Currently, there is an open space for class times, instructor name, office location, contact information, and office hours. That space can be filled once the course is implemented and a professor is assigned to teaching it. The readings that we require students to purchase are Materials in Sports Equipment by M. Jenkins, and Ethical Decision Making in Physical Activity Research by J. Drowatzky. We came to the conclusion of requiring these readings because we found that they are extremely relevant to the nature of our course and fit in well with the course outline. In our syllabus, we also define the learning outcomes as previously mentioned under ‘Objectives’.

Week one is dedicated to defining the importance of engineering in the sports world and developing an understanding of different ways materials can affect an athlete’s performance on the field. We begin the week with an introduction to sports engineering, reviewing basics of materials and technology and how that fits into both sports and engineering. We continue through the first week with discussions about the materials of protection, surface performance, and shoes. We end the week with a day on balls and ballistics, discussing the difference between the actual equipment that is used for specific sports and basic aerodynamic principles. We provide a response essay assignment for the

weekend that will be due the Monday of the following week - to attend a game or event on a sport of the student's choice and discuss how engineering can be applied to the apparel and equipment design of that sport and how that affects the athlete's performance.

The second week of the course is focused on a local athletic apparel manufacturer and dives greater into an understanding of the manufacturing process for athletic gear. On Monday and Tuesday, the discussion topic is ethics of equipment and sports in general, respectively. On Wednesday, we will introduce Majestic Athletic of Easton, PA and bring in a guest from the apparel manufacturer to provide insight on the business of apparel design and materials. The following day the class will visit the Majestic facilities to learn more about the company. For the end of the week we will have a discussion on clocks, timing, stadiums, and referees, followed by a class trip to Iron Pigs facilities in Allentown, PA. For the following Monday, the response essay that is due will be discussing the ethics in sports, manufacturing apparel, and equipment design. We would like the students to also discuss ethics in specific sports and how that changes or stays the same throughout.

By week three, we recognize the company that Lafayette Athletic Department most closely works with and learn about their relationship with the College as well as their design and manufacturing techniques. This entire week is dedicated to Nike and and their relationship with Lafayette Athletic Department. The class will take a trip to see the Lafayette facilities and gear at Allan P. Kirby Athletic Center and Metzgar Fields. At the end of the week, the students will watch a video on sports technology that is specified in the syllabus and review/discuss ideas for future sports engineering at Lafayette and how we can better improve the connection between athletics and engineering. The final response essay is to write about one of the two companies we learned about (or another, if the student prefers) and discuss their roles in the sports and engineering industries.

The idea for this course is not entirely our own. A similar course exists at University of Colorado Denver, called Introduction to Sports Engineering. The course in place at UCD was first offered in the spring of 2010 as a team taught class looking at all three aspects of sports engineering – classical engineering, sports science and medicine, and product design. Through the success of this project, University of Colorado Denver has taken it even further to implement an entire major dedicated to sports engineering.

Recommended Next Steps

Our long-term goal is that this class will take off and manifest itself into its own degree. In order for this to happen, we first need to receive course approval through a process within Lafayette. We have attached the CEP Course Approval Form issued by the Committee on Educational Policy at Lafayette. (See Appendix B.)

We believe that we have covered all grounds to gain approval for implementation at Lafayette College. Once approval is obtained, the course will need to be advertised to potential students through campus-wide emails, flyers in individual mailboxes, word of mouth and our interactive website with course information. Our vision is that the professor teaching the course would be someone who is enthusiastic about sports and is willing to work with a multitude of guest professors from a variety of different fields. There would not be much additional work required since we provide a detailed day-by-day syllabus in which the instructor can easily follow. In order to teach the course the instructor would just need to read and understand the books to know how they fit into our syllabus. Following the success of the interim course that we expect, we hope that future engineering studies students will be able to continue the work that we have done and turn this course into a series of courses, a minor, and eventually a major program at Lafayette College.

http://sites.lafayette.edu/egrs451-fa13-connolmm/

Student Signatures

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Arin Stasco

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James Kaminek

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Megan Connolly

Index of Appendices

Appendix A: Annotated Bibliography

Brzeziński, S., Malinowska, G., & Nowak, T. (2005). High-tech sports clothing with a high comfort of use made from multi-layer composite materials. *Fibres & Textiles in Eastern Europe*, *13*(4), 52.

Stefan Brzezinski, Grazyna Malinowska, and Teresa Nowak, researchers at the Institute of Textile Materials Engineering describe in this article the project undertaken where numerous materials designed and manufactured for the use of input of sports clothing were analyzed. They considered factors such as barrier characteristics, comfort of use and service life. Products must be protective against different atmospheric conditions as well as protect against physical damage. Athletes must obtain a high resistance to tear, abrasion, and overall lasting service life, as well as being physically comfortable. In order for a product to be marketable towards athletes they must have comfort-providing properties including the carrying off of perspiration, warmth retention, and air permeability as well as overall handle and shape. It is in these qualities that products become safe and desired by athletes and coaches. After acknowledging the difficulty of abiding to all these properties, the authors begin to make arguments for the multi-layer systems. They bring the reader through the properties of every layer and then go on to discuss the testing and results that multi-layer products have been through. This article will be very useful for our group when we begin to suggest specific products to be noted in the sports-engineering system that we propose to set up. It covers everything we must know about multi-layer products, even though our group will be sure to find other sources to determine its validity. The limitations of this article are that it only gives substantial information on the use of products made from Multi-layer Composite Materials rather than discussing products made by Majestic, the company that we plan to work with. This article was also published in 2005 which makes the information somewhat outdated.

Brophy-Williams, N., Driller, M. W., Halson, S. L., Fell, J. W., & Shing, C. M. (2013). Evaluating the Kikuhime pressure monitor for use with sports compression clothing. *Sports Engineering*. doi:10.1007%2Fs12283-013-0125-z.

The article submitted by Brophy-Williams, written by Driller, Halson, Fell, Shing, and Brophy-Williams examines a study done on the pressure that is exerted by sports compression clothing to the athlete and the ways that it could assist the athlete in the sport itself. Although this article focuses more on Kikuhime pressure and the validity and reliability of the device, it does directly refer to the subject of sports engineering. The article observes the use of compression garments and the history of their use for medical benefits that would enhance both recovery and performance in an exercise setting. This article would be useful in our proposed project because it can be used as a hands on, technical based project incorporated in the semester. It also could be a good project to team up with Majestic Athletic, given that their work is mainly with sporting apparel. Students will need to understand the background of the apparel fabrics and compression in order to have a working relationship with Majestic Athletic.

Cantu, D. (2012). Going, Going, Gone: The Making of a Baseball Bat. *Technology & Engineering Teacher*, 72(2), 8-14.

Cantu goes into great detail about the history of the baseball bat, more specifically the history of the metal bat in baseball. There is a whole section of the article dedicated to how bats are made and all the different types of bats that were made throughout history. When the game was first starting out Louisville Slugger only mass produced heavy wood bats. It wasn't until 1924 when the metal bat came into play and that industry started to grow faster than the wood bat industry. Over the last couple of decades, the metal bats industry has been improving the metal bat itself so much that it makes the game dangerous to the players not on offense. People in the stands, and on the field, are in a greater deal of danger when a player is using metal bat compared to a wood bat because of the velocity at which the baseball is hit. Safety officials in both the NCAA and Little League have been trying to deal with this problem by putting regulations on how powerful the bats can be. Every metal bat must now meet BBCOR and BESR standards which limit the "trampoline effect" of these bats. This source is relevant to our topic because it looks at a recent safety problem in sports technology. Students could read this article as part of our proposed sports and engineering class and gain knowledge in ethics of sports innovation. The major weakness of the article is it does not delve deep enough into the dangers of wood bats. They are not the perfect solution either because they can easily shatter and/or cause injury. We want our engineers to have the skill set to improve the game, not make it more dangerous to players and spectators.

Chowdhury, H., Alam, F., Mainwaring, D., Subic, A., Tate, M., Forster, D. and Beneyto-Ferre, J. (2009), Design and methodology for evaluating aerodynamic characteristics of sports textiles. *Sports Technology*., 2: 81–86. doi: 10.1002/jst.92.

Chowdhury, H., Alam, F., & Subic, A. (2010). Aerodynamic performance evaluation of sports textile. *Procedia Engineering*, *2*(2), 2517-2522. doi:10.1016/j.proeng.2010.04.025.

Course Approval Process (n.d.). *Virginia Tech: Office of the University Registrar* Retrieved December 2, 2013, from http://www.registrar.vt.edu/governance/course-approval/process/index.html

Froes, F. H. (1997). Is the Use of Advanced Materials in Sports Equipment Unethical? *JOM*, *49*(2) 15-19.

This article followed the theme of some of our other articles by challenging students when thinking about innovation in sports. Is all innovation ethical and good? This article brings up questions in sports like running, pole vaulting, golf, baseball/softball, bicycling and tennis. The article goes into great detail about each sport specifically and analyzes different sporting equipment used in each sport. Froes main argument is about the differences between engineering with an emphasis on cost vs. engineering with an emphasis on performance. He brings up this ethical question of "Should only the highest

level athletes be the only ones to be able to use safer and better performance products because they are the only ones who can afford them?" Clearly engineers need to find a balance between the two types of engineering to truly improve the sport. The reality is though, innovation s are constantly occurring and our current system favors the most powerful and wealthy. That is why in the Olympics the countries that are the most developed usually have the most gold medals. The article falls short in my book because one it cites outdated references, especially when talking about baseball and softball and two, it never really dives into the ethical questions as much as we would like. It leaves a lot up for interpretation and assumes a lot about the readers' ethics.

Jenkins, P. E., Plaseied, A., & Khodaee, M. (2010). UCD Sports Engineering Program. *Procedia Engineering*, *2*(2), 2757-2762.

The University of Colorado in Denver is one of the first university's to implement a Sports Engineering Program in the United States, the authors of this article Jenkins, Plaseied and Khodaee are all professors at the University and have taken the time to explain the new and exciting era of a sports engineering degree. They begin by explaining the connection between trained professionals and sports equipment manufacturers to develop new and better products. The authors stress the fact that at UCD, the faculty that teach the Sports Engineering students come from both the medical campus and a more traditional campus (engineering and liberal arts), which adds to the programs cross-disciplinary nature. The cross-disciplinary nature is something that our current project strives for so being able to refer back to the UCD model is something that we will need for our foundation, despite the fact that our project may not connect specifically medical and traditional fields, this is something that we want to achieve. Similar to Lafayette, the authors mention the active, sports-minded state mentality that is found in Colorado and how this is an asset to the Sports Engineering program because of the opportunities for collaboration with athletes, trainers, sports organizations and equipment manufacturers. We felt that the examples provided in this article could easily be applied at Lafayette and potentially become part of our project if we find ourselves desiring a research component in the sports engineering coursework. The last part of the article which we thought was most important was the explanation of Student Coursework. When attempting to achieve our goal of creating a Sports Engineering Degree years down the road, referring back to the course requirements to achieve this major at UCD will be very beneficial, but at this point we felt it was necessary to focus on UCD's specific course description of *Introduction to Sports Engineering* which was taught for the first time during the Spring 2010 semester. This is ideally our end product for the semester so our group feels that referring back to Appendix B; the *Introduction to Sports Engineering* course outline will be very beneficial. This outline includes topics of lectures, types of professors that taught each lecture, projects and homework assignments that were all part of the course. Overall we felt that this article will be one of our top references because of the fact that we are attempting to implement a very similar scenario, we do however find a few areas of critique. Being an old article, written in 2010 in the beginning stages of implementation for UCD, we would like to find a more updated status summarization of how the major and course are holding up today. The article also talks about how UCD uses a close connection with the medical campus for

the use of this project which is something that we haven't thought about doing. It is very important for us as a group to know how other universities have gone about implementing a similar situation so that we can avoid some of the problems that they may have experienced.

Lafayette College. (n.d.). *US News & World Report*. Retrieved December 2, 2013, from http://colleges.usnews.rankingsandreviews.com/best-colleges/lafayette-college-3284

Lafayette College. (n.d.). *Forbes*. Retrieved December 2, 2013, from http://www.forbes.com/colleges/lafayette-college/

Mao, A., Luo, J., Wang, R., Li, G., & Guo, Y. (2011). Engineering design of thermal quality clothing on a simulation-based and lifestyle-oriented CAD system. *Engineering with Computers*, (27), 405-421. doi:10.1007/s00366-011-0224-z.

This publication looks into athletic clothing with a more scientific perspective than the others that we found. Mao, Luo, Wang, Li, and Guo introduce a simulation-based, lifestyle-oriented CAD system to help the user in engineering design of thermal quality clothing. The article investigates the quality of thermal clothing as well as the functions that come along with wearing it for specific physical functions that goes along with moisture transfer. Their schematic of engineering design of thermal clothing deals with involved thermal behaviors, mathematical models and descriptions, simulation capability, CAD system, evaluation and optimization, and wearing the clothing. This could be a good publication to use if we decide to move toward the specifics of clothing for athletics because much of the science behind athletic clothing is outlined in this particular article. This article could also provide another technical based project that can be incorporated in our course. For example, Majestic Athletic may have a project for students that look at the differences in clothing through this CAD system. Having prior knowledge of this CAD system would benefit both the students and Majestic Athletic.

Mason, B., van der Woude, L., & Goosey-Tolfrey, V. (2013). The Ergonomics of Wheelchair Configuration for Optimal Performance in the Wheelchair Court Sports. *Sports Medicine, 43*(1), 23-38. doi:10.1007/s40279-012-0005-x.

This article focuses on the ergonomics or efficiency of wheelchairs in sports such as basketball, rugby and tennis. This article is heavily design-based but it brings into light the challenges that certain disabled athletes face. The most difficult challenges arise when dealing with the limitations of the athletes themselves. For example, one part of the article discussed how to design a wheelchair that could be moved without the athlete using their hands but the problem occurs because every disabled athlete is not the same. Some athletes may be able to control their thighs while others have to rely on other parts of their body. The other examples focus on general athletes in wheelchairs, such as seat positioning and material of the wheelchair itself to make the sport safer. This source is

creditable because these examples are first-hand observation from the authors. These design problems are what people in the industry face. These sorts of examples challenge students to think about design problems and to not always generalize "athletes." They have to be able to design for both the general case of athletes and the specific case. The article falls short of a true conclusion, which could be looked at as a weakness. We did not see that as a weakness, but as more of a good teaching tool to challenge the students much like the Up/down design project we did for EGRS 451.

Medwell, P. R., Brooks, L. A., & Medwell, B. S. (2011). Analysis of the lawn bowl trajectory as a teaching tool for sports engineering: Development of a graphical user-interface. *Procedia Engineering*, *13*, 531-537. doi:10.1016/j.proeng.2011.05.126.

Medwell, P. R., Grimshaw, P. N., Robertson, W. S., & Kelso, R. M. (2012). Developing sports engineering education in Australia. *Procedia Engineering*, *34*, 260-265. doi:10.1016/j.proeng.2012.04.045.

Mickle, W. K. (2010, July 6). *Patent US7748056 - Garment having improved contact areas - Google Patents*. Retrieved October 20, 2013, from http://www.google.com/patents/US7748056?printsec=description&dq=under+armour+apparel.

Moritz, E., Haake, S., Krueger, A. (2006). Approach of a Model for the Interaction Between Athlete, Sports Equipment and Environment. *Engineering of Sport 6, Volume 3* (pp. 17-22). Dordrecht: Springer.

In this article, the author Andreas Kruger, a professor at the University of Magdeburg, studies the three main reasons for growing interest in sports technology that include maximizing ones performance while considering safety and economics. Through the observations qualities of input effects, intended effects, side effects and feedback, researchers were able to obtain a model allowing producers to consider the athlete, his activities, the sports equipment and the environment all at once. The main purpose of this model is to produce products that allow athletes to achieve better results in competition and training while keeping things as safe as possible. All of these factors must be measured during the design process of sports equipment in particular because of their effects. Aside from the obvious effects of specific equipment, Kruger points out the importance of perception, emotion, status symbol and trend. This article will help us to obtain a strong foundation on what goes into the design process of sports equipment. The limitations of this article are that of which it does not go into great detail of examples and therefore our group will need to go elsewhere to find substantial examples.

OLaighin, G., & Costello, M. (n.d.). Sports and Exercise Engineering - GY411 - NUI Galway. *Sports and Exercise Engineering - GY411 - NUI Galway*. Retrieved October 20, 2013, from http://www.ExerciseEngineering.com.

Gearoid O'Laighin and Mary Costello, professors at the National University of Ireland in Galway write this booklet describing course information about the Sports and Exercise

Engineering Degree offered at their university. They start off with describing how the use of Engineering in the design of sports and exercise equipment is continuously growing each year regarding improvements allowing exercise equipment more suitable for use by disabled or elderly exercisers, designing systems to increase children's level of physical activity or by designing more efficient sports equipment that will improve sports performance for the professional and amateur athlete. The Bachelor of Engineer/Masters of Engineering Science-Sports and Exercise Engineering program at NUI Galway has a strong multidisciplinary focus which is coherent with what we are trying to achieve through our project here at Lafayette. The authors state that the program at NUI will create a new type of engineer whose training and education will provide him/her with the skills and expertise to design sports and exercise systems with a particular emphasis on Movement Assessment, Ambulatory monitoring of human performance, and systems for the assessment of sport and exercise. Although we may not be striving to achieve these same goals without project scope, it is still beneficial for us to look and see how this university brings their students through a somewhat similar coursework in efforts to achieve a varying degree. Aside from the overall focus of this major of improving human health through exercise, NUI uses their program to enable the graduate to design a broad range of high performance, portable electronic instrumentation and sensor devices with built-in wireless communication capabilities for application in sports and exercise. These systems will be worn by athletes and exercisers and will provide real-time feedback to coaches, athletes and exercisers on their physiological response to the demands of sports and exercise. When we read this part of the booklet, our heads immediately thought about our women's soccer team here at Lafayette whom currently uses a product similar to this letting their coach know the exact status of the player's body while performing a certain task. This could be a potential spot for connection when we are trying to find a team or group of people to establish a relationship with. Our critique of this article is that the focus of the NUI's sports and exercise engineering program is a little bit different from that which we hope to achieve. Here, there is more of a focus on overall human well being dealing with health rather than specifically athletes. Despite this critique, we feel that this passage may be useful when determining the necessary course requirements for our Sports Engineering Degree.

President & Chief Executive Officer. (2013.). FY10-11 Sustainable Business Performance Summary. *NIKE, Inc.*. Retrieved October 20, 2013, from http://nikeinc.com/news/nike-inc-introduces-new-targets-elevating-sustainable-innovation-within-business-strategy.

The 2013 Nike Sustainable Business Performance Summary discussing Nikes commitment to serving the athlete through innovation and design as the world's leading athletic equipment company. Consistent with efforts of the rest of the world to become sustainable, Nike has begun to make the same effort. They have explored new business models and have built tools such as the Nike Materials Sustainability Index to make it easy for designers to create products with lower environmental impacts. They have evaluated new materials and constructed four strategic pillars in efforts to optimize and deliver positive impacts and innovations to create our future. By combining Nikes sustainable efforts with their foundational motto of allowing for endless possibilities for

human potential through sport, they hold high ideals for the future. Since Lafayette currently uses a lot of Nike's equipment, it is important for our group to have a background on Nike's current position in the sports equipment world. Despite our awareness of Nike as a company currently, we found ourselves oblivious to many things that they discussed in this report. It is important for us to realize Nike's efforts to become sustainable and will only contribute to our project. We also feel that because the CEO of the company writes the report it holds extreme reliability due to the fact that he is spearheading the company. Some limitations of this article are that it simply summarizes Nike's standing in the production world today and not ones talks about any engineering systems that they currently may be a part of. Since this is our main goal for our end product, we can only use this article for background rather than relying on it for a lot of research.

Stein, D. G. (2004). College Sports, Inc: How Big-Time Athletic Departments Run Interference for College, Inc. In *Buying in or selling out?: The commercialization of the American research university* (pp. 17-31). New Brunswick, N.J: Rutgers University Press.

Youth Sports Drawing More Than Ever. (n.d.). *CNN*. Retrieved December 2, 2013, from http://www.cnn.com/2006/US/07/03/rise.kids.sports/

Appendix B

Course Proposal Form

PLEASE SUBMIT THIS FORM AND SUPPORTING DOCUMENTS TO THE REGISTRAR
BOTH PAGES OF THIS FORM MUST BE COMPLETED
(Revised August 2013)

Proposal for: [ ] Regular [ ] Interim [ ] Summer [ ] FYS [ ] Special Topic [1] ***course***

Request for change in: [ ] Number [ ] Description[2] [ ] Title [ ] Pre-requisites[2]

[ ] Other _____
Current number, title, pre-req. _____
___
Department_____ Suggested Course Number____ Date_____

Title_____

COURSE DESCRIPTION: (for catalog): Limit Description to *no more than 75 words*

Prerequisites_____
Staff_____
Contact Hours Per Week_____
Course Type _____ (i.e., Lecture, Lab, Seminar, Individual Instruction, etc.)
Effective Term_____
Is this a **required** course for Majors/Minors? _____ Yes _____ No

1. Please attach a syllabus that includes course objectives, learning outcomes, grading policy, academic honesty statement, course bibliography/reading list, and federal credit hour compliance statement. You should review **the course proposal FAQ** for more information.

2. Do you wish this course to fulfill a requirement within the Common Course of Study? If so, please indicate which area(s) – you may check multiple boxes.

[ ] Humanities (H) [ ] Natural Science w/lab (NS) [ ] Science Technology in Social Context (STSC) [ ] Social Science (SS) [ ] Quantitative Reasoning (Q) [ ] Engineering (E)	[ ] Global and Multicultural (GM1) [ ] Global and Multicultural (GM2) [ ] Elementary Language Proficiency (LANG) [ ] Values (V) [ ] Writing (W)

2a. Please attach an explanation of how the course fulfills the learning outcome(s) associated with the CCS requirement(s) you checked above, including if this course meets any of the General Skills outcomes. A full list of all CCS learning outcomes is available in **the course proposal FAQ.**

3. To secure approval, the department head must provide the following information:

1. *Explain how and where this course fits into the curricular mission of the department? In your statement, please consider:*
   Is this an elective or required course in the major? [3]
   Is this course essential to maintaining the quality of the major program? Why?
   Is this course needed to improve the major program? Why?
   Is it important as an elective course for non-majors?
   If appropriate, why is it attractive as a Special Topics course?

B. If this course overlaps with other courses (in your department or in other departments) explain.

How is it different?

List the department heads with whom you have consulted. Their comments/endorsements should be attached to the proposal.

_____ _____

Name Department

_____ _____

Name Department

C. Explain the impact this course will have on the following resources:
Staffing, Budget, Library, Computing. If additional resources are required, please provide a separate statement for review by the Provost. Explain how offering this course will affect the departments other offerings, i.e. are we still teaching the correct number of intro, service, major courses, etc.

4. Indicate whether the proposed course is appropriate for any of the following interdepartmental/interdisciplinary programs (a memo of concurrence by the appropriate program chairs are required):

	Req'd	Recom'd		Req'd	Recom'd
Africana Studies	[ ]	[ ]	Health Care/Society	[ ]	[ ]
American Studies	[ ]	[ ]	Health & Life Science	[ ]	[ ]
Architectural Studies	[ ]	[ ]	International Affairs	[ ]	[ ]
Asian Studies	[ ]	[ ]	Jewish Studies	[ ]	[ ]
Biotechnology/Bioengineering	[ ]	[ ]	Latin Amer/Caribbean Studies	[ ]	[ ]
Classical Civilizations	[ ]	[ ]	Literature in Translation[ ]	[ ]	
Computational Methods	[ ]	[ ]	Medieval Renaissance Studies	[ ]	[ ]
Environmental Sciences	[ ]	[ ]	Neuroscience	[ ]	[ ]
Engineering Studies	[ ]	[ ]	Policy Studies	[ ]	[ ]
Environmental Science	[ ]	[ ]	Russian/E. European Studies	[ ]	[ ]
Film and Media Studies	[ ]	[ ]	Women and Gender Studies	[ ]	[ ]

5. Will this course involve the use of human subjects in learning exercises? If so, approval by the Institutional Research Board may be necessary; contact the Provost's Office for further information.

6. Will this course involve the use of animal subjects in learning exercises? If so, approval by the Institutional Animal Care and Use Committee may be necessary; contact the Provost's Office for further information.

_____	_____	_____	_____
Proposer's Signature	***Date***	***Proposer's Signature*** [4]	***Date***
_____	_____	_____	_____
Department Head Signature	***Date***	***Department Head Signature***[4]	***Date***

[1] **Note: A Special Topics course, upon approval, may be offered *only two times within a three-year period*, with the further requirement that the course will be taught by the same staff member(s).**

[2] **Note: Please attach a syllabus for all proposals including requests for changes in description and pre-reqs.**

[3] **Note: For a new *required* course, please attach a request for change in requirements.**

[4] **Note: If this is a team-taught or INDS course, approval of additional department head(s) may be required**

Please Note: The Curriculum and Educational Policy Committee cannot evaluate incomplete proposals