Syllabus
Sports Analytics (ITAO 70420)
Spring 2020 / Mod 4 (Mar-May 2020)

Location: Zoom classroom, https://notredame.zoom.us/j/770902590
Time: Monday & Wednesday, 1:00PM – 2:50PM

Professor: Scott Nestler, PhD, CAP, PStat
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Telephone: (574) 631-8117

Office Hours: Mon & Wed, 9–11AM
(and by appointment)
https://notredame.zoom.us/j/708993754

Course Description: The techniques and tools of business analytics are transforming many industries, to include sports. This vertical has the advantage of being widely and closely followed, with large amounts of easily-accessible real-world data. Topics for study in this course include how to evaluate players, create good teams, and enhance coaching strategies. Assignments involve the hands-on use of a variety of techniques and tools, including: data collection and manipulation, probability, statistics, optimization, simulation, game theory. A basic knowledge of Excel, R, statistics, and sports (in particular, baseball, basketball, and football) is assumed. *You do not have to be a sports fanatic.*

Course Objectives: The overarching objective of this course is for students to gain an understanding of how to use data and quantitative methods to measure performance and make decisions to gain advantage in the competitive sports arena. Upon completion of this course, you will be able to:

- Recognize, formulate, and analyze decision-making opportunities in sports;
- Locate, acquire, process, visualize sports data for use in analysis;
- Choose and apply the appropriate tool (critical thinking, mathematical modeling, statistical analysis, predictive analytics, game theory, optimization, simulation, …) in sports;
- Operate in groups or teams.

Required Textbooks: No textbook to purchase. I will provide you with links to online readings and free FINAL DRAFT chapters of Winston, Nestler, & Pelechrinis, Mathletics 2nd Edition , Princeton University Press, 2020.

Software: Access to Microsoft Word, PowerPoint, Excel, and .pdf files. Other software as students are familiar with and desire to use (e.g. R, Python, SPSS, Tableau, …)

Grading: Your final course grade depends on your performance on five weekly homework assignments, class participation, a group project, and a final exam, with weights shown below.

Attendance	10%
Class Participation	10%
Homework Assignments (4)	40%
Group Project	40%

~~Per the Mendoza College of Business grading policies, the mean (average) final grade for this course must average between 3.3 and 3.6.~~ *SUSPENDED for SP20*

Attendance & Participation: Regular class attendance is absolutely expected and will not only facilitate your understanding of the material presented in the texts, but also will better prepare you for the homework assignments, course project, and examination. Classroom discussion is a critical component in the assimilation of concepts; all students are encouraged to ask questions and provide comments. Note that attendance is necessary for participation, but it is not sufficient for *active* participation.

Homework: There will be four (4) weekly homework assignments, usually due by the start of class on Mondays, as indicated on the schedule. *Except for the first assignment*, you are free to collaborate with two classmates (*Hint: I suggest your project partners*) on homework assignments, but please acknowledge all members of the group. Late submissions will be allowed, unless prior arrangements have been made with the instructor.

Course Project: The course project will be an in-depth investigation of a sports analytics topic. The focus can be on the use of analytics in a particular sport (e.g. baseball, football, basketball, etc.) or on a particular technology or decision opportunity. Project groups (of size 3) will be selected early in the course. A short (1-page) abstract will describe the data set to be used, questions to be investigated, and general approach. The project will culminate with a short presentation to the class and a 6-10 page (plus appendices as appropriate) written report.

Due dates and weights assigned to each portion of the project are as follows:

Item	Due Date	Weight
ID Groups & Topic	Wed., Mar. 25	-----
Abstract	Wed., Apr. 1	5%
Presentation	Mon., Apr. 27	15%
Report	Wed., Apr. 29	15%
Peer Eval	Mon., May 4	5%

Special Needs: It is University policy to make reasonable academic accommodations for qualified individuals with disabilities. Registration with the Office of Disability Services is required to receive accommodations in this course (no exceptions!).

Academic Honor Code: Upon entering the University, you were required to study the on-line edition of the Academic Code of Honor, to pass a quiz on it, and to sign a pledge to abide by it. The full Code and a Student Guide to the Academic code of Honor are available at http://honorcode.nd.edu. Perhaps the most fundamental sentence is the beginning of section IV-B: "The pledge to uphold the Academic Code of Honor includes an understanding that a student's submitted work, graded or ungraded – examinations, draft copies, papers, homework assignments, extra credit work, etc. - must be his or her own." Please recall that you are all bound to abide by the University of Notre Dame Honor Code, and the Honor Code states that, "as a member of the Notre Dame community, I will not participate in or tolerate academic dishonesty."

Tentative Course Schedule (Change 1)
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Session	Date	Day	Topic(s)	Homework Due (*)
-	MAR 16	Mon	No class	---
-	MAR 18	Wed	No class	---
1	MAR 23	Mon	Course Introduction & Syllabus Overview	---
2	MAR 25	Wed	Places & Ways to Get Data for Analysis	ID Project Groups & Tentative Topics
3	MAR 30	Mon	Measuring Player and Team Performance	HW #1
4	APR 1	Wed	Analytics in Baseball	Project Abstracts
5	APR 6	Mon	Analytics in Football	HW #2
6	APR 8	Wed	Analytics in Basketball	---
-	APR 13	Mon	No class (Easter Break)	---
7	APR 15	Wed	Analytics in Basketball, Part 2	HW #3
8	APR 20	Mon	Team Formation	---
9	APR 22	Wed	Analytics in Other Sports (Soccer, Hockey, Lacrosse)	HW #4
10	APR 27	Mon	Project Presentations, Part 1	All Slides Due
11	APR 29	Wed	Project Presentations, Part 2	Report Due
12	MAY 4	Mon	NO Final Exam	Peer Review Due

***** - These are just the deliverable graded assignments due by the start of each class. For reading and video assignments to be completed as class preparation, see the "Lessons" tab on Sakai.

DISCLALIMER: *The information provided on this syllabus is tentative and may be modified, using a Sakai announcement.*