

Course Description

Prerequisites: MATH 1342 and MATH 1343. This course introduces statistical and computational concepts, techniques, tools and applications to analyze and interpret sports-related data from a managerial business perspective. Students will acquire technical and managerial skills in gathering, analyzing, making predictions on and visualizing diverse sports datasets. (The weekly workload may span 9 to 12 hours approximately and depends on individual students' background.)

Course Modality

Online Asynchronous Mode (15-week schedule)

Instructor Information

Dr. Wingyan Chung (wchung@uttyler.edu, office: COB 315.09)
Professor, Computer Science Dept.

Office Hours

Tuesday and Thursday 3:00 - 4:00 pm and by appointment in COB 315.09

Emails will normally be answered within 2 business days; emails received during Friday–Sunday will be answered by the following Tuesday.

Textbook Information

The following textbooks are required throughout the semester and are available from the university bookstore and the website linked below.

- S = T. Severini "Analytic Methods in Sports, 2ed.," C. & H. (2020). <http://www.taseverini.com>.
- W = W. Wayne, S. Nestler, K. Pelechrinis "Mathletics: How Gamblers, Managers, and Fans Use Mathematics in Sports, 2ed.," Princeton University Press (2022), <https://mathleticsbook.com>.

Course Objectives

Upon successful completion of this course, students should be able to:

- Understand and explain statistical concepts, methods, and applications on sports data analysis,
- Apply a wide range of methods for sports data acquisition, representation, and reporting,
- Use computer software to perform sports data analysis and support decision making, and
- Build sports analytics models and apply them to solving organizational problems.

Computer Account Access

Students will need a Patriot account and password for computer access. This information can be found at <https://www.uttyler.edu/technology-support/patriots-account/>

Course Materials

This class will use Canvas for course documents, slides, submission of assessment items, assignments, online discussions, quizzes and other class-related materials. Students should check the Canvas site frequently during the semester to keep up to date about course activities. Submissions are due by 11:59:00 pm on the due date (except otherwise stated). Students should submit their work early to avoid last-minute hassles. Email submission is NOT accepted.



Course Grading

Assessment of student performance will be based on the following:

Assignments (4 @ 7 points each)	28
Quizzes (8 @ 3 points each)	24
Class Participation (4 posts @ 2 points each)	8
Individual Project	15
Final Exam	25
<hr/> Total Points	<hr/> 100

Grading Scale

- A = 90.0 points or more
- B = 80.0 to less than 90.0 points
- C = 70.0 to less than 80.0 points
- D = 60.0 to less than 70.0 points
- F = Less than 60.0 points

Course Policies

1. Assignments (A) – Assignments will be periodically given with specific deadlines. Students will practice the skills learned about the course topics. Late submission (within 3 days after due date) will incur a 30% deduction in total score. Submission is closed afterward.
2. Quizzes (Q) – Individual timed quizzes (proctored by ProctorU) will be given periodically. Each quiz will be open for a one-week period and must be submitted by its deadline (and will be closed afterward). Missed quizzes cannot be made up without acceptable emergency-related documentation (sent to the instructor before the quiz or within 1 day after the quiz deadline). No pause is allowed in each quiz.
3. Class Participation (C) – Class Participation points will be scored by the quantity of quality discussion posts a student contributes regarding relevant sports-analytics articles. Each post is due on the specified due date of its submission period, after which the submission is closed. No late submission is allowed.
4. Individual Project (P) – An individual project will focus on building a real-world sports analytics solution and documenting the outcomes systematically. Students must meet the milestone deadlines (for draft proposal (P1), formal proposal (P2), final submission (P3)) throughout the course. More details will be provided.
5. Final Exam (E) – Individual comprehensive online final exam (proctored by ProctorU) is scheduled to be done within a 24-hour window. Details of the exam arrangement will be provided.
6. Make-up or Extension for Missed Submissions – Make-up or extension for missed submissions are available ONLY for valid reasons pre-approved by the [Office of Student Accessibility and Resources](#) or for serious sickness / emergencies (with doctor's notices / proper documentations submitted prior to or in the same week of the deliverable). To be considered for make-up or a short extension (normally within 1 week after submission is closed), students must email official documentations to the instructor before the due date of the assessment items.

Course Schedule

Week	Start Date	Topic	Materials	Items Due (Day)
1	8/21	Course Introduction; Describing sports data	Syllabus; S-Chs. 1-2	
2	8/28	Summarizing sports data; Using Microsoft Excel	S-Ch. 2	C1 (Sat.)
3	9/4	Probability: How does uncertainty play in sports?	S-Ch. 3	Q1 (Sat.)
4	9/11	Baseball – metrics, pythagorean theorem, linear weights, Monte Carlo simulation, expected value, streakiness	M-Chs. 1-12	A1 (Fri.)
5	9/18	Basketball – linear weights, +/- ratings, lineups, matchups, simulation	M-Chs. 28-32	Q2 (Sat.), C2 (Sat.)
6	9/25	Statistical Methods: How are players compared?	S-Ch. 4	A2 (Fri.); Q3 (Sat.)
7	10/2	Project Work Week	TBD	P1 (Fri.)
8	10/9	Correlation: How do players' performance relate to other factors?	S-Ch. 5	Q4 (Sat.), C3 (Sat.)
9	10/16	Linear Regression: How to predict players' performance accurately?	S-Ch. 6	A3 (Fri.); Q5 (Sat.)
10	10/23	Multivariate Regression: How to use more variables to predict players' performance?	S-Ch. 7	Q6 (Sat.), P2 (Fri.)
11	10/30	Football – metrics, state & value analysis and decision making	M-Chs. 20-21, 23-24	A4 (Fri.); Q7 (Sat.)
12	11/6	Analytics for soccer, hockey, volleyball, and e-sports	M-Chs. 39-43	Q8 (Sat.)
13	11/13	Advanced Models: How to model complex sports events accurately?	S-Ch. 8	C4 (Sat.)
14	11/20	Emerging Trends in Sports Data Analytics	TBD	P3 (Fri.); C8 (Sat.)
15	11/27	Final Exam (on 11/30)	-	E (Thu.)

Remarks

A – Assignment

Q – Quiz

P – Individual Project

C – Class Participation

E – Final Exam TBD – To be assigned

Academic Integrity

Academic dishonesty is strictly prohibited and is a violation of the university rules. Any form of dishonesty, such as (but not limited to) plagiarism, cheating, collusion, and copyright infringement, is strictly prohibited and will be punished according to university rules.