



RICE SOCIAL SCIENCES

Department of Sport Management

Course: SMGT 430/530 – Introduction to Sport Analytics

Term: Fall 2024

Class: 2:30 p.m. – 3:45 p.m. Tue/Thu

INSTRUCTOR CONTACT INFORMATION

Instructor: Scott Powers

Office: Kraft 246

Email: scott.powers@rice.edu

Office Hours: calendly.com/saberpowers

REQUIRED TEXTS AND MATERIALS

Class Website: canvas.rice.edu

Required Text: All readings will be made available on Canvas.

Required Material: Bring your laptop to class every day, but please leave your laptop packed away when we are not working on coding exercises.

TOPICS

The general flow is that we will alternate between (a) discussing math/models using a whiteboard and (b) implementing these concepts in code. The course is divided into 4 units, each approximately 4 weeks:

- Unit 1: Estimating Team and Player Strength
Pythagorean Formula, Bradley-Terry Model, Plus-Minus Models
- Unit 2: Reducing Noise in Player Evaluation
Regression to the Mean, Regularized Regression, Regularized Adjusted Plus-Minus
- Unit 3: Applications of Markov Chains in Sports
Markov Chains, Win Probability, Credit Attribution, In-Game Strategy, Markov Decision Processes
- Unit 4: Practicum
Guest Speakers, Student Projects

COURSE OBJECTIVES AND LEARNING OUTCOMES

After successfully completing this course, you will be able to:

- Use R to apply theoretical statistical models to real-world sports data, and interpret the results.
- Calculate estimates of team and player strengths, adjusting for sample size and strength of schedule.
- Estimate in-game win probability models based on game state (e.g. score, possession, time remaining).
- Identify an interesting research problem in sports, solve it with data, and present your solution.

How Your Grade Is Determined

Sport analytics is a demanding and highly competitive field. This class aims to provide the tough but honest feedback that you will need to succeed in it.

		$[93\%, \infty)$	\rightarrow	A	$[90\%, 93\%)$	\rightarrow	A-		
$[87\%, 90\%)$	\rightarrow	B+		$[83\%, 87\%)$	\rightarrow	B	$[80\%, 83\%)$	\rightarrow	B-
$[77\%, 80\%)$	\rightarrow	C+		$[73\%, 77\%)$	\rightarrow	C	$[70\%, 73\%)$	\rightarrow	C-
$[67\%, 70\%)$	\rightarrow	D+		$[63\%, 67\%)$	\rightarrow	D	$[60\%, 63\%)$	\rightarrow	D-
		$[0\%, 60\%)$	\rightarrow	F					

Assignments. (40%) There are 4 individual assignments, each worth 10%. You are encouraged to help each other, but your submission must reflect work you have done yourself. Assignments will be graded anonymously, so please remove any personally identifying information from your submission. The expected completion time for each assignment is 10 hours.

Project. (40%) This is a project-based course, and the project you build in stages over the course of the semester will determine a large chunk of your grade. You are encouraged to work with a partner on the project (no more than 2 students per team), but you may work individually if you wish.

- Project #0 (0%): Registration expected hours: 1
- Project #1 (5%): Proposal expected hours: 5
- Project #2 (10%): Abstract expected hours: 10
- Project #3 (5%): Presentation expected hours: 5
- Project #4 (20%): Paper expected hours: 20

Midterm. (10%) There is a midterm exam that carries the same weight as a homework assignment.

Attendance. (10%) Showing up is a requirement for most jobs in sport analytics. In this class, you are expected to show up and engage in discussions, which are part of the learning experience. We will keep attendance and collect feedback using exit tickets at the end of each class.

Late Work. You may submit late work subject to a 10% score deduction for each late day.

Absence Policy. If you notify me of your absence before the beginning of class, you will receive an opportunity to make up your absence.

RICE HONOR CODE

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at <http://honor.rice.edu/honor-system-handbook/>. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

AI Policy. You are allowed (and even encouraged) to use AI as a tool for developing R code (attribution in this case is not necessary). Please do not use AI to generate any part of your writeups.

DISABILITY RESOURCE CENTER

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with the Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

MENTAL HEALTH POLICY

The wellbeing and mental health of students is important; if you are having trouble completing your coursework, please reach out to the Wellbeing and Counseling Center. Rice University provides cost-free mental health services through the Wellbeing and Counseling Center to help you manage personal challenges that threaten your personal or academic well-being. If you believe you are experiencing unusual amounts of stress, sadness, or anxiety, the Student Wellbeing Office or the Rice Counseling Center may be able to assist you. The Wellbeing and Counseling Center is located in the Gibbs Wellness Center and can be reached at 713-348-3311 (available 24/7).

TITLE IX RESPONSIBLE EMPLOYEE NOTIFICATION

At Rice University, unlawful discrimination in any form, including sexual misconduct, is prohibited under Rice Policy on Harassment and Sexual Harassment (Policy 830) and the Student Code of Conduct.

Please be aware that all employees of Rice University are “mandatory reporters”, which means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I must share that information with the Title IX Coordinator.

Although I have to make that notification, you will control how your case will be handled, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

To report sexual harassment, please contact the Title IX Coordinator at titleix@rice.edu. To explore supportive measures and other resources that are available to you, please visit the Office of Interpersonal Misconduct Prevention and Support at safe.rice.edu.

CONSENT FOR IRB PROTOCOL FY2024-47

This semester your instructor is participating in a study looking at teaching and learning. The purpose of this study is to determine the impact of the Center for Teaching Excellence's Instructor Network to Support Teaching Innovation and eLevate Learning (INSTILL) program. As part of that evaluation, your instructor will share data from this course with the CTE; no personally identifiable student information will be saved. Your participation in this study will last for the duration of the current semester and will entail activities no different from the regular activities you would otherwise engage in as part of the course. If you would like more information, please do not hesitate to ask. If you would like to opt out of the study, please talk to your instructor as soon as possible.

This syllabus is only a guide for the course and is subject to change with advance notice.